IMPACT OF NURSE INITIATED HIV INTERVENTIONAL PACKAGE (HIP) ON HIV INFECTED ADOLESCENTS ATTENDING ART CLINIC: A RANDOMIZED CONTROLLED TRIAL

THESIS

Submitted to

THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY

CHENNAI-32

for the award of the degree of

DOCTOR OF PHILOSOPHY
IN
NURSING

By

Mrs. S.RAJATHI. M.Sc (Nursing)
Reg. No. 141420016

Under the guidance of

Prof. Dr. N. USMAN M.D., D.V., Ph.D.
Emeritus Professor / Research Guide
The Tamilnadu Dr. M.G.R. Medical University
Chennai-32

JANUARY - 2017

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JANUARY - 2017

CERTIFICATE

This is to certify that the thesis entitled as **"Impact of Nurse Initiated HIV Interventional Package (HIP) on HIV Infected Adolescents Attending ART Clinic: A Randomized Controlled Trial"** submitted by **Mrs.S.RAJATHI** for the award of the Degree of Doctor of philosophy in Nursing, is an original research work done by her during the period of study, under my supervision and guidance and it has not formed the basis for the award of any other Degree, Diploma, Associate ship, Fellowship or other similar title in any other University. I certify that, this thesis is her original independent work. I recommend that this thesis should be placed before the examiners for their consideration for the award of Ph.D Degree in Nursing.

Place :

Date :

Research guide

DECLARATION

I hereby declare that this thesis entitled as, **"Impact of Nurse Initiated HIV Interventional Package (HIP) on HIV Infected Adolescents Attending ART Clinic: A Randomized Controlled Trial"** submitted by me for the degree of Doctor of Philosophy in Nursing is the record of original research work carried out by me during the period from Jan 2014 to Dec 2016 under the guidance of **Prof. Dr. N.USMAN. M.D., D.V., Ph.D** and has not formed the thesis for the award of any Degree, Diploma, Associate ship , Fellowship in this university and any other University or institution for higher learning.

Place :

Date :

Research Scholar

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LIST OF ABBREVIATIONS

ACTG	AIDS Clinical Trial Group
AIDS	Acquired Immuno Deficiency Syndrome
AOR	Adjusted Odds ratio
ART	Anti Retroviral Therapy
cART	Continuous Antiretroviral therapy
ARV	Anti Retro Viral
ALHIV	Adolescents Living with HIV/AIDS
ANOVA	Analysis Of Variance
BIAs	Behaviorally Infected Adolescents
BCC	Behavior Change Communication
BMI	Body Mass Index
BMM	Biological Markers Monitoring
CABA	Children Affected By AIDS
CD4	Cells of Differentiation 4
CDC	Centre of Disease Control
CI	Confidence Interval
CLHIV	Children Living with HIV/AIDS
COE	Centre of Excellence
DSACS	Delhi State AIDS Control Society
EMD	Electronic Monitoring Device
FANTA	Food and Nutrition Technical Assistance Project.
GHTM	Government Hospital of Thoracic Medicine
HAART	Highly Active Anti-Retroviral Therapy
HIP	HIV Interventional Package
HIV	Human Immuno Deficiency Virus

HRG	High Risk Group
HRQOL	Health Related Quality Of Life
HSRC	Human Science Research Council
ICH	Institute of Child Health and Hospital for Children
IEC	Information ,Education and Communication
KMCH	Kilpauk Medical College and Hospital
LMIC	Low and Middle Income Countries
LTFU	Loss to Follow-up
MBSR	Mindfulness Based Stress Reduction
MUAC	Mid Upper Arm Circumference
NACO	National AIDS Control Organization
NACP	National AIDS Control Program
NCHS	National Centre of Health statistics
NGOs	Non- Governmental Organizations
NRTIs	Nucleoside Reverse Transcriptase Inhibitors
NNRTIs	Non-Nucleoside Reverse Transcriptase Inhibitors
No.	Numbers
OIs	Opportunistic Infections
OR	Odds Ratio
OVC	Orphan and Vulnerable children
ACTG	AIDS Clinical Trial Group
PCOE	Pediatric Centre of Excellence
PIAs	Perinatally Infected Adolescents
PIs	Protease Inhibitors
PLHIV	People Living with HIV
PLHA	People Living with HIV/AIDS

PMTCT	Prevention of Mother to Child Transmission
PPTCT	Prevention of Parent to Child Transmission
QOL	Quality of Life
RCT	Randomized Controlled Trial
RCQHC	Regional Centre for Quality of Health Care
REE	Resting Energy Expenditure
REACH	Reaching Excellence in Adolescent Care and Health Study
RGGGH	Rajiv Gandhi Government General Hospital
ROS	Reactive Oxygen Spices
RTI	Road Traffic Injuries
S.D	Standard Deviation
SMS	Social Marketing System, Smart Message Services
SPSS	Statistical Package for the Social Sciences
STI	Sexually Transmitted Infections
TANSACS	Tamil Nadu State AIDS Control Society
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations International Children's Emergency Fund
UOR	Unadjusted Odds Ratio
WHO	World Health Organization

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ABSTRACT

INTRODUCTION

As the global HIV epidemic enters its fourth decade, significant advances have been made in HIV prevention and treatment in the developing world. But, still notable challenge involves in the increased proportion of HIV infected children who live through school age and into adolescence especially prenatally infected adolescents due to lifelong commitment to the life-saving drug therapies. However, the Adolescents Living with HIVs (ALHIV) are facing many challenges for optimal adherence to ART, nutritional status and QOL when compared to the children and adults owing to parental death, dependency on caregivers/parents, need of autonomy, breaking of parental bonding, attitudes of defiance/ denial, and disclosure status.

Since, the adolescents are fulcrum of key population they are facing many barriers to continue the optimal adherence to ART. Subsequently it causes poor adherence makes to lower immunity level, reduce nutrition intake and decrease QOL of HIV infected adolescents. Still many research findings stated that, the interventional strategies help the adolescents to get better adherence improvement. Hence, the investigator planned to evaluate effectiveness of HIV Interventional Package (HIP) on HIV infected adolescents attending ART clinic: A Randomized Controlled Trial. The HIP includes adherence counseling, nutritional counseling and strategies to enhance the QOL includes selected asana and maintenance of the diary after the practice of asana and intake of drugs. The **Objectives of the present study** are listed below,

1. To assess the base level of ART adherence, nutritional status and QOL on HIV infected adolescents in experimental and control group (pretest).
2. To evaluate the 3rd and 6th month level of ART adherence, nutritional status and QOL on HIV infected adolescents in experimental and control group (post test).
3. To compare and determine the effectiveness of HIV Interventional Package (HIP) on HIV infected adolescents in experimental and control group

4. To correlate ART adherence level with nutritional status and QOL on HIV Infected adolescents in experimental and control group.
5. To associate the gain score findings of HIV Interventional package on HIV infected adolescents in experimental and control group with demographic variables of HIV infected adolescents/caregivers.

MATERIALS AND METHODS

The total of 388 HIV infected adolescents was divided in to experimental (195) and control group (193) by simple random technique. The data were collected from HIV infected adolescents/caregivers from four main ART centres through Modified Adherence Assessment Questionnaire, Nutritional assessment questionnaire includes anthropometric variables and Modified QOL questionnaires. The investigator adopted the King's goal attainment theory and it was more suitable to interpret the study findings phenomenon in the conceptual frame work. The HIV interventional package (HIP) was given to the experimental group alone and the selected asana were demonstrated by the researcher. But the conservative care was given to control group. At the end of the 6^{th} month the cursory instructions regarding HIP and practice of asana were also given to the control group. Simultaneously the data were collected from both groups at '0'month, 3^{rd} month and 6^{th} month intervals. The collected data were analyzed by using of both descriptive and inferential statistics.

RESULTS AND ANALYSIS

Based on objectives the study results are listed below,

Regarding level of ART adherence and CD4 count

- However there are various methods was used in this study for to assess the ART adherence level, since the pill count was highly correlated with missed dose history in both groups. In the experimental and control group, the mean ART adherence score in pretest was 85.36 and 85.60 whereas in post test score was 98.74 and 90.54 respectively. The mean difference in ART gain score with 95% confidence interval was 13.4% in experimental 4.9% in control group.

- Regarding CD4 count, the baseline mean score was 664.86 in experimental group and 669.72 in control group. Whereas in the 6^{th} month assessment of mean score was 840.30 and 703.35 respectively. The paired t-test value of 7.21 was

significant at p=0.001*** in experimental group. It revealed that there was significant changes in level of CD4 count in experimental group.

- These findings showed that the motivational counseling and interventional diary has effectiveness to increase the adherence to ART among HIV infected adolescents in experimental group than the control group. The gain score differences of 8.5% showed the effectiveness of HIP in the improvement of adherence level in experimental group of HIV infected adolescents.

Regarding Nutritional status

- The repeated measures of ANOVA 'F' test showed the statistically significant improvement in all the anthropometric variables except height at p=0.001***. It revealed that, except height there was a marked improvement in all other nutritional variables of HIV infected adolescents. But in the Bonferroni t–test, all the variables had significance from baseline to the 6^{th} month evaluation at p<0.01** and the 3^{rd} to 6^{th} month evaluation also had significance at P <0.05* but except the variable of height. Whereas in control group all nutritional variables of HIV infected adolescents had no significance in ANOVA F-test and Bonferroni t–test.

- Regarding the interpretation of 'Z' score on HIV infected adolescents in experimental group, 7% had severely malnourished and 22% moderately malnourished in baseline assessment whereas in the 6^{th} month evaluation it reduced to 1% and 18 % respectively. The chi square value of 9.48 was significant at p=0.05*.However in control group there was no significant improvement from baseline to the 6^{th} month evaluation. The chi square value of 0.10 was not significant at p=0.99.

- In consideration with nutritional gain score in experimental group, the baseline assessment showed that, 28% of participants had mal nourished whereas the in 6^{th} month evaluation it reduced to 19%. However in control group, the baseline assessment showed that, 29% of participants had malnourished whereas in the 6^{th}month evaluation it reduced to 28 %. It showed that the experimental group has gained more score i.e., 9.3% when compare to the control group (1.5%).

- These findings revealed that the reinforcement of nutritional counseling including antioxidants rich diets has effectiveness to increase the nutritional level of HIV infected adolescents in experimental group than the control group. The gain

score difference of 7.8% proved the effectiveness of HIP in the improvement in the nutritional status in experimental group of HIV infected adolescents.

- Regarding clinical signs and symptoms the dry skin, skin rashes, oral problems, nausea vomiting, diarrhea and loss of appetite were reduced from baseline to 6th month evaluation in experimental group and it was significant at p=0.01**.But in regard to seborric dermatitis, texture and color of hair no marked improvement in study period. Whereas in the control group there was no significant changes seen in HIV infected adolescents.

Regarding Quality of life

- In regard to QOL interpretation score on HIV infected adolescents in experimental group 81% had poor QOL, none of them had good QOL in baseline assessment whereas at 6th month evaluation it reduced to 23% and 14% respectively. The chi square value of 174.19 was significant at p=0.001***. However in control group there was no significant improvement from baseline to the 6th month evaluation. The chi square value of 0.10 was not significant at p=0.99.

- Considering with the mean QOL score in baseline assessment was 163.66 and 162.93 whereas in the 6th month score 215.64 and 166.02 respectively in both groups. The mean difference in QOL gain score with 95% confidence interval was 15.1% in experimental 0.9% in control group. It revealed that there was marked improvement in QOL of HIV infected adolescents in experimental group than the control group.

- These finding depicted that, the strategies to enhance of QOL counseling and yoga has effectiveness to increase the QOL of HIV infected adolescents in experimental group than the control group. The gain score difference of 14.2 % showed the effectiveness of HIP in the improvement of QOL of HIV infected adolescents in experimental group.

Regarding Correlation of ART adherence with Nutritional status and QOL,

- In regard to correlation of ART adherence and nutritional status in experimental group the baseline assessment showed that poor correlation between ART and nutritional score. But in, 3rd and 6th month evaluation there was fair and moderate correlation between ART adherence and nutritional score since r=0.31, 0.42

was significant at p=0.01**. Whereas in the control group, throughout the assessment period showed that, there was a poor correlation between ART adherence and nutritional score because of 'r' value was lesser than 0.2.

- In relevant to correlation of ART adherence and QOL score, the experimental group baseline assessment showed poor correlation between ART and QOL score. But in, 3rd and 6th month evaluation there was fair and moderate correlation between ART adherence and QOL score since r=0.31, 0.43 was significant at p=0.05** .Whereas in the control group, throughout the assessment period showed that there was a poor correlation between ART and QOL score because of 'r' value was lesser than 0.2.

Regarding Association of ART Adherence, Nutritional status and QOL,

- Regarding association with ART adherence gain score with demographic variables, in Univariate analysis showed the influencing factors of adolescents age & sex, age & sex of caregivers, relationship with adolescents and residence were significant with unadjusted OR with 95 % CI. Whereas in multivariate analysis, the sex of caregivers and residence were not significant at p= 0.60 and 0.18 with adjusted OR 1.3 & 1.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI.

- Considering association with nutritional gain score with demographic variables, in Univariate analysis showed the influencing factors of adolescents age & education, age & sex of caregivers, relationship with adolescents and residence were significant with unadjusted OR with 95 % CI. But in multivariate analysis, the sex of caregivers and residence were not significant at p=0.14 and 0.33 with adjusted OR 1.5 & 0.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI.

- In regard to association of QOL gain score with demographic variables, in Univariate analysis showed the influencing factors of adolescents age & sex, age & sex of caregivers, relationship with adolescent and residence were significant with unadjusted OR with 95 % CI. Where in multivariate analysis, the sex of caregivers and residence were not significant at p= 0.60 and 0.14 with adjusted OR 1.3 & 1.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI.

CONCLUSION

The study reports revealed that, in the experimental group pretest mean score was 85.36 in adherence and 163.66 in QOL. But in the 6th month evaluation, it was increased to 98.74 and 215.64 respectively. In corresponding to the improvement of HIP components, the mean difference score with 95 % confidence interval was 13.38 & 51.97 and percentage of gain score was 13.4% in adherence and 15.1% in QOL. But in the control group, there was no significant change in mean difference score and the percentage of gain score increased to 4.9% in adherence and 0.9% in QOL. In regard to nutritional status, the both groups baseline assessment showed 28% and 29% of HIV infected adolescents had malnourished. But in the 6th month evaluation, It reduced to 19% and 28% respectively. In percentage wise nutritional gain score was increased to 9.3 % in experimental and 1.5% in control group.

This study finding suggests that adolescent focused interventions including behavior modifications are essential to improve the CD4 count, adherence rate, nutritional status and enhance quality of life. The global targets of zero infections, zero discrimination and zero deaths in the adolescent population for HIV is within our reach but adolescents centered interventions are needed as in tailored approach in order to improve the overall wellbeing of adolescents. This study finding revealed that the motivational counseling with interventional aids of diary and yoga practice makes the adolescents to build a chance for a safe, happy, healthy and productive nation in the future.

Chapter - I

Introduction

CHAPTER I

INTRODUCTION

I am fourteen and frail
But uncorrupt and fragrant
Full of dreams and desires
And, the' 'will to do' like fires
Listen to me, give me some space
Protect my grace, brighten my face
For I am your future, - I am
Innocence, I am Adolescence.

R K Baxi

The word "Adolescence' is coined from the Latin word 'adolescere' literally means, "to grow up", "to emerge" or "to attain identity". It's sighted as a midway period between the childhood to adulthood and our enlightening purpose is the preparation of the children for the adult roles. It is a period of manifold transitions involving physical, psychological, social, economic, education, training, employment and unemployment, from one living circumstance to another.[1] At the global level, WHO (2012) and UNICEF (2005) defines 'adolescence' as age straddling of 10 to 19 years, "youth" as those in 15-24 years and these two overlapping age group of 10-24 years covering as "young people". According to developmental characteristic, the adolescence stage is further divided into early (11-14 years), middle (15-17 years) and late adolescence (18-21 years).[2]

In India, the Ministry of Health and Family Welfare has recognized the WHO definition, but in other contentious view as per Child Rights Law and UNAIDS, up to 18 years of age group to be considered as children.[3] In many countries of the region, the Human Immuno Deficiency Virus (HIV) information is not widely available for adolescents (10-19 years) or young people (10-24 years) as evidenced by global reports. Where data are accessible for young people, principally in the context of HIV, they are recurrently not disaggregated by age cohort, primarily an early adolescent between the ages of 10 to14 years.[4]

Adolescence next to second part of infant period, where the myriad changes of physical, physiological, psychological, neurobehavioral and hormonal changes take place with varying patterns of social relations and interactions. These innumerable changes in puberty makes to augment in height and weight, completion of skeletal

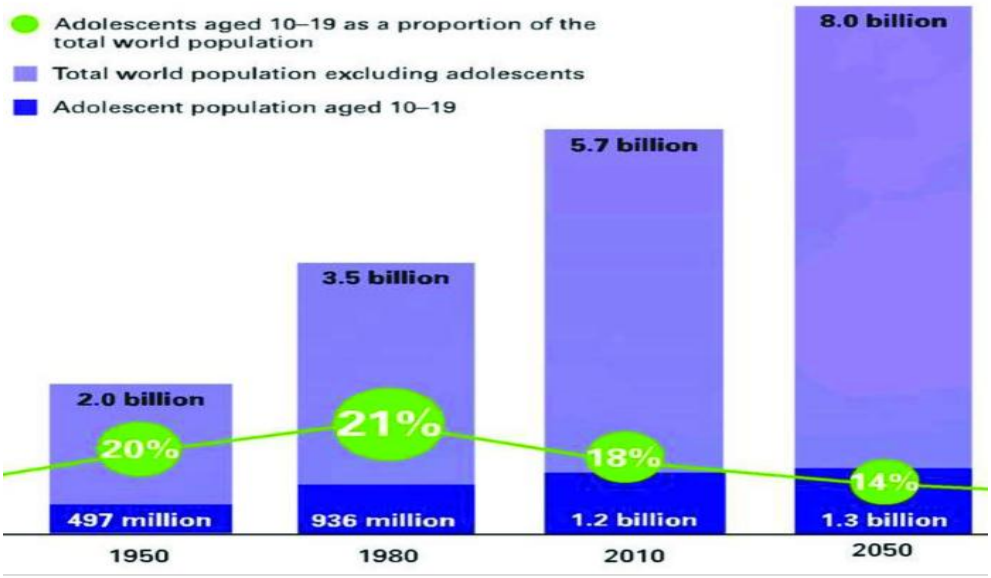
growth together which enhance in skeletal mass, sexual maturation and changes in body composition. The progression of these events during puberty is mainly reliable on the adolescence but often prejudiced by the age of onset, gender, duration, along with the individual variations.[5]

This period is a window of opportunity that makes the stage for a healthy and productive adulthood and in notorious view prone to a number of health impacting conditions owing to personal choices, environmental influences and lifestyle changes compile of substance use disorders (tobacco, smoking, alcohol and others), Road Traffic Injuries (RTIs), suicides(completed and attempted),violence, teen and unintentional pregnancies and Sexually Transmitted Infections (STI) including Human Immunodeficiency Virus (HIV) infection.[5,6]

The epidemic and non curable disease of HIV/AIDS affect the "Fulcrum" of population on adolescents in two ways: i.e., Perinatally Infected Adolescents (PIA) through vertical transmission of mother to child and Behaviorally Infected Adolescents (BIA) usually through the sexual transmission. It is also essential to remind that, adolescents can be active as a transitional phase progress to adulthood in which sexual experimentation and drug use are instigated, thus growing the risk to invite and as well as to transmit HIV in second decade.[7] Worldwide, the majority of 95% of new HIV infections were disproportionately noticed in adolescents (10-19 years) and mainly in Asia and the Pacific were accounted to take place in key population group such as adolescent males who have sex with males, adolescents who sell sex, and adolescents who inject drugs with contaminated injecting equipment face additional challenges to HIV treatment, care and support.[8]

Globally UNAIDS (2012) estimated that 2.2 million (2.0- 2.5 million) adolescents between 15 to 19 years were HIV-positive, and most of them were not aware of their status. The break down data was 870,000 (770,000−960,000) adolescent boys and 1.3 million (1.2−1.5 million) adolescent girls. Among these, the majority (75%) of adolescents with HIV were infected through perinatal transmission. In 2013, more than 1.2 billion of adolescents were in worldwide: this signifies that approximately one in every six persons is an adolescent. The figure 1 showed the world population with proportion of adolescents.[9]

Fig 1: World population with proportion of adolescents (10-19 years)



Source: Progress for children, A report card on adolescents, UNICEF

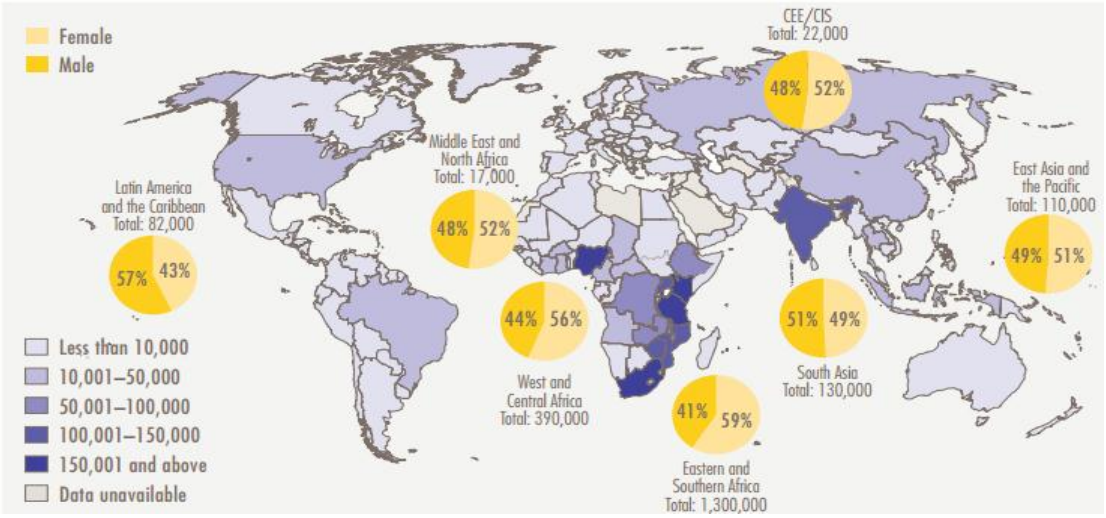
The percentage of adolescents in the universal population was sharp around 1980 and is now on the decline almost everywhere, but a tendency will increase slightly through 2050. Still the growth of adolescents predicted to be 1.3 billion in 2050 the need of attention to the area is to be prioritized. About 21% of Indian population in adolescents (approximately 243 million) followed by 207 million in China , 44 million in United States, 41 million in both Indonesia and Pakistan in which adolescents are newly infected with HIV for every two minutes especially in the age of 15 to19 years.[10]

The Human Sciences Research Council (HSRC-2012) survey estimated the age of 10 years, 6.2% of children born to HIV-positive women will be HIV-positive as a result of perinatal infection and breastfeeding. The recent survey of overall HIV prevalence in young people 15–19 years was 3.2%, i.e., 0.7% for males and 5.6% for females; this imitates an 8 times higher prevalence in females compared to males. Further, the incidence rate of HIV in the 15-24 years age group was four times higher in females than male caused by horizontal transmission.[11]

The figure 2 shows, the world currently holds the largest generation of young people in history, with 2.1 million (1.7 -2.8 million) adolescents and youth making up one fourth of the world's population. Among this, females were 1.2 million; males 930,000 and also estimated that, 7, 80,000 youth were newly infected with HIV. Even

in Low and Middle Income Countries (LMIC) of Africa, Asia, Caribbean and the Latin America accounts for 97% of the new infections .The East Asia and the pacific have the percentage of male and female of 49 % and 51% respectively and whereas in South Asia is reversible. The six countries of South Africa, Nigeria, Kenya, India, Mozambique and Tanzania had accounted for 26 new infections among late adolescents for every hour.[12]

Fig 2: The Estimated Number of HIV Infected Adolescents in Worldwide-2012



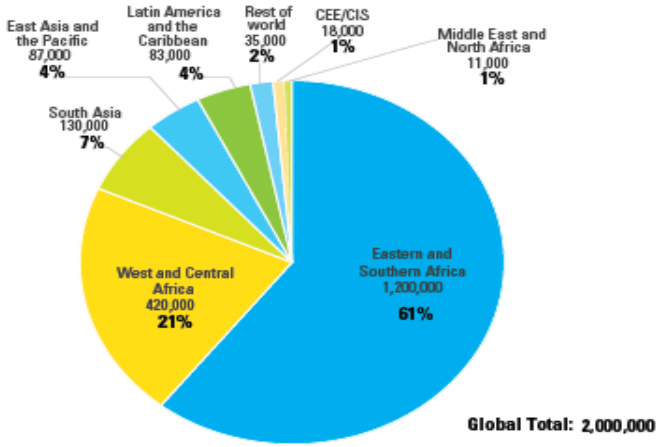
Source: UNAIDS sixth stock taking report - Towards AIDS free generation-2013

In 2013, as per UNAIDS reported that globally below 15 years were 3.4 million and between 10 to 19 years were 2 million adolescents living with HIV. Among these, the mainstream of HIV positive adolescents i.e., 1.8 million an account of 85% was resided in Sub-Saharan Africa. In this region, the AIDS-related mortality among 10–19 years was more than doubled during the period of 2005 to 2012, but in contrast the overall level was decreased in all other age categories.[13] AIDS among adolescents is not under control and the new HIV infections among adolescents are also not declining, evolution is also bumpy across various regions. For example, since 2005 the number of new HIV infections have been noted moderately stable in Asia and the Pacific, while it has dwindled in Southern and Eastern Africa although now it remains unacceptably high.[14]

Globally, UNAIDS (2014) breakup reports estimated for the entire region includes, the total adolescents (10-19 years) living with HIV were 2 million: it was represented in figure 3. The Southern and Eastern Africa and Central & West Africa had maximum of 61% and 21% respectively**.** Next the Asia and pacific had around

11% of the total population. The rest of the world was minimal of 4% to 1% including Latin America & the Caribbean and Middle East and North America.[15]

Fig 3: The Anticipated Percentage of Adolescents Living with HIV in 2014



Source: HIV and AIDS Estimates, UNAIDS - July 2015.

Globally; there has been 32% declined in the estimated number of new HIV infections among young people (15-24 yrs) and the table 1 illustrates the data from 2001 to 2012. Across Sub-Saharan Africa and the Caribbean, countries have achieved notable decline in incidence rate of 36 % and 55% respectively. In contrast, in the Middle East &North Africa and East Asia, there was an estimated that 50% and 24 % raise in the number of new HIV infections among adolescents. Moreover, there is also a gender divide as young women aged 15 to 24 years were 50% more possible to acquire HIV than their male peers.

Table 1: The Trend of New HIV Infections Among Young people in the Year of 2001-12

Region	Number of new HIV infections (2001)	Number of new HIV infections (2012)	Decline/Increase in new HIV infections (%)
Caribbean	8 300	3 700	55% decline
East Asia	21 000	2 6000	24% increase
Easter Europe Central Asia	33 000	20 000	38% decline
Latin America	36 000	31 000	15% decline
Middle East and North Africa	7 700	12 000	50% increase
Oceania	1 200	<1000	53% decline
South and South East Asia	150 000	110 000	28% decline
Sub-Saharan Africa	800 000	560 000	36% decline

Number of Adolescents and Youth Living with HIV and AIDS Related Mortality

As per UNAIDS (2012) reported that, an estimated 5.4 million young people (10-24 years) were living with HIV. There were around 900 000 adolescents aged 10-14 years were living with HIV, among this majority were acquired through vertical transmission. Unfortunately, many young people aged 10-14 years were remaining unaware of their HIV status. The other age groups of 15-24 years were respectively reduced from 2001 in 1.3million to whereas in 2012, 1.2 million in the age of 15 to 19 years depicted in table 2.

Table 2: The Trend of Adolescents and Youth Living with HIV in the year of 2001-2012

Age	Number of adolescents and youth living with HIV (2001)	Number of adolescents and youth living with HIV (2012)
10-14	250 000	900 000
15-19	1 300 000	1 200 000
20-24	4 400 000	3 300 000
Total (10-24)	**6 000 000**	**5 400 0000**

Whereas the AIDS related deaths were increased among the same age groups are shown in table 3.The adolescents aged 10-14 and 15-19 years were died 21,000 and 17,000 in 2001 but it was increased triple in amount of 61,000 and 46,000 respectively in 2012. The total number of AIDS related death among adolescents and young people were 1, 10,000 in 2001 where as it had increased to1, 54,000 in 2012.[16]

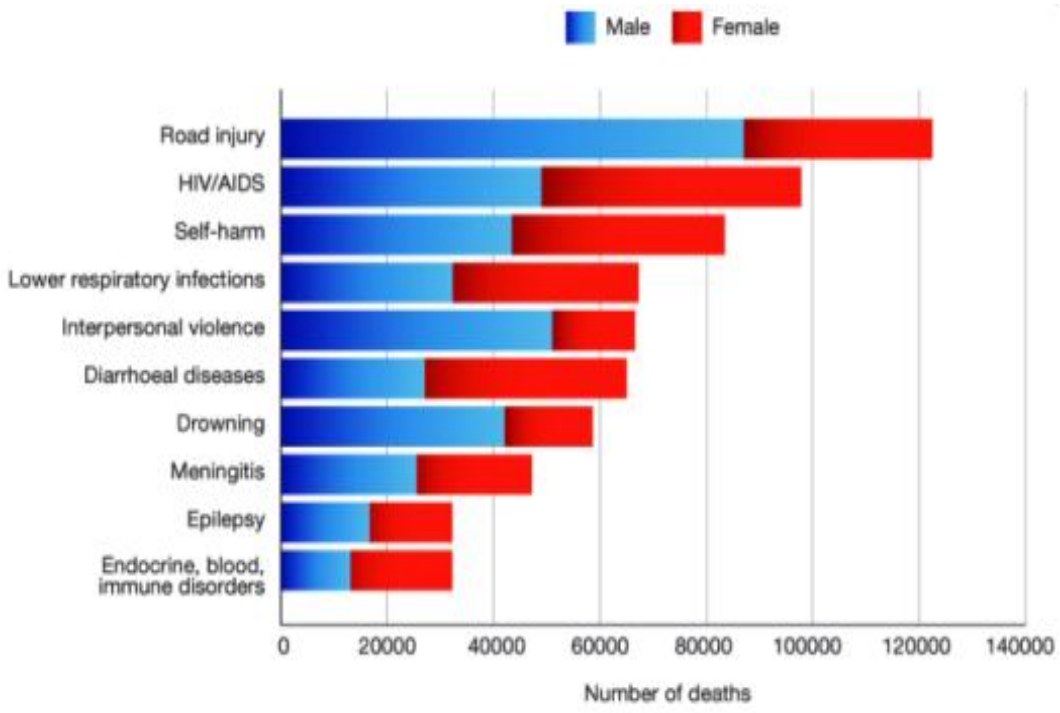
Table 3: AIDS-Related Mortality among Adolescents and Youth living with HIV (2001-12)

Age	Number of AIDS-related deaths (2001)	Number of AIDS-related deaths (2012)
10-14	21 000	61 000
15-19	17 000	46 000
20-24	73 000	48 000
Total (10-24)	**110 000**	**154 000**

As per WHO report (2013), around 1.3 million adolescents pass away from treatable or preventable reasons and mortality is soaring in boys than in girls and also in late adolescents than the early adolescents. The UNAIDS also estimated that, growing pattern were seen in AIDS-related mortality i.e., 6 % of total AIDS-related mortality among young people (15-24 years). It's mainly of inadequate prioritization of adolescents in national plans for scale-up of HIV testing and management services still the total number of young people living with HIV is mounting. The AIDS-related mortality among adolescents have tripled since 2000 at the same time as declining among all other age groups, which can be principally, attributed to PIAs without access to the life-saving intervention.[16,17]

In 2014, the "Health for the world's adolescents" report of WHO revealed that depression was the major reason of illness and disability for both boys and girls aged 10 to 19 years. Globally, the top three causes of adolescent deaths were road traffic injuries, HIV/AIDS, and suicide. The HIV/ AIDS is a number two cause for the death of the adolescents as shown in figure 4 and also number one cause for the adolescent death in South Africa.[18]

Fig 4: The Top 10 Causes of Death Among Adolescents In World Wide

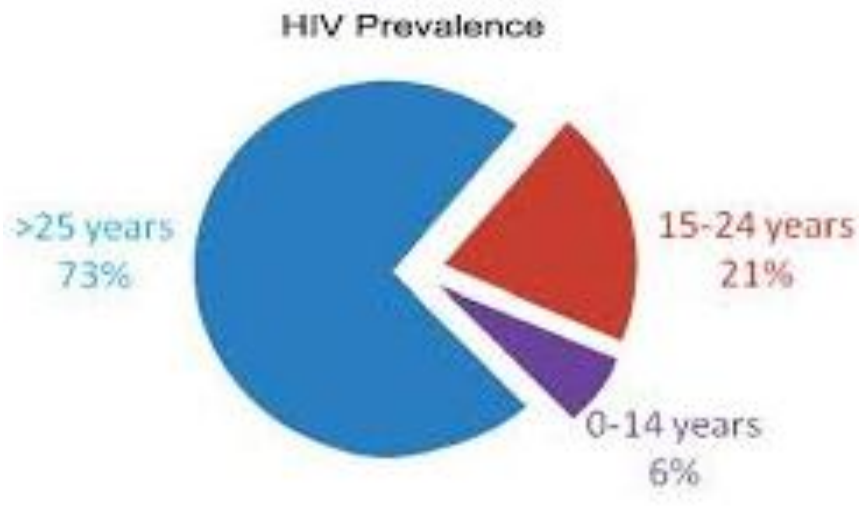


Source: Health for world's adolescents-WHO- 2014

The primary countries with elevated HIV prevalence in sub-Saharan Africa, greatly affected by HIV were young women and adolescent girls i.e., 7 in 10 new infections are 15-19 year girls. In worldwide, there were more than 6,300 new HIV infections per day was crop up in 2012 among this around 2500 of new cases were adolescents and youth ages of 15–24 years. While approximately, every day 712 new cases of HIV were diagnosed less than 15 years of age due to vertical transmission, a little percentage were the result of horizontal transmission, includes sexual transmission through sexual abuse or coercion, or early sex.[18, 19]

In certain countries like Asia, the accessible partial facts suggested that above 60 % of young key populations (15-19 years) instigate sexual activity earlier in their life. The most regions of the world, the exposure of HIV testing and counseling was very poor in adolescents moreover principally in key population.[6,19] The figure 5 shows the age wise global HIV prevalence reveals that, nearly 21% of HIV infections were spread in the age of 15-24 years. The statistics from 2008 to 2012 reported that, the access and coverage level was fluctuate drastically even in all countries, but the primary country signified that the adolescents girls (15–19 years) less than 5:1 were not known of their disclosure status.[20]

Fig 5: Age Wise Global HIV prevalence

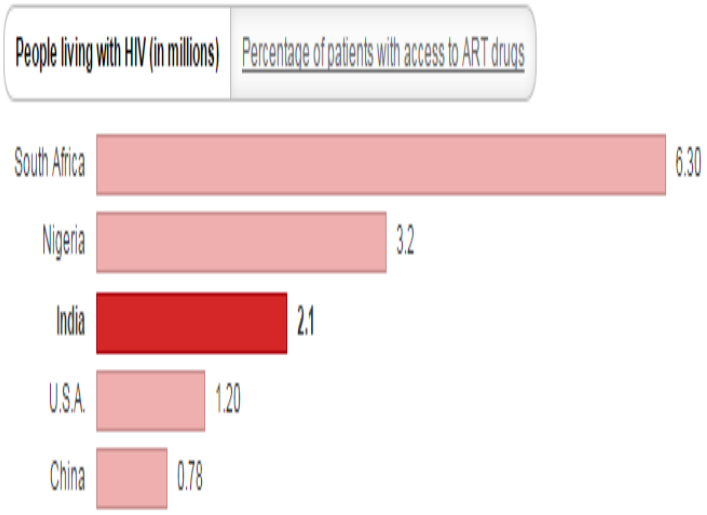


Source: Naswa and Marfatia – Adolescent HIV/AIDS-2010

As per UNAIDS report (2014), after South Africa and Nigeria the third highest number of 2.1 million PLHIV is India as shown in figure 6.[21] India is debatably a abode for leading number of Orphans and Vulnerable Children (OVC)

living with HIV. It is anticipated that 13% of them acquire HIV infection through sexual contact and 20-30% of female sex workers in the country are less than 18 years. In India, there are 25 million orphans from all causes of which around 2 million may be endorsed to HIV/AIDS. [22]

Fig 6: The Estimated Population of People Living With HIV.



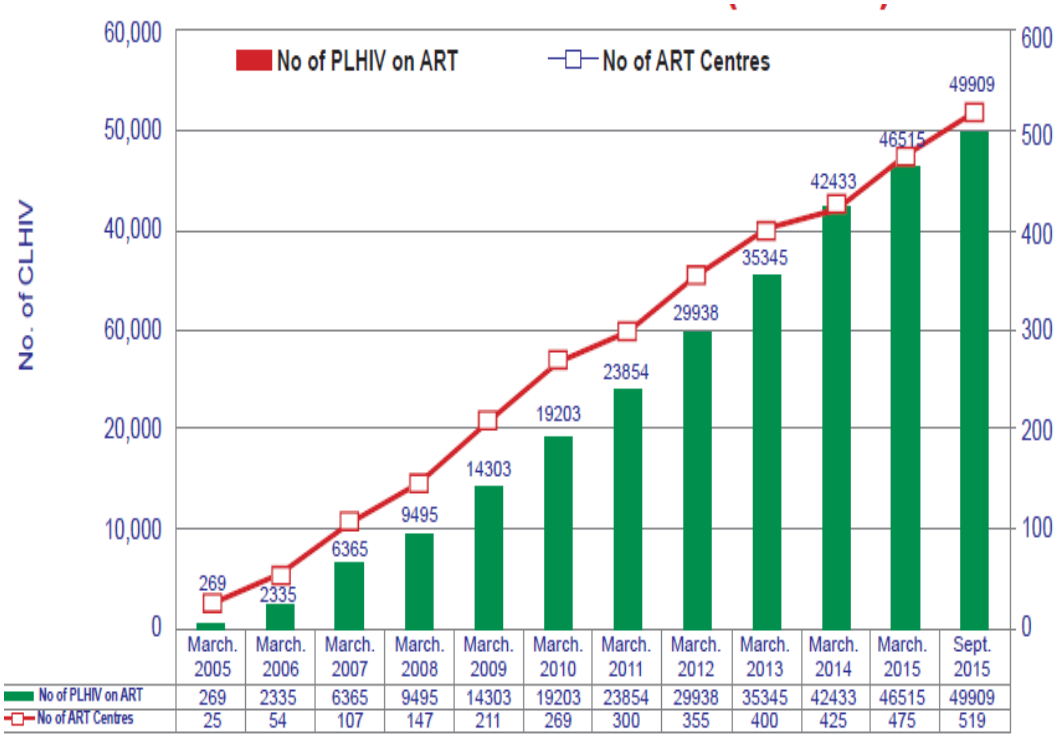
Source: UNAIDS Gap report 2013- 2014

Globally the current treatment coverage data for adolescents is unavailable; as of May 2014, only 30 countries were reported the estimated number of adolescents on Anti Retroviral Therapy (ART) in the Global AIDS Response Progress Reporting System. In LMIC, only 34% of children were received the treatments in the age of 0 – 14 years when compared with 64 % of adults. At present there is no precise report of adolescent management and care facts for some regions uniquely for ages 10-19 years. The majority of long term survivors of PIAs endure a numerous physical, psychological and social transitions that increase the risk of non-adherence. [6, 23]

The non adherence in PIAs causes treatment resistance and failure of first line and in some cases second line regimens. The imperative role of adolescent-friendly services are stand for the non adherence to ART in the adolescents and youth than for adults. The lifelong commitment to adolescents especially PIAs, presents unique challenges since it may not be handled moreover by pediatric or adult HIV management programs. [24]

All Adolescents Living with HIV (ALHIV) require the most constructive drug schedules that ease the daily pill burden and are related with lower side effects in order to enhance the likelihood of optimal adherence. The ALHIV have unique needs due to the vital transitions and individual life circumstances results in habitually face various challenges with adherence to ART [25.] In India, the National Pediatric HIV/AIDS project was commenced on 30th Nov 2006 till September 2015, nearly the registered Children Living with HIV/AIDS (CLHIV) were 77, 729 for whom the receiving free active services on treatment of HIV care were 49,909. The figure 7 shows an outlook of the services provided to the CLHIVs in India, in the period of 2005 to September 2015.

Fig 7: The ART scale up for children living with HIV/AIDS in India, 2015-16.



Source: NACO Annual Report 2015-16

Although the first line therapy was victorious, certain proportion of children and adolescents showed evidence of treatment failure. The sub optimal adherence was the main source for of many children to increase their viral load and disease progression to AIDS. The WHO reported that the average switched rate for adults from first to second line ART is 2-3% per year. Now, prerequisite of second line ART for children has been accessible to all Centre of Excellences (COE) and ART plus Centres.[26]

Anti Retroviral Therapy (ART) and It's Significance

The trademark of HIV infection is progressive of CD4 + T cell reduction causing to an augmented risk for the evolution of Opportunistic Infections (OIs), AIDS and death. The HIV infected children and adolescents have prominent viral loads and were at risk for rapid progress of disease due to poor development of immune system when contrasted to the adults. The advent of Highly Active Anti Retroviral Therapy (HAART) in 1996 extensively declined the mortality and morbidity in HIV infected children in both resource limited and rich countries. Even though the HAART treatment for HIV infection is a lifelong commitment to all the People living with HIV/AIDS (PLHIV) especially more challenge for ALHIV they have to take from childhood period. But the sustained intake of ART medication needs to reduce viral load in undetectable level and to enhance the quality of life of PLHIV.[27]

The ART is combination of at least three antiretroviral drugs markedly reduced the morbidity, mortality and remarkably AIDS related death rates declined by 80% from1998 to till now. The major goal of HARRT is to repress HIV viral replication and renovate immune function. The booming adherence to HARRT results in virologic repression, boost in the CD4 count + T cells and enhancement in the clinical well being of the individual, evidenced the weight gain and control of OIs.[28]

The optimal adherence (>95%) to ART is the main significant indicator to restrain HIV imitation and to shun the emergence of the drug resistance. The adherence rates exceeding 95% are vital to maximize the benefits of ARV medications. The optimal adherence to treatment regimen is a major requirement for the efficacy and stability of ART and keeping an adolescent on a first line (1 NNRTI + 2 NRTI) as long as possible. Once the first line regimen had less improvements in therapeutic outcomes due to non adherence or poor retention in care or Loss of follow up (LFT) causes the increased viral load and progress of disease turns into next choice of the second line regimen.(1 PI + 2 NRTI.)[29]

As per 'WHO' Adherence is defined as "the extent to which a person's behavior of taking medicine, following diet and or executing lifestyle changes, corresponding with agreed recommendations from health care providers."[30] The

adherence measurement is generally based on pioneer of **Paterson's** study; identified that up to 95% adherence is essential for the efficient HIV viral suppression.[31]The optimal level of more than 95% drug adherence is essential and associated with improved Clinical, Immunological and Virological outcomes. Globally 62% of adolescents and young adults only were adherent to ART and comparable to adults. There were discrepancy between regions like poorer adherence in Europe, South and North America, (50-60%) and elevated levels in Africa and Asia (>70%).[32]

Even the adherence to the ART is worse in both categories of adolescents. The other litigious view of PIAs were started on ART earlier in life resulting in partial viral suppression, emergence of drug resistance and end in ART failure when compare to the adolescents infected in second decade. The adherence rates exceeding 95% are essential to maximize the benefits of ARV medications. The non-adherence of less than 95% are at last associated with ART failure includes the augment of viral resistance, treatment failure and increased the risk to progress the end stage of disease.[9,28]

The ALHIVs are facing the many challenges for optimal adherence to ART, when compared to the children and adults due to dependency on caregivers/parents, need of autonomy, attitudes of defiance/ denial, and delay in the disclosure status. The concomitant group of these adolescents faces many concerns related to disclosure, regimen fatigue, stigma within their schools, homes and communities/self stigma, loss of parents/caregivers support and financial burden.[33]

The infected adolescents adhere to ART treatment and support has misfired throughout to the epidemic results in many non adherence problems. The middle and late adolescents are having major risk of non adherence when compared to younger adolescents. The high prevalence of suboptimal adherence to management during adolescence, boost the morbidity and OIs, ends in progress to shoddier of life and over use of health care system. The various causes include physical, psychological, medical, social and lifestyle factors were influencing the adherence rate among adolescents. The common barriers are like pill burden, forgetfulness, regimen fatigue, busy schedule, depression, stigma and disclosure contributes to poor retention in the care, sub optimal and non adherence to antiretroviral therapy in this population.[25, 33, 34]

Antiretroviral therapy means not only for the adherence to ARV medications (right drug, dose, route, frequency and time) and also it includes in the complete treatment and care. The optimal level of (95 %) adherence to ART inhibits HIV reproduction which has significant in the stable decline in AIDS related to mortality and morbidity. The ART adherence below 95% associated with the treatment failure and even 80-90 % have the risk of resistance to ARV medications. The Non-adherence to ART consequences in inadequate suppression of viral replication in the body and allows the disease to progress at a faster rate. It's typically coupled with frequent hospital admissions, development of OIs, poor QOL and end in death.[35]

The poor adherences to ART especially of below 75% were three times more likely to die compared to those were above 75% of adherence levels.[36] The Non adherence is prime and the foremost reasons for the failure of first line ART and also reduces treatment outcomes. The perinatal HIV infected adolescents has been reported to correlated with malnutrition, under weight, low weight gain and delay in sexual maturity due to disease progression as well as the side effects of ART medications.[37]

The many adolescents who initiated treatment in early childhood have experienced side effects from the medications, including lipo dystrophy, anemia, nausea, dizziness, memory loss, inability to sleep, rashes, weakness and other symptoms. Such physical side effects create a complicated relationship between an adolescent and their body. They can result in lower self-esteem, as adolescents struggle to understand why they might look different from their peers or try to hide physical side effects like rashes that could prompt questions from other children. **Krishnan .O** from New Delhi, reported that "The side effects are the biggest barriers between ALHIV and other children," at the Lott Carey Care Home. It is because of the side effects that the ALHIV develop internalized stigma, and then it becomes difficult to address their issues. The lipodystrophy, or even the perception cause a risk of appearance change, can lead adolescents to discontinue their medication. [24,29, 38]

Adolescents born with HIV often experience difficult in regularly taking their treatment but once they become teenagers, "Adherence is particularly complex because of the socioeconomic pressures related to orphan-hood, neuro cognitive

deficits associated with chronic and severe HIV infection, and stigma and discrimination". The other factor that may influence adherence is whether adolescents are being taken care of by their own parents or caregivers from older generations and in the other view, adolescents have lost either one or both of their parents and are cared for by their grandparents or other family members. "Those adolescents under their own parents custody adhere much better they will take drugs together and remind each other when to take them," said **Nongyao,** a paediatric HIV nurse at the Chiang Mai University Hospital in Thailand. [23, 39]

After the arrival of ARV medications, progress in treatment options and preamble of HAART, HIV disease has changed from an acute terminal to a chronic disease. The HAART regimens greatly reduce the morbidity & mortality associated with HIV infection, but high adherence is required for an optimal response to HAART. Although HARRT has substantially improved the survival of the children infected with HIV, these remains a need to systematically evaluate and determinates of mortality among HIV infected children. The successful virological, immunological, and clinical outcomes on cART are dependent on at least 95% adherence to the regimen. The self-reported adherence in PIAs may be anywhere between 40 to 84% in resource-rich countries lower than reported for adults. In a African cohort, the numbers of adolescents achieving 100% adherence estimated by pharmacy refills was lower than that for adults i.e., at 6 , 12 ,24 months respectively of 20.7%, 14.3%, 6.6% compared to 100% adherence in adults.(P=0.01)[25]

The optimal adherence to prescribed regimens is a key to ARV effectiveness but there is no 'golden standard' for the assessing and monitoring adherence. Hence, multiple approaches are often used and it has been dichotomized as "direct" versus "indirect" and now currently as "objective" versus "subjective". The objectives methods of Electronic Monitoring Device (EMD), Biological Markers monitoring (BMM) includes viral load and CD 4 count, and therapeutic monitoring methods involves measuring drug levels in blood and hair are very expensive and not possible to do in all health care settings. The self report method (3 and 7 days recall) , missed dose history, visual analog scale, pill count method and pharmacy refill records are generally considered as subjective measures, which mainly rely on the individual to caregiver's report of his or her behavior, sometimes it may over estimate the adherence .[39,40]

Among all the methods the adherence is monitored by the standardized questionnaire developed from Adult AIDS clinical trial group (ACTG) and adapted by pediatric AIDS clinical trial group. The adherence can be enhanced by intervention strategies and modalities includes of nurse-delivered individual counseling, individual peer support , peer group & phone based counseling, facilitated group sessions, and data-driven approaches such as using Electronic Dose Monitoring (EDM), text/pager messaging and incentives. Apart from this , the "Remainder tools" like pill boxes, pill charts, medication diaries, buddy system, electronic device such as beepers, alarms and watches are used as to be remainder for taking ARV medications.[41] A meta analysis report stated that, the participants in the intervention arm were about 50% more likely to reach 95% adherence with OR=1.50; 95% CI and 25% more prone to have an untraceable HIV-1 RNA viral load with OR=1.25, 95% CI, than those in the control arm. [42]

The non-adherence is the distinct most imperative challenge to successful management of all HIV infected individuals, more than ever the HIV infected adolescents/ youth. It may be owing to any fusion of patient or provider-related, disease and medication related, psychological and structural barriers. The adherence is not stable and needs to be assessed incessantly as the factor leads to non-adherence may change over time, imposing different approaches to address the treatment effects especially PIAs.[43] In their second decade of HIV infection in PIA with lack of effectiveness in cART, will generally have immunologic deterioration, with advancement of clinical illness, including OIs. The Indian studies have shown that particularly of older adolescents, encompass the majority of PHIV-infected children being hospitalized and have maximum rates of mortality and morbidity.[23, 44]

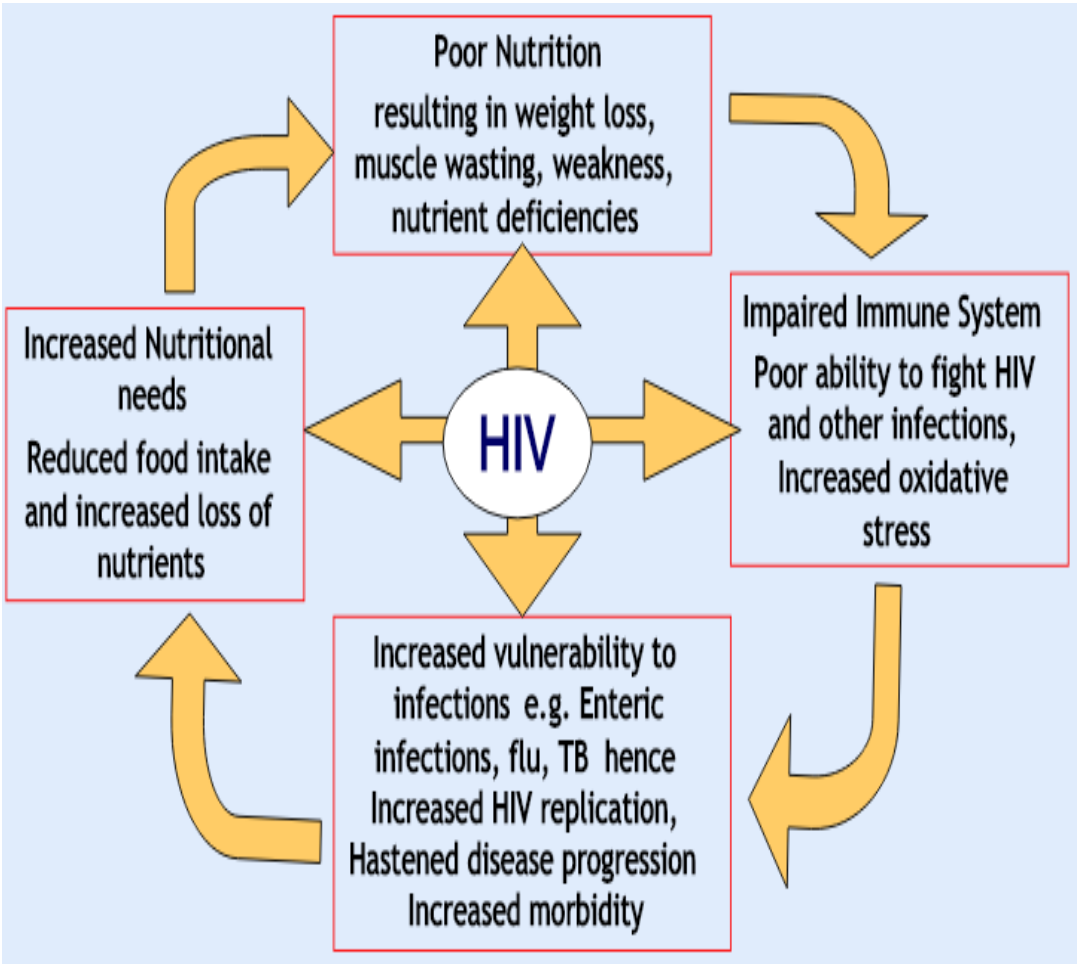
Nutritional status

Nutrition is frequently taken as additional significant and major indicator of the health and general status of adolescents. The adolescence is period of fabulous changes made in growth as physically, emotionally and socially, because of poor nutrition these changes become even more complicated for an adolescent diagnosed with HIV.[10] The balanced nutrition is predominantly vital for adolescents as it is a principal determinant of the spurt of growth that portray of adolescence. The poor and malnutrition is often cited as the main reason for the low weight gain and delay in the

inception of puberty in Indian adolescents. In worldwide, the 47 % of underweight prevalence were seen among adolescent girls in India. The NFHS-3 data showed that, the majority of general population aged 15–19 years were had low weight (47% girls and 58% boys) and anemic (56% girls and 30% boys). The in-depth data viewed that more than 39% were mildly anemic and other 15% and 2% had moderate to severe anemia respectively. The nutritional requirements are more among adolescents than any other stage of life. The imbalanced and inadequate diet intake at this age progress to stunted growth and deferred sexual maturation.[45]

Nutrition and HIV are interrelated; the relationship between this two is multifaceted and multidirectional. A vicious cycle of mal nutrition and HIV is represented in figure 8.

Fig 8 : A Vicious Cycle : Mal nutrition and HIV



Source: Adapted from RCQHC and FANTA project -2003

HIV can cause or deteriorate under nutrition by causing reduced food intake, increased energy requirements, and poor nutrient absorption. The under nutrition in

turns and further abate the immune system, rising vulnerability to infection and deteriorate the impact of disease. So the poor intake of food leads to loss of weight and malnutrition, which further weakens the body's defense mechanisms, thus aggravating and perpetuating this cycle. According to AIDS in Regional Center for Quality of Health Care (RCQHC) and Food and Nutrition Technical Assistance Project (FANTA) reported that, the most common and often disturbing symptoms were the loss of muscle tissue and fat, weight loss, vitamin and mineral deficiencies , poor nutrient absorption, metabolic changes, viral replication, reduced immune function and increased vulnerability to OIs.[46]

The one of the co-factors involvement in development of AIDS is prominent levels of Reactive Oxygen Species (ROS), as the deferred reaction by the immune system may be due to a primary reduction of antioxidants. The HIV infection increases the free radical production inside our body and to counter act this, our body increases production of own antioxidants. The HIV associated with substantial oxidative stress and reactive oxygen species consequently decreasing the body's battle to HIV results in decline of antioxidants cause the progression of HIV to AIDS. The antioxidants are substances that restrain oxidation and sentinel the body from the detrimental effects of free radicals which play a vital role in scavenging excess ROS to sustain normal physiological conditions.

The anti oxidants are the vitamins, minerals and enzymes which protect and repair our cells from free radicals. The antioxidant vitamins are A, C, E, glutathione, and phyto chemicals contain foods can activate the intercepting and stabilizing of the ROS. The cofactors of minerals like manganese, selenium, zinc, copper and iron are needed to enhance antioxidants enzyme activities.[47] The combination of antioxidants and HAART lower the viral loads and the generation of ROS from antiretroviral (ARV)treatment. Hence on a global scale, it is presumed that antioxidant management may offer a cost effective therapeutic approach for PLHA. **Anthony et al (2011)** revealed that, the level of antioxidants inside CD4 and CD8 cells were low in PLHIV because of that deficit in the immune cells might impair the ability to fight HIV virus.[48]

The food insecurity and malnutrition leads the adolescent to survival strategies that expose them to a greater risk of disease progression. The well-nourished

adolescents are infected with HIV virus are better able to offer some resistance to opportunistic infection and tolerate the side effects of ART management but the malnourished adolescents with AIDS have minimal internal resources to fight OIs. There are many practical and unique considerations and challenges to cART utilize in PIAs even in weight shunting, delayed puberty, candidiasis, poor dentition, poor palatability and GI intolerance (eg., nausea, vomiting and diarrhea). These adolescents have enhanced nutritional requirements demanding diet rich in protein, vitamins (includes anti oxidants) and minerals (calcium, iron, iodine and phosphorus) due to rapid growth spurt and better physical activity. These concerns can be declined by periodical screening and nutritional education for all ALHIV.[47, 49]

Improving and maintaining good nutrition may prolong health and delay the progression of HIV to AIDS. The early nutritional assessment and intervention may prevent severe malnutrition, decrease the incidence and severity of infection and provide some protection of the immune system enabling the better QOL for the CLHIV. According to the stages of the disease progression, the HIV virus reduces the food intake, make difficulties interrelated to digestion and absorption, alternate metabolism of nutrients (eg., carbohydrates/ lipid metabolism may be different in HIV) and distorted body functions: improper utilization of fats, inability to produce saliva and other juices.[49,50]

The increased Resting Energy Expenditure (REE) was sensible in HIV-infected adults are probable to increase of 10% in order to maintain body weight in asymptomatic HIV-infected adults and as well as children. During symptomatic HIV and consequently in AIDS, the energy requirements increased to around 20–30% to maintain adult body weight.[51] The data from 14 developing countries reported that significantly increased incidence of anemia among female (15–19 years) was compared to their male adolescents. Aside from India, in nine countries of Central and West Africa, the majority of 15–19 years girls were anemic.[52]

Chatterjee A (2007) found that low CD4 count during pregnancy and under nutrition in children increased the risk of mortality.[53]The clinical trials have suggested the need for increasing the intake of the following micro nutrients as supplementation for the prevention and treatment of AIDS: Vitamin A,C,E and Carotenoids, Selenium,

Zinc, Copper, Manganese, Flavonids or vitamin P and B complex vitamins.[54] **Coovadia HM et al (2002)** revealed that Zinc deficiency may boost HIV replication, harm cellular immunity and accelerate apotosis of cells concerned in the immune responses.[55] Since the nutritional counseling is necessary for all PLHIV and especially for the adolescents during every month of clinic visit. Moreover, nutritional management, counseling and education should be beneficial to reduce the nutritional deficiency and also increase quality and extension of life in all PLHIV.

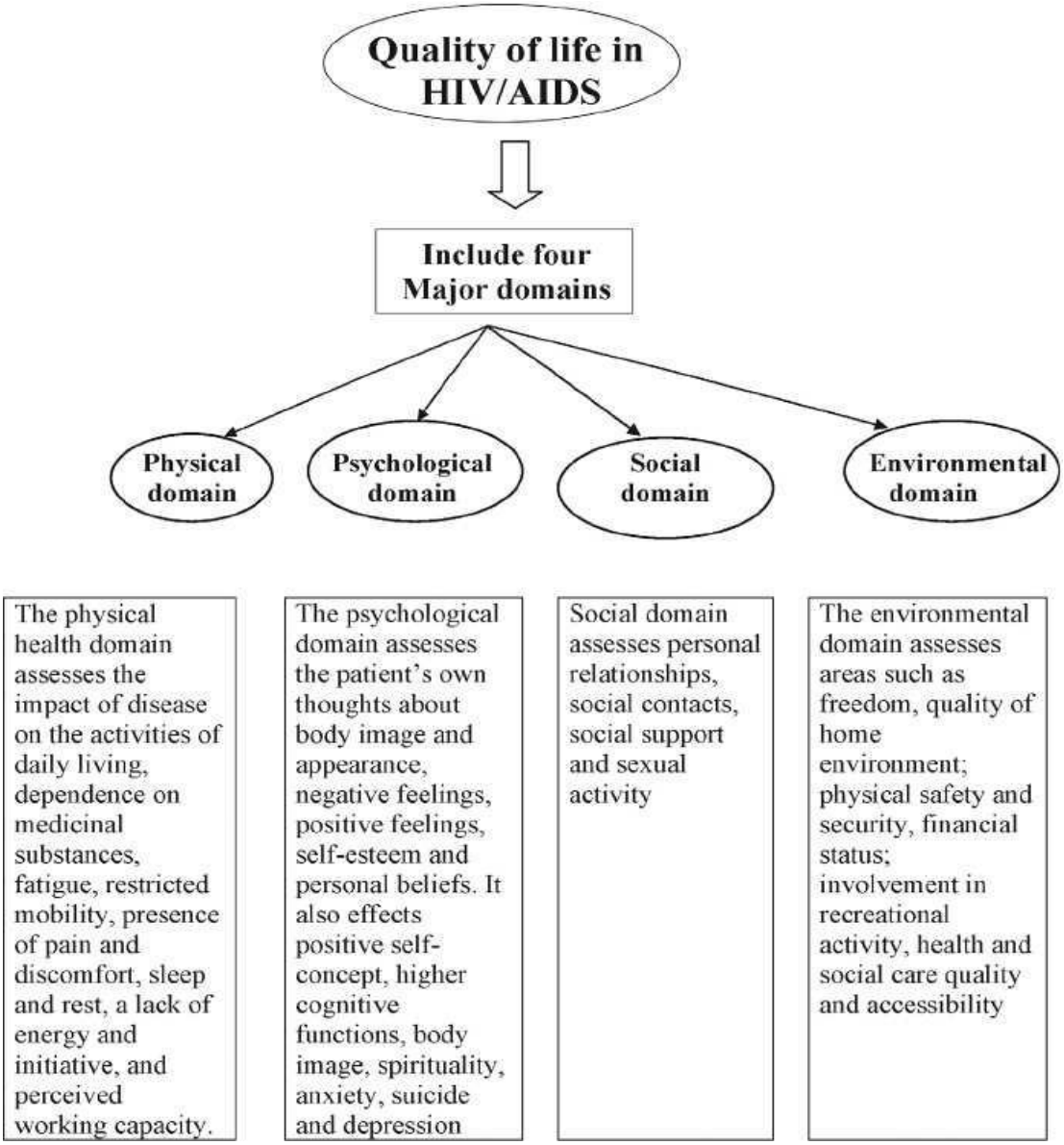
Quality of Life (QOL)

The term 'Quality of life' (QOL) viewed as "communicate an overall sense of well being and including aspects such as happiness and satisfaction with life as a whole". The WHO defined the term 'QOL' as, "Individuals perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, standards, expectations and concerns". The QOL is the result of the interaction among health, environment, social and economic conditions which affect human and social development. It reveals the difference or gap between the hopes and expectations of a person and their present experience.

The dramatic decline in morbidity and mortality among the individuals infected with HIV since the initiation of HAART. The recent advances in the clinical test and management make fatal disease of HIV/AIDS to chronic and potentially manageable disease. However, the constant management is required for co-morbid illness or iatrogenic effects from HIV related medications. But still the HIV/AIDS makes mounting trouble on the health of the population and furthermore makes socioeconomic burden for individuals, families, communities and governments in some countries.[56]

The QOL plays an essential role in the life of an individual suffering from chronic disease like HIV, TB, stroke and cancer etc. The QOL is a multi dimensional model whose definition and evaluation remains litigious and it's divided in to four major domains namely physical, psychological, social and environmental. The figure 9 shows that, the consequence of HIV on QOL surged under four major domains. [57]

Fig 9: Outlined the Domains of Quality of Life in HIV/AIDS



Source: Basavaraj, IJSTD ; 2011.

The adolescents are the only a high risk and underserved group in international and national response to HIV epidemics. It may be due to abscond from formal education, enter work, commence sexual experiences and begin experimenting with alcohol and other substances of misuse to make their life to be more complicated. In the absence of a cure, HIV-infected children / adolescents will require adherence to ART on the lifelong basis, which is a prerequisite for their survival. The HIV/AIDS not only distress the physical health but also affects individual overall QOL. When compared to the other illness, children with HIV infection are possible to experience more difficulties in their daily life because of parental death from AIDS and social stigmatization may worsen their QOL.[58]

The HIV-Health Related Quality of Life (HRQOL) may be a primary measure of management and care programs for BIAs and young adults since of the unique stress experienced during this stage of cognitive and sexual development. Further, BIAs has raised concerns over stigma compared with PIAs, and challenges in coping with the physical and social aspects. But the stigma may impact depression and social support from society for both categories of adolescents. The PIAs had lower QOL when compared to the other age groups because of the long term management for life saving drugs of ART with pill burden and its side effects. [59]

The elevated CD4 count with optimal adherence was associated with higher QOL scores in the health perception domain Thai and Cambodian children.[60] The **Lee GM et al (2006)** reported that, the HIV infected children had significantly lowered QOL scores as contrasted to HIV exposed but uninfected children[61]. According to the Global Youth Wellbeing Index reported that, 85% of youth (10 to 24 years) had low levels of overall well-being in the 30 countries. The ALHIV are mostly resist with the profuse of socioeconomic problems such as, poverty, substance abuse, depression, stigma and discrimination which can intrude their QOL not only in physical functioning but also in psychological distress.[62]

The lack or delay of disclosure may prejudice treatment of accepting and participation in HIV care. In ALHIV and also amplify in psychosomatic and behavioral problems such as suicide, attempted suicide and suicidal ideations. The stressful events of anxiety, depression, stigma and social support were related to progression of HIV/ AIDS. The estimated range from 22% to 38% of prevalence of depression were noticed in HIV infected adolescents The management of depression in HIV/AIDS may not extend the life but can reduce the risk of suicide and progress the QOL and improve the adherence even a complex ART regimen.[63]

A case control study was conducted in Northern India, on QOL of HIV infected and other chronic ailments children (40+40) at the referral hospital. A significantly improved QOL was observed with chronic illness than children with HIV.[64] A cross-sectional study of HIV-infected children in Thailand revealed that a significant correlation was found between physical functioning, symptoms, health care utility and social role functioning. [65]

The impact of HIV/AIDS among children was studied in Yunnan in the year 2006 among 116 affected and 109 control families by measuring the HRQOL. This study reported that, children suffered from HIV had worse score on HRQOL than those from unaffected families. The significant relationships were observed between physical functioning, social support, time on medications and co morbid health problems. It showed that co morbid health problems were less among children who reported a time on medications and better physical functioning was seen among those who had greater social support.[66]

The other study from India identified the QOL of 52 boys and 45 girls in institutional care home in Bangalore. The results found that, caregivers perceived children to have an overall increased in QOL than self-reported by children. It revealed that, self-reported QOL declined with age of the child, while caregiver-reported QOL improved with age, suggesting a need to ensure better psychological support for older children.[67] **Garcia P (2010)** found that certain modifiable factors like ART regimen, nutrition are strongly associated with survival and improves the QOL of HIV infected people. [68]

Assessing HRQOL is useful for to evaluate the perceived burden of chronic disease, effects of management and tracking changes in health over time helps to monitor the overall QOL of ALHIV. The strict adherence to ART promotes QOL. The HAART has also been shown to extend the length and improve the QOL of those infected with the HIV. Apart from this, in order to improve the QOL of children/adolescents they need good physical and mental health essential for enhancing the various physiological dimensions of growth and development. The good QOL can be maintained by sustained intake of ART, good nutrition and mild exercises like yoga can lead a productive life which will condense the burden on the society towards HIV infected people. Developing the good practices like yoga early in life will be benefited for future of adolescents living with HIV/AIDS.

Yoga

The science of yoga is an ancient one, it is the rich heritage of our culture. It has now become the subject of modern scientific evaluation. The yoga is originated from Sanskrit word ‘Yuj’ means ‘to yoke’ or ‘to control’ and is often termed as

'uniting' or the 'method of discipline'. In 2000 years ago, the Indian sage of Patanjali has intricate the practice of yoga into the Yoga Sutra and outlines the eight limbs of Yoga (Ashtanga Yoga). They are Yama (universal ethics), Niyama (individual ethics), Asana (physical postures), Pranayama (breath control), Pratyahara (strengthening senses), Dharana (concentration), Dyana (meditation), and Samadhi (self realization).

Among these eight limbs, today many people enthusiastically followed the third and the fourth limb of ashtanga yoga, together of this both limbs are called as 'Hatha yoga'. The word "asana" refers to pose or posture, its helps to increase stamina, physical power and as well as designed to purify the body. The asanas are aided to open the many channels of the body especially the spine, so that energy flows in our body to go freely. It's increase concentration of our breath (Prana), which helps us to connect the body-mind[69]. In the western world, now yoga is regarded as a holistic approach to health. The National Institute of Health as classified yoga is a form of **Complementary and Alternative Medicine** (CAM).[70]

The "Healing comes from inside" said by **Jon Kaiser (1998),** strongly recommends that yoga makes to relieves stress, peace the mind, and regulates breathing and circulation. A regular practice can aid to sustain the immune system in concurrence with a comprehensive HIV management program.[71] **Chapel Hill (2008)** reported that stress significantly increases the hazard of HIV would progress to AIDS.[72] **Steve Cole (2010)** said that HIV was a tremendously stressful disease equally during the period of adjusting as well as living with it and because of the medications side effects. The HIV spread more rapidly in presence of nor-epinephrine (stress hormone) in the body, make 'T' cells more vulnerable to attack and can increase the HIV rate of the reproduction 10 fold. And also he found that, ARV medications were less effective in people with high levels of nor epinephrine and people with HIV face treatment options that would range from uncomfortable to dangerous." [73]

Misha Cohen (2010) reports as, "Yoga is superb tool for the stress decline when done appropriately." It can help to relieve various symptoms, as well as the ARV medications side effects, including the digestive problems and the joints pain. "A regular yoga practice is a simple way to achieve the good strength, boost the immune system and enhance circulation always".[74] **Joseph and Nair** (2015)

evaluated the effect of naturopathy and yoga intervention on CD4 counts of HIV/AIDS reported that an growing trend in the CD4 count was proportional to the participants following yoga intervention. It is signifying that the prospect of lifestyle changes could bring positive outcomes in PLHIV. [75]

HIV/AIDS makes a grand deal to face a disease that seems to have no heal as yet. The most people with HIV experience extreme feelings of despair, loneliness, fear, anxiety, and depression. Yoga cannot replace the professional counseling in connection with major grief, but yoga techniques can help to ease extreme fear and anxiety, gain knowledge of stress-coping skills, and fabricate the internal strength through the relaxation and self-awareness exercise of the meditation. Yoga helps to train the most of the physical capabilities; slow-paced versions that can emphasis for extends of flexibility and breathing techniques that helps in relaxation.[76]

Pranayama increase the lung capacity and balance the system through physical and mental functions. The regular yoga therapy improves the flow of blood and oxygen in the body which helps in getting rid of toxin and other waste from the body. The yoga therapy restores the normal function of all endocrine glands of the body. The current trend makes the Yoga as complimentary medicine when it's combined with allopathic, more useful for the successful health problems even in particular chronic ailments. The ARTs have brought rehabilitated trust for most of the PLHIV. Still, they do not offer cure they can cause many side effects and other non adherence reasons, more than 70% of HIV-positive people have changed to alternative medicine for help along with HARRT regimens.[77]

The regular yoga practices augments body flexibility and muscular strength, relieves the stress, reduces pain, anxiety and depression, improve the cardiovascular and respiratory functions, promotes sleep patterns , increase the immune power and enhance overall well being and QOL. The yoga includes the selected asanas are aid to relax and tone up the muscles and to massage the internal organs. The breathing technique of pranayama and meditation help to regulate the body's energy levels, calm down the mind, reduce the stress hormone and brings down the negative effects of stress and it's by products and improved QOL. In fact many researchers have reported that reducing stress emerged to be a key asset for supporting people with HIV virus.[78] Moreover the investigator as a clinical instructor observed that the

diagnosis of HIV creates anxiety and living with HIV makes stressful life of all PLHIV. But yoga has many amazing effects of PLHIV lower levels of stress, greater sense of peace, greater levels of physical fitness and improves immunity.

Now over all yoga, act both as curative and preventive therapy for the minor ailments in PLHIV. Today yoga has become popularity in therapeutic practice; nearly stress reduction in people with HIV can contributes longevity and improves health.[73] The regular yoga practices along with adherence to HARRT regimen lead to enhance overall well being with less burden to the society for PLHIV. The regular practice of yoga will promote the health, to develop positive attitudes and health practices, improve self confidence of ALHIV which prevents HIV transmission in future.

1.1. BACK GROUND OF THE STUDY

One of the most fascinating periods of "Adolescence" in human life, marks the transition from being dependent child to independently functioning with adult. But the adolescents in this stage discernible by emotional turmoil, risk behaviors and challenges. The different countries have their own understanding for an age of children and adolescents, the wide and overlapping age categories of data specific to adolescents are often subsumed in other age-ranges. As per UNAIDS (2012) report, globally there were approximately 4 million young people (15 to 24 years) were living with HIV, among these 2/3 of new HIV infections were common in youths (15 to 24 years) and 29% were adolescents aged 15 to 19 years. The currently reported the global summary of AIDS epidemics 2014 was illustrated in table 4.[12,13]

In 2013, as per UNAIDS report: globally an estimated of 5 million young people aged 10 – 24 are living with HIV, and more than 75 were infected every hour. Among this, 2.1 million (1.7 – 2.8 million) adolescents (10 –19 years) were living with HIV. In 2014, globally the total number of PLHIV was 36.9 million; among this 2.0 million were adolescents aged 10-19 years of age; 220, 000 million children were newly infected with HIV and 60,000 adolescents were died because of HIV/AIDS. After sub-Saharan Africa, the region with the leading number of PLHIV is Asia and the Pacific region. Still the global AIDS epidemic persists to affect millions of people, despite their age or sex**.** In the year of 2005 to 2012, the number of AIDS related

mortality was decreased by 30% for all ages apart from adolescents, though 50% increase in that same period.[13]

Global Scenario of HIV/AIDS [79]

Table 4: The Global Summary of HIV/AIDS Epidemiological Estimates for 2014

Global Summary of the AIDS Epidemic, 2014	
People Living With HIV in 2014	
All ages	36.9 million [34.3 million - 41.4 million]
Adults (aged 15+)	34.3 million [31.8 million–38.5 million]
Women (aged 15+)	17.4 million [16.1 million–19.5 million]
Children (aged 0–14)	2.6 million [2.4 million–2.8 million]
Adolescents (aged 10–19)	2.0 million [1.9 million–2.2 million]
People Newly Infected With HIV in 2014	
All ages	2.0 million [1.9 million–2.2 million]
Adults (aged 15+)	1.8 million [1.7 million–2.0 million]
Women (aged 15+)	870,000 [790,000–950,000]
Children (aged 0–14)	220,000 [190,000–260,000]
Adolescents (aged 15–19)	220,000 [200,000–250,000]
AIDS Deaths in 2014	
All ages	1.2 million [980,000–1.6 million]
Adults (aged 15+)	1.0 million [450,000–3.2 million]
Women (aged 15+)	420,000 [180,000–1.3 million]
Children (aged 0–14)	150,000 [140,000–170,000]
Adolescents (aged 10–19)	60,000 [54,000–67,000]

Source: Current status + Progress updated November 2016 (UNAIDS-2013)

Since 2010 to 2015 the new HIV infections have fallen by 6% i.e., now the total number of people newly infected with HIV was 2.0 million it was reduced from 2.2 million [2 million–2.5 million]; and new HIV infections among children have

decreased by 50% i.e., now 150 000 [1,10,000–1,90,000] children become newly infected it was down from 290 000 [2,50,000–3,50,000]. Regarding AIDS-related mortality, now 1.2 million [940 000–1.3 million] people died in 2015, compared to 2 million in 2010 [1.7 million–2.3 million] i.e., reduced by 45% since in 2005. Since the start of HIV as epidemic, the total of 78 million [69.5 million–87.6 million] people has become infected and 35 million [29.6 million–40.8 million] people have died from AIDS-related illnesses**.**[15]

As per UNAIDS 2014 report, the new HIV infections per day among all the age groups were about 5,600, among this 600 were children below 15 yrs & 5,000 were adults aged more than 15 years and about 30% are young people's (15-24 years). Around 3,200 people passed away as of AIDS, since inadequate coverage to HIV prevention, care and management services among these age groups.[79] The figure 10 shows the estimated number of CLHIV aged less than 15 years in 2014. Since March 2015, approximately 17 million PLHIV (41% of the total) were accessing the ART.[80]

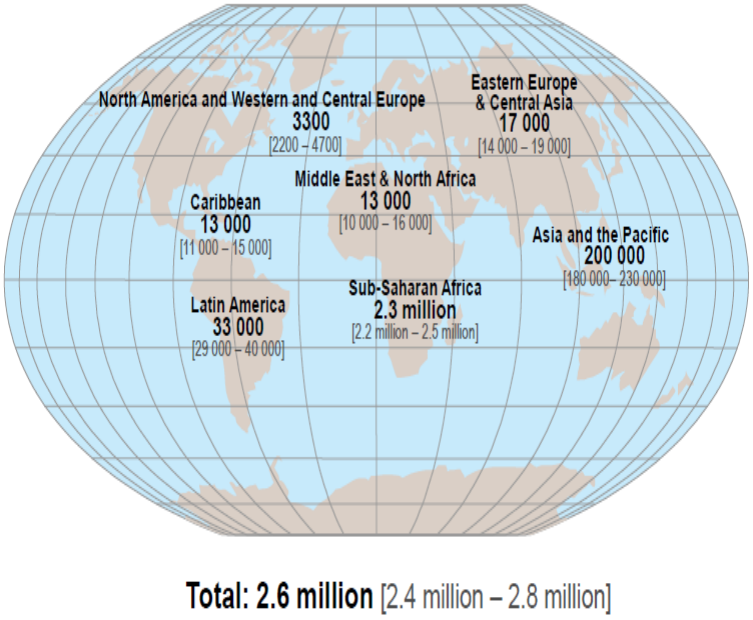
Regional Trends[79 – 83]

In 2014, globally the new HIV infections were estimated around 11% in adolescents aged 15 to 19 yrs among this more than 60% were adolescent girls. The regional HIV and AIDS statistics were in 2014 as shown in table 5. About two and half times more risk to acquiring the HIV among adolescent girls than adolescent boys in sub-Saharan Africa. In other view, more adolescent boys were newly infected with HIV every year than adolescent girls in the UNICEF regions of South Asia and Latin America, Middle East and North Africa and the Caribbean

The incurable of HIV virus excessively affects persons who inject drugs, men who have sex with men and sex workers in nearly almost regions of the world. In Eastern Europe and Central Asia, HIV epidemics that were once distinguished largely by transmission among persons who inject drugs were now gradually more by significant sexual transmission. In parts of Asia, there were more and more distinguished by transmission among heterosexual couples. In Asia as a whole, HIV epidemics have long been definite in persons who inject drugs, sex workers and their clients and men who have sex with men. Now, they are steadily escalating into lower-risk populations through transmission to the sexual partners of those most at risk. This

reflects the discrepancy in risk behavior among these regions, which means that interventions must be tailored to the dynamic of the epidemic and specific nature of adolescents.

Fig 10: Estimated Number of Children Living with HIV (0-14 years) in 2014



Source: Core epidemiology Slides from UNAIDS 2014-15 report

East and Southern Africa: (as per UNAIDS 2015 Global statistics)

There were more than two-thirds (70%) of all PLHIV i.e., 19 million (17.7 million-20.5 million) in this region, included 88% of the world's HIV-positive children. In 2015, people became newly infected in this region was around 9,60,000 million (830000-1.1 million); it had declined from 14% from 2010 to 2015 and globally its accounts for 46 % of the new infection.

In 2014, an estimated of 66% of AIDS related mortality i.e., around 470000 (390000-560000) were adults and children and it had been declined by 38% between 2010 to 2015, and also there were 56,000 (40,000-76,000) new HIV infections among children, it also fell by 66% in new HIV infections. The Sub-Saharan Africa continued to be harsh in specific to HIV epidemics and accounted for around 70 % of PLHIV worldwide; among this both new HIV infections and AIDS-related deaths were accounted for 67% in this region alone. The spread of HIV is generally through

heterosexual, both in the circumstance of transactional and commercial sex. In this region**,** over 80 % of ALHIV were in LMIC. The highest proportion 26 % of ALHIV in the world includes Swaziland, Zimbabwe and Timor-Lest.

Table 5: Regional HIV and AIDS Statistics and Features -2015

Region	People living with HIV (total)	New HIV infections			AIDS-related deaths (total)	Total number accessing antiretroviral therapy
		Total	Aged 15+	Aged 0–14		
Eastern and southern Africa	19.0 million [17.7 million–20.5 million]	960 000 [830 000–1.1 million]	910 000 [790 000–1.1 million]	56 000 [40 000–76 000]	470 000 [390 000–560 000]	10.3 million
Latin America and the Caribbean	2.0 million [1.7 million–2.3 million]	100 000 [86 000–120 000]	100 000 [84 000–120 000]	2100 [1600–2900]	50 000 [41 000–59 000]	1.1 million
Western and central Africa	6.5 million [5.3 million–7.8 million]	410 000 [310 000–530 000]	350 000 [270 000–450 000]	66 000 [47 000–87 000]	330 000 [250 000–430 000]	1.8 million
Asia and the Pacific	5.1 million [4.4 million–5.9 million]	300 000 [240 000–380 000]	280 000 [220 000–350 000]	19 000 [16 000–21 000]	180 000 [150 000–220 000]	2.1 million
Eastern Europe and central Asia	1.5 million [1.4 million–1.7 million]	190 000 [170 000–200 000]	190 000 [170 000–200 000]	<1000 [<1000–1100]	47 000 [39 000–55 000]	320 000
Middle East and North Africa	230 000 [160 000–330 000]	21 000 [12 000–37 000]	19 000 [11 000–34 000]	2100 [1400–3200]	12 000 [8700–16 000]	38 000
Western and central Europe and North America	2.4 million [2.2 million–2.7 million]	91 000 [89 000–97 000]	91 000 [88 000–96 000]	<1000 [<500–<1000]	22 000 [20 000–24 000]	1.4 million

Source: Global Statistics Fact sheet - UNAIDS 2015.

Latin America & the Caribbean

About 2.0 million (1.7 -2.3 million) people are projected to be living with HIV; including 100,000 (86, 000 -1, 20,000) newly infected in 2015; among that 2100 (1600-2900) were children. The adult HIV prevalence rate of 1.1% depicts that, the Caribbean was the second hardest hit region in the world next to sub-Saharan Africa. The six countries in Latin America and the Caribbean have universal epidemics. With

accessible data, Haiti had the region's highest prevalence rate of 1.9%, and Brazil the maximum number of people living with the disease (around 610,000 to 1,000,000).

Western and Central Africa

An estimated 6.5 million (5.3-7.8million) PLHIV in this region, including 410 000 (310 000 -530 000) were newly infected among this 66,000(47,000-87000) among children and it's declined up to 31%. Approximately AIDS related deaths were 3,30,000 (250, 000-430000) and its fell by 10% from 2010.

Asia and the pacific

An estimated 5.1 million PLHIV in this region and is also home to the two most populous nations in the world i.e., China and India; currently low prevalence states were translated into large numbers of PLHIV. Nearly 300,000 people became newly infected among this 19,000 (16,000-22000) were children it has been declined to 24 and 26 % respectively. Approximately AIDS related deaths were 180,000 (150,000 - 220000) and its fell by 5% from 2010.

Eastern Europe & Central Asia

An around 1.5 million PLHIV in this region, accounting of 190,000 newly infected and it rose by 57% among this more than 1000 were children between the period of 2010 to 2015. The AIDS related deaths 47,000 (39000-55000) people died and it was increased by 22% in the same period. The epidemic was driven mainly by injecting drug use and heterosexual transmission. The Russian Federation and Ukraine estimated that, 85% of people were living with HIV in the region.

North Africa and the Middle East

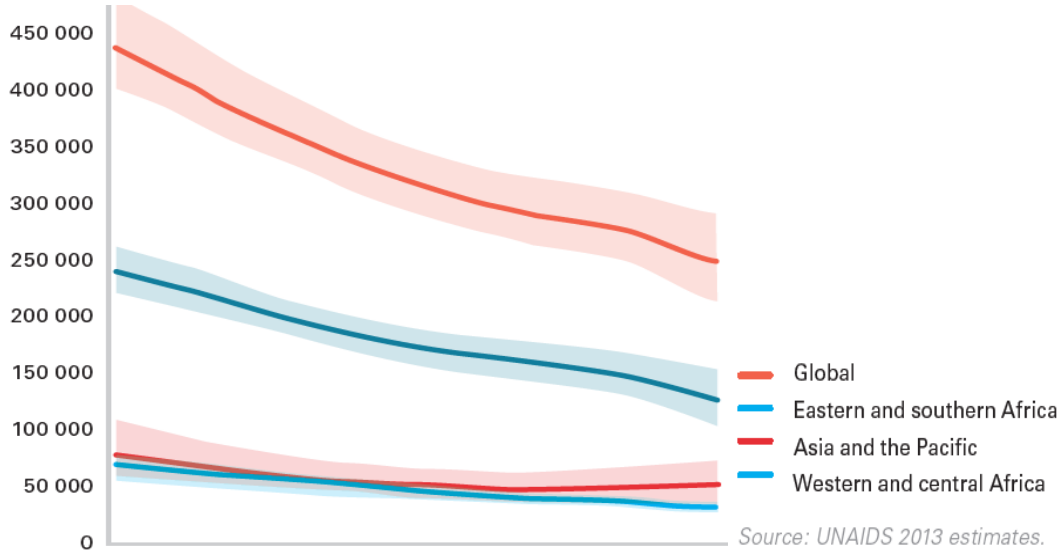
In 2015, approximately 230,000 (160,000 -330,000) PLHIV in this region and an estimated 21,000 (12,000 - 37,000) people became newly infected. It was 4% reduced in between 2010-15 but even 2100 (1400-3200) new HIV infections were children. The AIDS related mortality of 12,000 (8700-16000) were adults and children and it was increased by 22% from 2010-2015.

Western and Central Europe and North America

In 2015, the number of PLHIV in this region were 2.4 million (2.2-2.7 million) and there were estimated that, 91,000 (89,000-97,000) new cases of HIV. An account of 22,000 people in these regions died of AIDS and it was decreased by 24% in 2015.

Over the period of 2000 to 2013 : the global and three latest regions of new adolescent infections were shown in figure 11. Around 2/3 of new HIV infections in adolescents principally affected on girls in Saharan Africa and more than 80% of adolescents were in Gabon (89 %),Sierra Leone (85 %) and South Africa (82 %); and In Asia and the Pacific, the new HIV infections in adolescents were reported to more than 95% in 'adolescent key populations'. The selected countries in Asia, there were 49 births per 1000 girls were aged between 15 to 19 years and around 60% of the girls living with HIV were not known their status.

Fig 11: The Number of New HIV Infections Among Adolescents aged 15-19 year

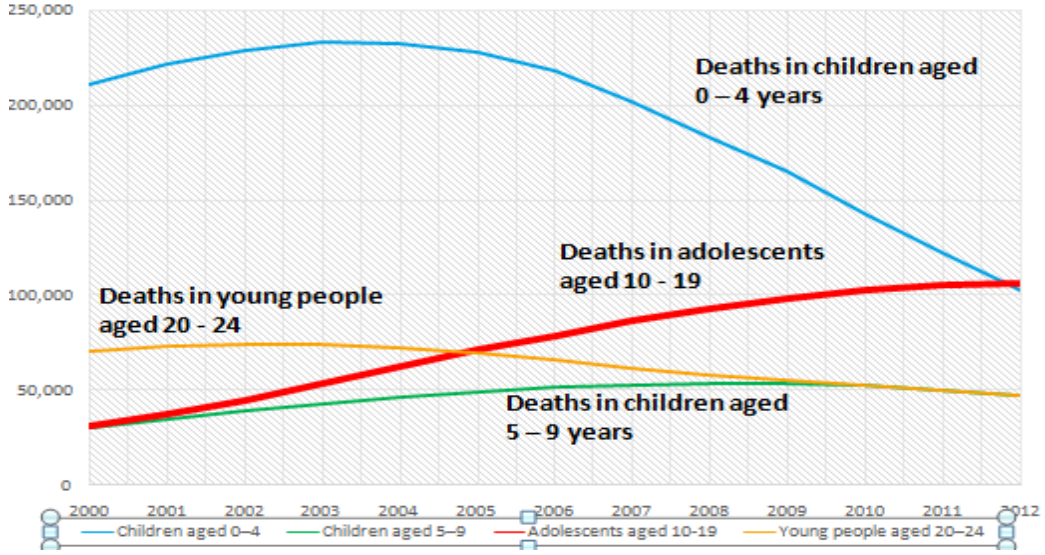


Source: UNAIDS 2013 estimates

In 2012, over 90 % of AIDS-related deaths among these age groups (97,000 of 110,000) were happened in sub-Saharan Africa. According to Sixth Stocktaking Report on Children and AIDS (2013) published an alarming new data stated that, the only age group of 10-19 years of AIDS-related deaths have raised in the past seven years. Globally, overall AIDS-related deaths fell by 35% between 2005 and 2013 but death among adolescents had increased by 50% and 300 deaths for every day. In worldwide, the HIV/AIDS is a number two cause of mortality among adolescents and number one sub Africa. The figure 12 showed the estimated number of AIDS related mortality among children to young peoples in globally. The total number of AIDS related mortality among adolescents and young people were 110000 in 2001 where as it had increased to 154000 in 2012. In South Asia, AIDS-related mortality had almost quadrupled among 10-19 years i.e., around 1,500 in 2001 but

5,300 in 2014. In East Asia and the Pacific, mortality among these cohorts elevated from 1,000 to 1,300 over the similar period. [81,83]

Fig 12 : The Estimated Number of AIDS Related Deaths Among Children (0-9 years), Adolescents (10-19 years) and Young people (20-24 yrs)



(Source UNAIDS 2013 Estimates, Annual report HIV/AIDS)

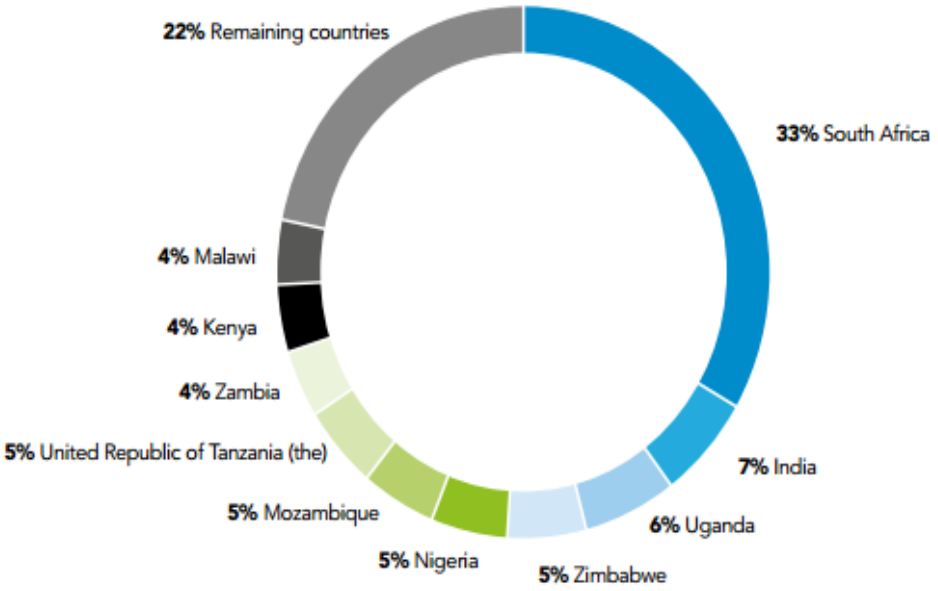
Global Scenario of HAART Therapy

Globally, around 12.9 million people were receiving ARV management at the end of 2013. The PLHIV, who were not accessing ARV, had been declined from 90% [90–91%] in 2006 to 63% [61–65%] in 2013. The ARV access had rapidly increased in a few countries includes, 33% in South Africa, followed by 7% in India , 6% in Uganda, and 5 % in Nigeria, Mozambique, the United Republic of Tanzania and Zimbabwe. The figure 13 showed the percentage wise distribution of ART therapy in globally. Around 22 million or three of five PLHIV were still not accessing ART. The proportions of people who had not received to treatment are 58% [56–60%] in South Africa, 64% [55–72%] in India and 80% [79–82%] in Nigeria. The number of children receiving ART was terribly low i.e., 24% [22–26%] in contrast view the 76% [74–78%] were not receiving HIV treatment. Now the coverage the ART therapy has been increased to 17 million people as per UNAIDS report in 2015.

A growing number of countries are developing national action plans for OVC. But still the orphans and children were considered as vulnerable to HIV and AIDS, because of higher risk of absents in schooling, residing in households with poor food

security, and suffering from depression and anxiety. The majority i.e., 85 % (11.0 million) of single or double orphaned children due to AIDS were live in sub-Saharan Africa. The HIV has extensive social and economic consequences for children and their families, especially for OVC do not receive any type of support. Globally, the estimated 17.8 million (16.1 –21.6 million) orphaned children endure of AIDS.[79,80,83]

Fig 13 : The Number of People Receiving ART in 2000-2013



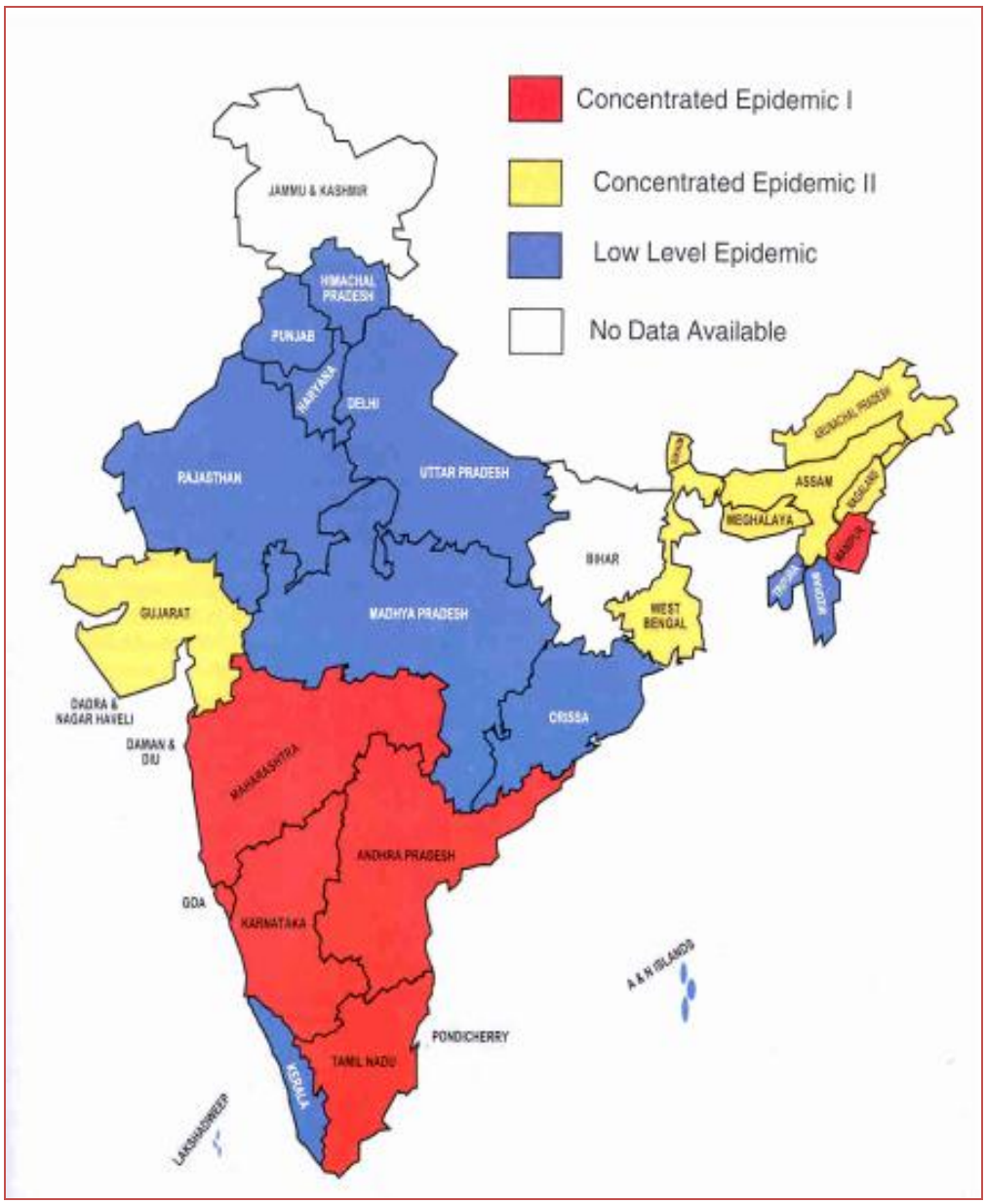
Source- UNAIDS gap report - 2013

Indian scenario [26, 84-87]

India has the third largest number of PLHIV in the world i.e., 2.1 million (1.7 - 2.7 million) after South Africa and Nigeria and estimates for about 4 out of 10 PLHIV in the region. The National adult HIV prevalence (15–49 years) is estimated at 0.26% (0.22% –0.32%) in 2015 and almost it was estimated that males around 0.30% and females around 0.22%. In 2015, estimated adult HIV prevalence was highest in the Manipur i.e., 1.15%, followed by Mizoram (0.80%), Nagaland (0.78%), Andhra Pradesh & Telangana (0.66%), Karnataka (0.45%), Gujarat (0.42%) and Goa (0.40%). In addition to these states, national prevalence was greater than estimated i.e., 0. 26% in Maharashtra, Chandigarh, Tripura and Tamil Nadu. Whereas the estimated adult HIV prevalence in the range of 0.21– 0.25% in Odisha, Bihar, Sikkim, Delhi, Rajasthan and West Bengal and the remaining other States have below 0.20%. The figure 14 illustrated the epidemic regions of HIV/AIDS in India.[84]

The high prevalence states in India, includes the southern parts of Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra and the north eastern states of Manipur and Nagaland. At national level, it's has continued to steady decline an estimated peak of adult HIV prevalence i.e., 0.38% in 2001-03 through 0.34% in 2007 and 0.28% in 2012 to 0.26% in 2015 due to reduction in new HIV infections among adults from about 2.7 lakhs in the year 2000 to 21.17 lakhs in 2015, a drop of about 57%. This decline reflects impact of scaled-up HIV prevention interventions under the National AIDS Control Program (NACP) during this period.

Fig 14: The Epidemic Regions of HIV/AIDS in India

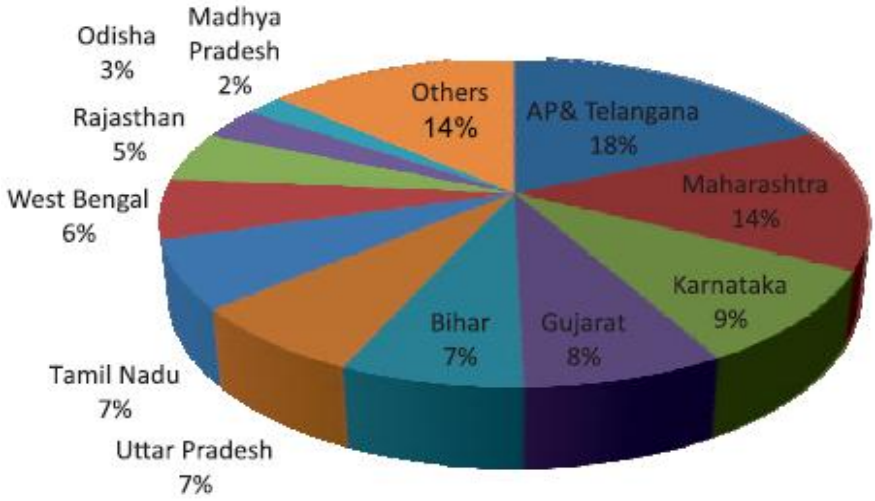


Source: Dr. Y. D. Badgaiyan. Status and management of HIV/AIDS in India-2014

According to NACO, the estimated total number of PLHIV in India is 21.17 lakhs (17.11 –26.49 lakhs) in 2015. The Children below 15 years were accounted for 6.54%, and nearly two fifth i.e., 40.5% of the total new infections are females. The figure 15 showed the distribution of PLHIV in selected states of India in 2015.[87] The estimated number of PLHIV was the highest in undivided states of Andhra Pradesh and Telangana (3.95 lakhs) followed by Maharashtra (3.01 lakhs), Karnataka (1.99 lakhs), Gujarat (1.66 lakhs), Bihar (1.51 lakhs) and Uttar Pradesh (1.50 lakhs). The other states of, Rajasthan (1.03 lakhs), Tamil Nadu (1.43 lakhs) and West Bengal (1.29 lakhs) are estimated with PLHIV numbers of 1 lakh or more.

The Government of India, NACO recently started to focus on OVC through Children Affected by AIDS (CABA). The low HIV prevalence state of Delhi with 0.3% prevalence in general population in compare to national prevalence of 0.26%. Over the years, prevalence has steady decline in high risk groups (HRGs) and general population. However, there is no accurate statistics available on the prevalence of HIV/AIDS between these age groups due to moderately lesser attention given to them by policymakers and program managers.[23]

Fig 15 : The distribution Of PLHIV in selected states of India, 2015



Source – India HIV Estimations 2015

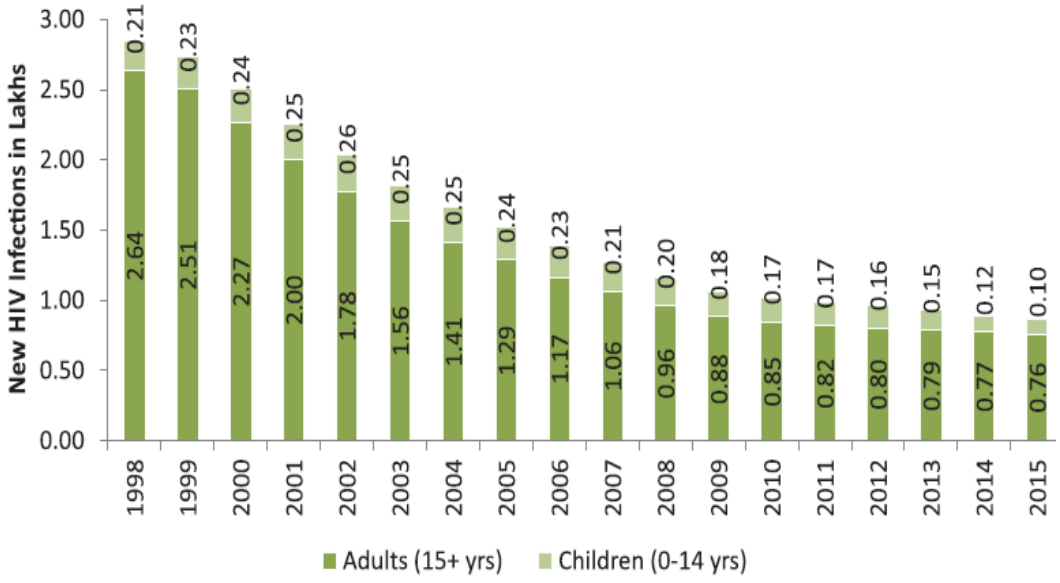
Annual New HIV Infection

In 2015, the estimated new infections are around 86 (56–129) thousands in India, i.e., it accounted for 66% in 2000 and now it has declined to 32%. The children (0 to14 years) are estimated for 12% (10.4 thousand) of total new infections while the

remaining (75.9 thousand) new infections were among adults (>15years). In India, the total AIDS cases 45% aged between 5-24 years. The shocking fact is that, 6 adolescents are infected every minute with a new HIV infections and 90% of those infected by horizontally are not aware of their HIV zero status and therefore there is risk for transmitting the virus to the partners.

In 2015, the range of new infections in Tamilnadu, Maharashtra, and Odisha are 3-4 thousands, while West Bengal and Rajasthan are 5 - 7.5 Thousands. The Andhra Pradesh & Telangana, Bihar, Gujarat and Uttar Pradesh currently account for 47% among adults with each of these States contributing 7.5 thousands or more new infections. During 2007-15, the new infections among adults have also declined by 50% or more in the states of Andhra Pradesh & Telangana, Karnataka, Maharashtra, Manipur and Odisha.

Fig 16 : Estimated New HIV infections in India, 1998-2015



Source – India HIV Estimations 2015

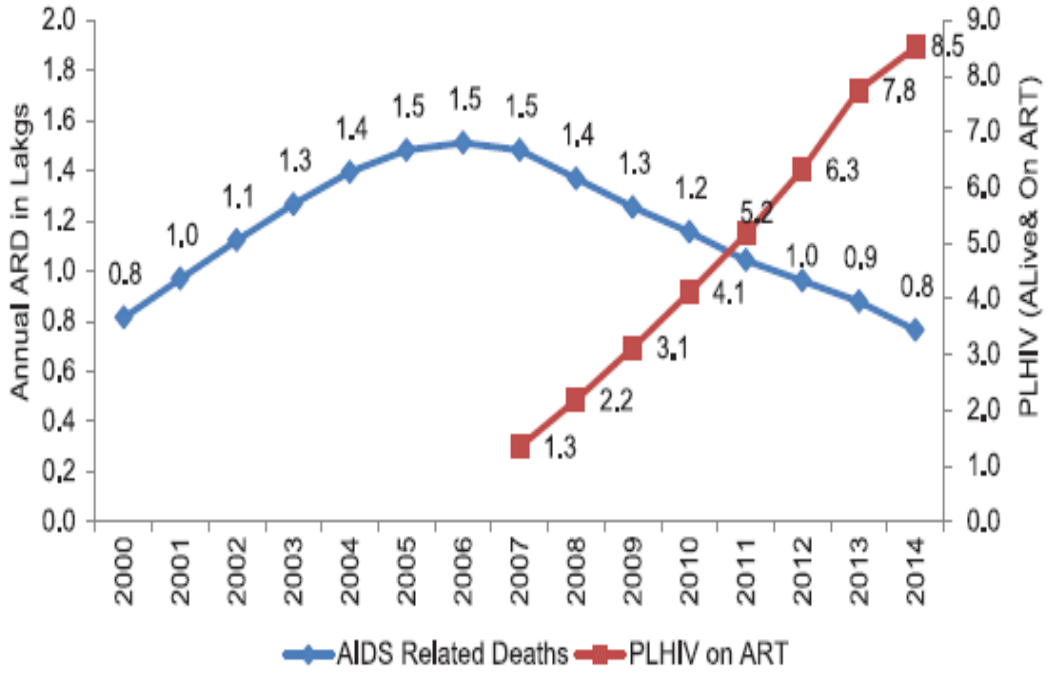
A clear decline in new infections as notice at national level has been also observed in most of the States/UTs. The figure 16 showed the estimated new HIV infections in India. In 1998, adult new HIV infection rate was 2.64 and children below 14 years was 0.21 whereas it's was currently declined in to 0.76 and 0.10 respectively because of vast improvement in HIV/AIDS control and prevention management and PMTCT program.

Burden of AIDS Related Mortality

The number of AIDS related mortalities are started to have a waning trends since 2007 and also annually by 54%. The estimated of 67.6 [46.4–106.0] thousand people died in 2015 because of AIDS-related causes and declined by 70-81% in Karnataka, Maharashtra and Tamil Nadu during 2007-15. The figure 17 showed the annual AIDS related deaths and ART scale up in India 2000-14. This decline is reliable with the rapid expansion of access to ART in the country. It is estimated that the scale-up of free ART since 2004 has saved cumulatively around 4.5 lakhs lives in India until 2014.

The absolute numbers of deaths among children (0 to 14 years) also consistently started to decline, in contrast annually more than 10,000 AIDS mortalities among adolescents and youth that continue to occur in India. In between 2005 and 2013, the number of AIDS related deaths fell by 27% in Asia and the Pacific regions. Whereas in India more than 51% of the country evidenced that, decline of 38% in the same period because of major scale up in access to HIV treatment.

Fig 17: The AIDS related deaths and ART scale up In India - 2014.



Source - HIV estimations -2015

In India, there are estimated about 25 million orphans from all causes, of which approximately two million may be attributed to HIV/AIDS. The National AIDS Control Organization (NACO), Government of India, recently started to focus on OVC through Children Affected by AIDS (CABA). The HIV/AIDS pandemic brought a dramatic increase in the number of OVC due to parental illness and death.

Global situation of children orphaned by AIDS is a main concern, especially in Africa, which is estimated to have 14.2-17.5 million world orphans due to HIV/AIDS. India is debatably a home for largest number of OVC living with HIV. It is estimated that 13% of them obtain HIV infection through sexual contact and 20-30% of female sex workers in the country are less than 18 years. Still, there is no accurate statistics available on the prevalence of HIV/AIDS among these cohorts due to relatively minimal attention given to them by policy makers and program managers.

Estimated Needs for ART

The free ART program was launched by Government of India on 1st April 2004, in the six high-prevalence states of Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Manipur, and Nagaland. Among this the first four states account for 53% of all HIV infected people in the country. The estimated annual new HIV infections were around 1.16 lakhs in adults and around 14,500 were children. The six high prevalence states account for only 31% of new infections, while the ten low prevalence states of Odisha, Jharkhand, Bihar, Uttar Pradesh, West Bengal, Gujarat, Chhattisgarh, Rajasthan, Punjab & Uttarakhand together account for 57% of new infections. The greater vulnerabilities in these states are being given advanced focus in the AIDS control program. The table 6 showed list of ART centres and patients on ART.[87]As per report on 2014, there are around 8,10,339 lakhs PLHIV registered at the 453 ART centers functioning all around the country in that nearly 6.5 lakhs are on first line ART.

Based on the postulation, the progression and survival of children and adults infected with HIV as well as current modalities, estimated that around 13.45 lakhs of PLHIV need ART in 2015. It covers around 12.71 lakhs adults (aged > 15 years) and 75 thousand children (aged<15 years). The high saddle states includes, Andhra Pradesh & Telangana (2.6 lakhs), Karnataka (1.4 lakhs), Maharashtra (2.3 lakhs), and Tamil Nadu (1.1 lakhs) require a more than half of the estimated ART support.

Table 6: State wise ART Centres and patients on ART (as on Sep 2014)

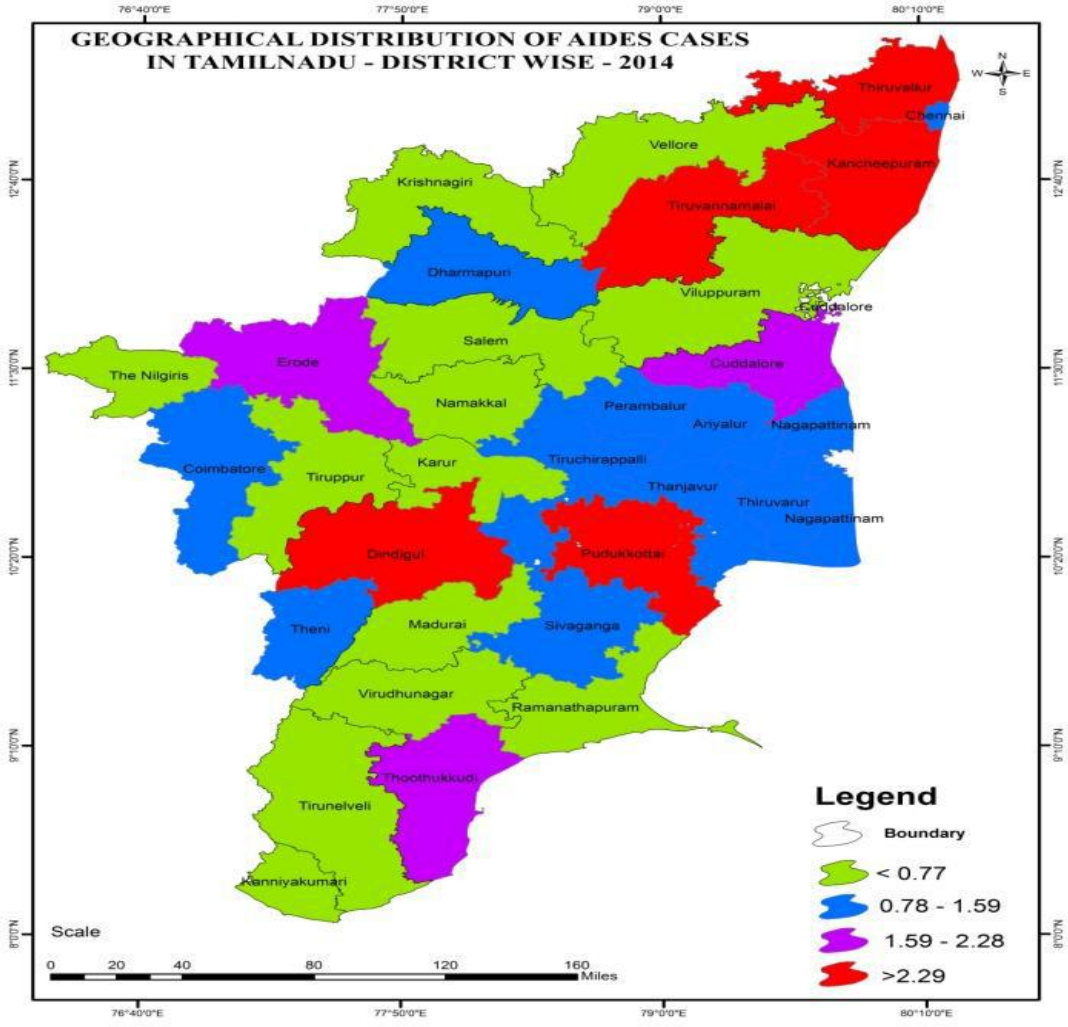
State	Functional ART Centres	Number of PLHIV alive and on ART as on Sept.-14					
		Male	Female	TS/TG	Children		Total
					Male	Female	
Andhra Pradesh	55	84898	87128	252	4020	3335	179633
Arunachal Pradesh	1	19	25	0	4	1	49
Assam	4	1886	1051	2	82	64	3085
Bihar	16	12264	8457	11	857	378	21967
Chhattisgarh	5	3569	2343	7	255	194	6368
Chandigarh	1	2110	1251	6	216	114	3697
Delhi	9	10552	5752	196	750	338	17588
Goa	1	1080	892	3	86	64	2125
Gujarat	28	24406	14947	152	1383	827	41715
Haryana	1	3279	2213	5	173	70	5740
Himachal Pradesh	3	1280	1308	1	149	101	2839
Jammu & Kashmir	2	812	551	4	64	47	1478
Jharkhand	7	2872	1928	9	235	143	5187
Karnataka	61	50311	55107	194	3916	3149	112677
Kerala	8	5007	3822	0	241	216	9286
Madhya Pradesh	15	6708	4758	27	475	272	12240
Maharashtra	70	71816	65515	201	5575	3918	147025
Manipur	10	4802	4207	49	338	333	9729
Meghalaya	1	257	289	0	14	11	571
Mizoram	3	1503	1588	0	113	92	3296
Mumbai	12	17009	11046	163	823	704	29745
Nagaland	6	2317	2413	3	127	139	4999
Odisha	10	5168	3807	59	293	212	9539
Puducherry	1	477	466	5	38	34	1020
Punjab	8	7724	5900	35	468	272	14399
Rajasthan	17	11371	9165	13	880	479	21908
Sikkim	1	52	43	0	5	4	104
TamilNadu	52	40467	38431	187	2201	1849	83135
Tripura	1	346	183	0	12	4	545
Uttar Pradesh	28	18738	15226	73	1483	697	36217
Uttarakhand	2	1069	919	5	91	49	2133
West Bengal	14	11753	7373	59	639	476	20300
Total	**453**	**405922**	**358104**	**1721**	**26006**	**18586**	**810339**

Source: NACO Annual Report 2013-14

Tamilnadu [88, 89]

The State AIDS project cell was formed in January 1993 in Tamilnadu. The Tamilnadu State AIDS Control Society (TANSACs) was first registered society in India for HIV/AIDS control and prevention in 1994 as mandate of NACO, New Delhi. The predominant mode of transmission of HIV in this state is a hetero or homo sexual transmission. The commercial sexual workers, truckers and intravenous drug users are identified targeted high risk groups in this state. The number of AIDS cases reported from Tamilnadu increased enormously from 1092 in 1998 and till 2014, it believed to have between 1.82 to 2.04 lakhs people suffering from HIV, according to number of various surveys. The figure 18 shows that, the geographical distribution of AIDS cases in Tamilnadu district in 2014.

Fig 18: The Geographical Distribution of AIDS Cases in Tamilnadu-2014



Source: Geographical distribution of AIDS cases in TN district wise 2014

The map shows that the geographical distribution of AIDS in Tamilnadu in the year of 2014.[88] In this view, the central place of Tamilnadu concentrated high in HIV/AIDS affected peoples. The southern district of Tamilnadu is very low level. There are several districts that showed that, the high-prevalence in the general population and an upward trend since 2010. Erode, Salem and Trichy districts show over 1% prevalence in the general population. The prevalence in several other districts, such as Namakkal and Tiruvarur, are above the state and national average and it's climbing. The Kanyakumari being a new entrant in to this category. The following table 7 shows, the number of people in pre ART, on ART, LTFU in each district wise of Tamilnadu in 2011.[89]

Table 7: Details of Pre ART and Alive on ART in district wise of Tamilnadu in 2011

S.No.	District	Pre ART	Ever started on ART	Alive and on ART	Loss to Follow Up Rate (%)
1.	**Ariyalur**	554	314	287	0.97
2.	**Chennai**	45008	20321	9474	9.69
3.	**Coimbatore**	8635	4301	2210	5.21
4.	**Cuddalore**	3141	1666	1282	2.88
5.	**Dharmapuri**	4386	1876	1481	2.13
6.	**Dindugal**	4986	2636	1930	2.92
7.	**Erode**	2435	1422	1143	5.84
8.	**Kanchipuram**	526	272	222	2.94
9.	**Kanniyakumari**	1825	920	666	0.11
10.	**Karur**	3049	1509	1091	0.86
11.	**Krishnagiri**	5073	2322	1815	6.16
12.	**Madurai**	14604	6570	3669	1.99
13.	**Nagaipattinam**	815	386	306	5.18
14.	**Namakkal**	12299	6860	4120	2.81
15.	**Nilgiris**	423	223	176	7.17
16.	**Perambalur**	2691	1285	874	1.01
17.	**Pudukottai**	1740	805	704	0.99
18.	**Ramanathapuram**	966	432	355	2.08
19.	**Salem**	13719	6475	3760	1.51
20.	**Sivagangai**	1397	521	439	0.38

21.	**Thanjavur**	5829	3027	1824	3.24
22.	**Theni**	6585	2781	2183	0.58
23.	**Thirunelveli**	5361	2172	1472	1.34
24.	**Thiruvallur**	1726	763	553	5.24
25.	**Thiruvannamalai**	2357	1183	906	1.86
26.	**Thiruvarur**	366	175	152	3.43
27.	**Thoothukudi**	1888	888	678	2.14
28.	**Trichirappalli**	9924	4936	3019	7.74
29.	**Tiruppur**	1576	933	785	4.50
30.	**Vellore**	8229	3738	2308	5.03
31.	**Villupuram**	3998	2043	1390	1.81
32.	**Virudhunagar**	2816	1278	911	1.72

Since, the first HIV case was identified in Tamilnadu in 1986; it has been a 24x7 fight against the disease. Currently the results are proven that, the number of new cases has plummeted of more than 60% since 2010 in the state. The Tamilnadu recorded 26,089 fresh cases in 2010-11, whereas in 2014, it was reduced to 9,892. In 2014, the proportion of AIDS prevalence high in 30-49 years age group 37.82 followed by 15-29 years age group 32.45, 10.67% AIDS prevalence in 0-14 category of age group. Among this many people are residing in rural areas (57%) has compared with urban population (43%) for the year 2014.

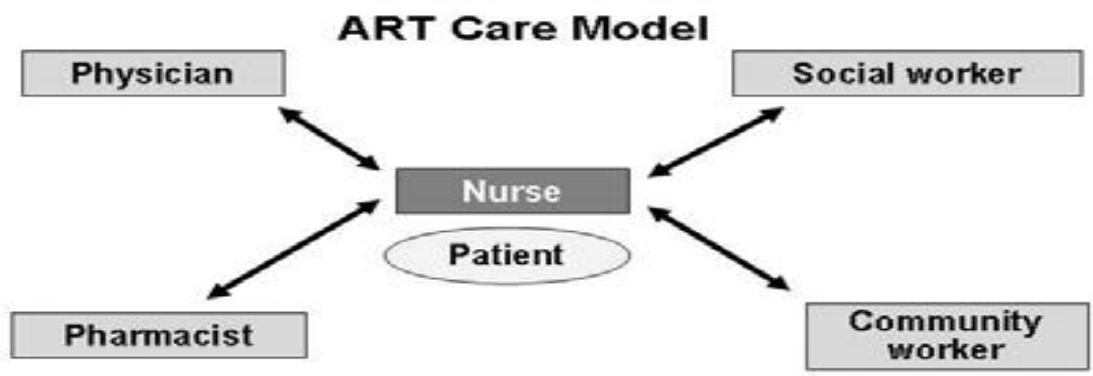
ROLE OF A NURSE

HIV still is a chronic disease with diversified clinical manifestations need a lifelong commitment to ART. The routine care of children /adolescents and psychological challenges with HIV demands a dedicated multidisciplinary approach from a variety of health care professionals including Medicals, Nurses, Psychiatrist, Dentist, Social worker, and Case manager. The ART care model was shown in figure 19.[90] The authenticity of HIV care requires that nurses to take more active and central role in the treatment of PLHIV. The participation of nurses in multi-disciplinary approach is crucial in ensuring ART to the thousands of PLHIV includes of adolescents living with HIV. Such participation in these new healthcare teams needs that nurses to acquire greater knowledge and skill in treating and managing HIV clients.

"THE NURSE IS AT THE CENTER OF PATIENT CARE
&
THE CENTER OF THE TEAM"

Nurses take a vital role in the ART multidisciplinary team. This role includes triaging HIV patients, treating and assessing the patients in need of palliative or symptomatic care, supervising ART ancillary staff, refilling ARV medications for steady and adherent patients, providing enduring adherence & Nutritional assessment counseling and serving as an HIV/ART point person for hospital staff. The nurses play a vital role in the promotion of optimal adherence, nutritional Counseling; thereby nurse can increase the QOL of the HIV infected adolescents. The trusting of nurse- patient relationship makes the patient to feels safe and comfortable even while promoting ART adherence level, nutritional status etc., Many healthcare systems recognize that, adherence as the nurse holds number one responsibility while managing a client who is receiving ART. The nurses play an essential role in generating the right environment: safe, non-judgmental, and confidential.

Fig 19: The ART Care Model in Multi Disciplinary Team Approach



Source: Tesfai Gabre -Kidan MD 2004

Management of Child/adolescents with HIV/AIDS on ART: A Nursing Perspective: [91,92]

- The Nurse in partnership with the physician, Coordinates patient care and treatment.
- A Multidisciplinary team - family-centered approach to care is beneficial to the patients.
- The Nurse recognizes and values each team member's contribution.

- The Nurse is the key resources in referring the patients to support and other Services.
- The Community and other linkages are critical components of the successful treatment of patients in which Nurse's role is crucial.

Adolescence is a period, when relationships are generally shifted from family-oriented to being peer-oriented. The proceedings such as running away, being homeless, or being incarcerated have the potential to disrupt social and developmental trajectories and bang social development. It causes a many barriers for the adolescents to stick on ART therapy. The adolescents require improved adherence support, information about their treatment schedules from health care professionals. So that they feel motivate to take their medication and confident to assume responsibility for their own health.[91] Therefore, the investigator has shown her interest to identify the adherence rate, nutritional status and QOL among HIV infected adolescents.

1.2 NEED AND SIGNIFICANCE OF THE STUDY

Adolescents are the most vulnerable group to get and spread HIV/AIDS in the community. About 31% of HIV prevalence in India is among the adolescents aged between of 10-24 years. The financial burden of preventable health problems in adolescence are large and include the long term costs of chronic diseases that are the result of behavior begun during adolescence. For adolescent infected with HIV, adherence to ART may be dependent upon the ability of their parents or care givers to administer the medication consistently according to guidelines ensure by the health care professionals. The HAART has given a new hope for long term survival and better QOL of persons with HIV disease.[38,39]

The optimal levels of adherence are essential for clinical improvement and the prevention of HIV related complications and OIs. Today, the epidemic of HIV in the country was different from the initial scenario. Since use of ART, the large number of children infected by vertical transmission reaches adolescence and adulthood. Whereas the non adherence to ART management to be foremost challenge to all PLHIV and especially to teenagers, even with the promise of better quality of life includes emotional, social and vocational rehabilitation.[25,38].

The successful treatment for PIA is complex, since they face additional physical challenges cause risk of co morbidity, deferred growth and development, often resulting in late puberty in girls, and stunting and/or wasting makes difficult to reach transition phase of adult. Adolescents have a life time potential of transmitting HIV as risk behavior. So the hidden epidemic of ALHIV needs more attention and a tailored approach in order to reduce the risk of spreading the virus to others.

Koech E et al (2014) conducted retrospective analysis on uniqueness and outcomes of HIV infected adolescents and youth enrolled in Kenya. Among 22,832 participants, the median CD4 cell count was 332 cells/ml; 70.8% were WHO stage I/II. The adolescents (10–19 years) had more advanced WHO stage and lower median CD4 cell count compared to youth (15–24 years) at enrollment (284 vs. 340 cells/ml; P<0.0001). The pre ART patients cumulative incidence of Loss of follow-up (LFTU) and death at 24 months was 46.1% and 2.1% (95% CI) respectively. For those on ART, 32.2% were LTFU and 3.9% (95% CI) died within 24 months. The LFT among pre-ART and ART patients was twice as high among youth and older adolescents compared to young adolescents. The study reports suggested that, the novel strategies targeting these populations are urgently needed to improve retention in ART. The number of youth and adolescents (10–24 years) with HIV infection has increased and substantially presenting unique challenges to effective health service delivery.[93]

Lwanga F et al (2015) did a study on nutritional status of HIV-infected adolescents in Uganda. The nutritional status was assessed respectively by using BMI-for-Age (BAZ) and Height-for-age (HAZ) as indicators of thinness and stunting. Among 205 participants, the prevalence of stunting was 36.2% (72/199), among this 11.1% (22/199) of adolescents were severely stunted. The eighteen percent of the adolescents (36/200) were thin; among this 8% (16/200) were severely thin. The study findings suggested that, there is need for advanced comprehensive care and support system includes adequate nutritional guidance to care and support for HIV infected adolescents.[94]

Fawzi MCS et al (2010) assessed the psycho social support intervention for HIV-affected youth and their caregivers in Haiti. A total of 492 HIV-affected youth aged 10–17 yrs, and their caregivers (n=330) were included in the study. In analysis, the youth reported high levels of anxiety, including constant fidget (86%), restlessness

(83%), and worrying a lot (56%). Their parents and caregivers also reported a high level of depressive symptoms, such as low energy (73%), feeling everything is an effort (71%), and sadness (69%). The parents' depressive symptoms were positively associated with their children's psychological symptoms and psychosocial functioning. (OR-1.6 to 2.4) The findings concluded that, there is a significant level of anxiety and depression observed among HIV-affected youth and their caregiver's. The results suggested that a family-focused approach, psycho social interventions are needed and may be beneficial for improving overall QOL of youth and their caregivers.[95]

Naoroibam R et al (2016) conducted the effects of Integrated Yoga (IY) on psychological status and CD4 counts of HIV-1 infected participants from Manipur State of India. A total of 44 participants were selected and randomized equally in to Yoga and control groups. The yoga group received 60 minutes/day of IY interventions, includes the asana, pranayama, relaxation techniques, and meditation. The intervention continued for 6 days a week for 1 month whereas in control group, followed daily routine as a conservative management. The results showed that, the considerable reduction in depression scores ($F = 4.19$, $P < 0.05$) and non-significant decline in anxiety scores along with non significant increase in CD4 counts in the yoga group. However in the control group, there was a non-significant raise in anxiety and depression scores and decline in CD4 counts. In between-group comparison depicted a significant decline in depression scores ($F = 5.64$, $P < 0.05$) and significant increment in CD4 counts ($F=5.35$, $P < 0.05$) in the yoga group as compared to the control. The study results revealed that**,** regular one month practice of IY can reduce depression and improve immunity in HIV-1 infected participants.[96]

To address this serious gaps, the UNAIDS and UNICEF launched '**All In'** movement in 2015. The objectives are, to reduce new HIV infections among adolescents by at least 75%, to reducing AIDS-related mortality by at least 65%, and eliminating stigma and discrimination by 2020. The overall the goal of optimal level of adherence to ART is reduced HIV/AIDS morbidity and mortality by 60 –90%, and to prolong the quality and survival of life of all ALHIV. Hence, a multi disciplinary approach towards ALHIV is essential and specially need to focus the optimal adherence to ART helps to achieve global targets and also 90-90-90.[97]

The health professionals involved in the care of the children and adolescents with HIV are faced with dual challenge of understanding the effect of ART adherence, nutrition and QOL .The HAART regimens significantly reduce the morbidity & mortality associated with HIV infection among Children, maximizing the HRQOL has become a high priority of long term management of HIV infected individuals. Nutritional management during adolescent period plays a crucial role in maintaining the HRQOL and also to maintain the physical & mental health of the child. There is a strong correlation between ART& Nutrition & QOL. If a child is on ART and has good Nutritional status, has good impact over his QOL. The health professionals are involved in the care of the children and adolescents through counseling, knowledge will aid in effectively interpreting the factors involved in sustained adherence and helps to define the nutritional status and improve QOL and outcome of HIV infected children.

The effective non judgmental communication is vital in nurturing adherence to health promotion as well as preventive practices of treatment of chronic health conditions in teens. The Researcher herself is a nurse educator, administrator and counselor. She has come across in her clinical field, some of the adolescents were required counseling to correct their behavior. These observational and professional experiences make the researcher to pay attention on those adolescents. The researcher also felt that at least nursing students have the opportunity of guiding and counseling to sexuality and healthy lifestyle to avert the spread and as well as contracting HIV.

In this present study the investigator planned to implement HIV interventional package of adherence counseling, Nutritional counseling, provision of educational strategies regarding to improve their QOL and demonstration of selected asana to HIV infected adolescents. The first three components of interventional package benefits can be enhanced by the fourth component of selected asana. The focus of HIV interventional package , will promote the health, develop positive attitudes and health practices ,improve self confidence which prevents HIV transmission in future .This study can helps the Tamilnadu State AIDS Control Society (TANSACS) to achieve the goal of "Getting to zero"- zero new infection, zero AIDS related death, zero stigma and discrimination over the next five years. This study can abet to ensure that tomorrow's adults will be healthy and lead productive life with fewer burdens to the society.

Considering the facts about the prevalence of HIV among the adolescents and the professional experience of the researcher makes the present study to finds the importance. There is need for to protect the HIV infected adolescents from OI and counteract the HIV. The nursing professionals play a main role in making the adolescents group and community to aware of AIDS, its occurrence, transmission and its prevention. The effectiveness HIP will ensure the adolescents to improve in major part of adherence to ART, nutritional status and QOL in terms of improve the immunity, weight gain, management of symptoms and safe and healthy behaviors abets to reduce the new morbidity and mortality.

Chapter - II

Aims and Objectives

CHAPTER – II

AIMS AND OBJECTIVES

2.1 TITLE

"Impact of Nurse Initiated HIV Interventional Package (HIP) on HIV Infected Adolescents."

2.2 STATEMENT OF THE PROBLEM

Impact of Nurse Initiated HIV Interventional Package (HIP) On HIV Infected Adolescents Attending ART Clinic: A Randomized Controlled Trial.

2.3 AIMS OF THE STUDY

2.3.1 Primary Aim

To improve the ART adherence level, increase nutritional status of HIV infected adolescents and enhance their quality of life through the HIV interventional package to HIV infected adolescents.

2.3.2 Secondary Aims

1. To improve and sustain adherence to ART among adolescents with HIV/AIDS.
2. To increase and sustain normal range of CD4 count in adolescents with HIV/AIDS.
3. To improve the anthropometric changes of HIV infected adolescents through increase the appetite and power of digestion.
4. To reduce the minor illness and improve the quality of life among HIV infected adolescents through counseling of various strategies to make better of their life.
5. The selected asana and pranayama of yoga boost up the above the three compounds and enhance the quality of life of HIV infected adolescents.
6. The HIV interventional package including behavior modification of yoga helps to prevent the HIV transmission in future generation.

2.4 OBJECTIVES

1. To assess the base level of ART adherence, nutritional status and QOL on HIV infected adolescents in experimental and control group. (Pretest)
2. To evaluate the 3rd and 6th month level of ART adherence, nutritional status and QOL of life on HIV infected adolescents in experimental and control group. (Post test)
3. To compare and determine the effectiveness of HIV Interventional Package on HIV infected adolescents in experimental and control group.
4. To correlate ART adherence level with nutritional status and QOL on HIV infected adolescents in experimental and control group.
5. To associate the gain score findings of HIV Interventional package on HIV infected adolescents in experimental and control group with demographic variables of HIV infected adolescents/caregivers.

2.5 OPERATIONAL DEFINITIONS

Impact **:** The effect of an HIP intervention.

Nurse **:** A professionally trained person in nursing who is able to look after the HIV clients.

HIV Interventional Package (HIP) : A specific interventional package includes adherence counseling, Nutritional counseling, provision of educational strategies to enhance the quality of life and demonstration of yoga includes selected asana. The interventional aid of diary to be maintained after the practice of yoga and ingestion of ART drugs.

Human Immunodeficiency Virus (HIV) **:** A retrovirus in humans in which the immune system begins to fail, leading to life-threatening opportunistic infections.

Adolescents	**:**	Individuals in the age group of 10 to 18 years.
Antiretroviral Therapy clinic (ART)	**:**	One of the health centre's in the hospitals providing HIV/AIDS prevention, treatment, care and support to all people living with HIV/AIDS.
Randomized Controlled Trial (RCT)	**:**	The gold standards of study design, the subjects are selected by random to receive the specific interventions (Experimental group) and to be compared with standard of care. (control group).

2.6 HYPOTHESIS

H_0 - There is significant difference in pre and post test score on adherence level, nutritional status and QOL of HIV infected adolescents in both groups.

H_1 - There is significant improvement in post test score on adherence level, nutritional status and QOL of HIV infected adolescents in both groups

H_2- There is significant correlation between ART adherence with nutritional status and QOL of HIV infected adolescents in both groups.

H_3 - There is significant association between the gain score findings of ART adherence, nutritional status and quality of life of HIV infected adolescents/caregivers with demographic variables of both groups.

2.7 ASSUMPTIONS

The investigator assumes that,

- The ART adherence can be improved by adherence counseling and daily maintenance of diary.
- The optimal ART adherence can improve the nutritional status and QOL of HIV infected adolescents.

- ❖ The nutritional status of HIV infected adolescents can be improved by nutritional counseling and easily available, accessible and affordable foods of antioxidants helps to increase the immunity and enhance their QOL.
- ❖ The nutritional status and QOL of HIV infected adolescents can be improved by behavior modification of yoga.
- ❖ The selected asana of HIV infected adolescents helps to increase the immunity level, improve nutritional status and enhance their QOL.
- ❖ The ART adherence & nutritional status is influenced by demographic variables.
- ❖ There will be effectiveness in all three components after HIV interventional package of HIV infected adolescents.

2.8 LIMITATIONS

- ✓ Assessment of ART Adherence based on the response from the caregivers and there is no objective method to confirm their claim of 100% adherence.
- ✓ Regarding quality of life, most of the information on adolescents was obtained mainly from the caregivers as the adolescents may not come out with all the details.
- ✓ The intervention strategies include adherence maintenance of diary and yoga practices mainly rely on the adolescents/caregiver's subjective reports.

Chapter - III

Review of Literatures

CHAPTER - III

REVIEW OF LITERATURES

To achieve lasting literature, fictional or factual, a writer needs perceptive vision, absorptive capacity, and creative strength.

Lawrence Clark Powell.

The term review of literature is utilized in two ways by the research community. It refers to the activities involved in identifying and searching for information on the topic and developing a comprehensive picture of the state of knowledge on the topic.[98] The purpose of review of literature for this topic will enable to develop a broad conceptual context into which the research problem will fit.

The review of literature is divided into two parts.

Part - I 3.1: Literature related to the study title.

Part- II 3.2: Conceptual frame work.

The Part-I consists of literatures related major areas of the study title. It comprises of five sections. They are,

3.1.1 - General literature related to HIV/ AIDS

3.1.2 - Related to ART Adherence assessment and interventions to improve adherence in HIV infected adolescents.

3.1.3 - Related to nutritional assessment and interventions to increase nutritional status of HIV infected adolescents.

3.1.4 - Related to QOL of HIV infected adolescents and strategies to enhance the QOL.

3.1.5 - Related to yoga in HIV/AIDS and interventional benefits of yoga in adolescents

This chapter deals with selected studies that are related to the objectives of the study. A literature review is a compilation of scientific studies concerned to the present study. It was commonly found as a sub selection of a published research articles. The review of literature is also presented as free standing explorations of a

body of knowledge. A search was made by the investigator in Pubmed and Cochrane data base, to explore the studies pertaining to reports and publications brought out in medical and nursing field in India and abroad related to sub titles of thesis. The investigator documented the following literatures are submerged in age wise for all the sub themes because there is lack of studies in pertaining to specific age group of adolescents. In pertaining to yoga there is a lack of studies in this age group specific to HIV/AIDS, general studies among this age group were also included.

PART I

Section : 3.1.1 - General Literature Related To HIV/AIDS

Adolescence (10-19 years) is differentiated by accelerated growth of physical, sexual, cognitive and emotional changes. This period is recently gained recognition as a distinct phase of life with its own special needs. These adolescents group face many difficulties and often confusing emotional and social pressures as they grow from children into adults. Due to changing demographic trends in a country make the largest number of adolescents and young people in the world including India. The history and milestone of HIV/AIDS are described in table number 8. On the verge of fourth decade of the AIDS epidemic, the world has turned the corner to halt and begun to prevent the spread of HIV among these adolescents. The HIV remains a global issue when it comes to prevention among adolescents.

Table 8: History and Milestone of HIV/AIDS [26, 99, 100]

1981	At University of California, Los Angeles a gay man was admitted to the medical center with severe immune deficiency and it is named as" Gay- Related Immune Deficiency" (GRID),
1982	Later, the CDC formally coined the term “Acquired Immuno Deficiency Syndrome” (AIDS).
1983	At the National Cancer Institute in the United States, Dr. Robert Gallo and his colleagues acknowledged the causative organism of the disease, which was later named as Human Immunodeficiency Virus (HIV).
1986	The first HIV case in Chennai was diagnosed by Dr. Suniti Solomon, in a female sex worker and also first report of AIDS in Mumbai.
1989	HIV infection identified among intravenous drug users in Manipur state. A medium Term plan for HIV/AIDs control with WHO support was started.

1991	Indian National AIDS control program was launched by Ministry of health and family welfare.
1992-99	SACs (State AIDS Control Societies) were set up to maintain blood safety. NACP I- Launched for focused on awareness generation, setting up surveillance and monitoring HIV epidemic, measures to ensure access to safe blood and preventive services for high risk group populations.
1999	NACP II- Launched focusing on behavior change, increased decentralization and NGO involvement, state AIDS Control societies established.
2001	Indian pharmaceutical companies sponsored ARV drugs with substantial price reduction
2002	National AIDS prevention and control policy adopted. A scale up of targeted interventions for high risk groups in high prevalence states. National blood policy adopted.
2004	Antiretroviral Treatment initiated
2006	National policy on pediatrics ART formulated.
2007- 12	NACP III- Launched to with the goal of Halting and Reversing the Epidemic in India by scaling up of prevention interventions among High Risk Groups (HRG) and General Population and integrating them with prevention, Care, Support & Treatment (CST) services.
2012-17	NACP IV launched to address the need for innovation within all key program strategies for integration of services, quality assurance at all service points and increase coverage saturation and treatment adherence. Launched of Third Line ART and scale up of first and second line ART. Demand promotion strategies specially using mass-media Campaign & Red Ribbon Express, Social Marketing System (SMS) and voluntary male circumcision.

Etiology

The HIV is a retrovirus belonging to the family of lentivirus and it usually transmitted through lymphocytes and monocytes. It is present in the blood, semen, vaginal secretion, and breast milk. It has incubation period of months to years. There are two major strains of HIV includes HIV 1and 2. Among this HIV 2 is a predominant in West Africa, whereas HIV -1 is the dominant strain in the world wide and is more common.

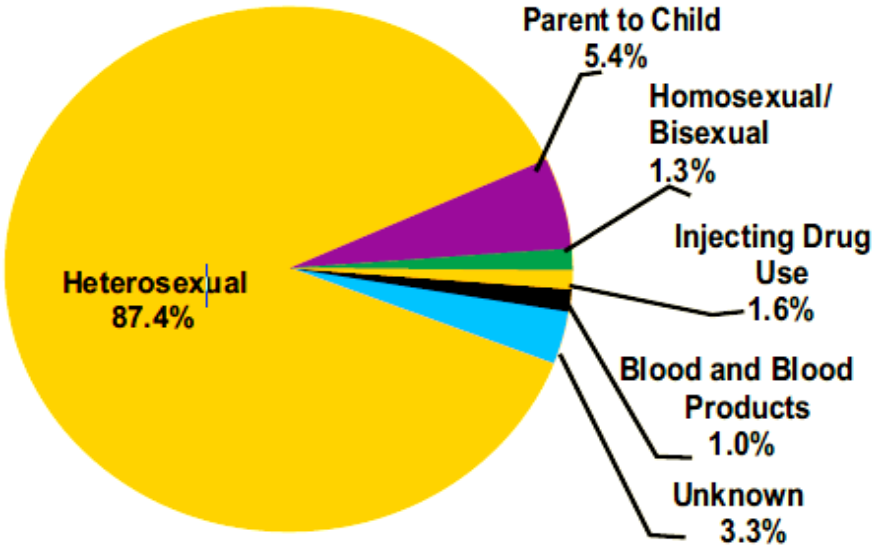
Patho Physiology

The HIV virus principally infects a specific subset of T lymphocytes includes the CD4 and‘t’ cells. The virus takes more than the machinery of the CD4 + t - lymphocytes, using it to duplicate it and rendering the CD4 cell to be dysfunctional. The CD4 + lymphocyte count slowly decreases over time, leading to progressive immune deficiency. The CD4 count ultimately reaches a decisive level of below 300 cells/ mm^3 which cause a considerable risk of opportunistic illnesses, followed by death.

Routes of Transmission

The HIV/AIDS can be caused by two way of transmissions. They are **horizontal** transmission of intimate sexual contact or parental exposure to blood or body fluids containing visible blood and **vertical** transmission of parent to child. The following figure 20 showed the transmission of HIV/AIDS in India.[101]

Fig 20 : HIV/AIDS - Route of Transmission in India



Source: NACO-Antiretroviral therapy for adults and adolescents May 2013

Adolescents and young adults are at increased risk for HIV due to the multiple transitions that congregate in this stage. It also coincides with the acquisition of behavior patterns that potentially influence health-related risk in adult life, including of tobacco, drugs and alcohol misuse and unsafe sex. These important factors have resulted in increased global focus on meeting adolescent health needs over the last two decades.

There are important differences between the adolescents who acquired HIV perinatally and those who acquired HIV non-perinatally. The PIAs will have a longer duration of exposure to the virus and may have been on cART for many years. This has implications for development, maturation, treatment side effects and clinical conditions. Whereas Non-perinatal or Behavior HIV acquisition (BIAs) could include consensual sex, rape, sexual abuse and infection via blood (e.g. blood transfusion, intravenous drug users). Irrespective of their differences, both groups will share common experiences and challenges moving from adolescence into adulthood. The following table number 9 described the differences and similarities between these two groups.

Table 9: Differences and Similarities between Perinatally and Non-perinatally Infected Adolescents [102]

S. No.	Important Factors	Perinatally infected adolescents (PIA)	Behaviourly Infected Adolescents (BIA)	Both share the following
1.	**Awareness of status**	✓ May know their HIV status for many years or need to undergo disclosure when they become adolescents.	✓ Generally older and know their status at time of diagnosis.	**Challenges of disclosure**: by others parents/caregivers/healthcare providers to others (family members, friends, teachers, and employers)
2.	**Family structure and support**	✓ Mother or other family members (father, siblings, etc.) may be HIV positive. ✓ Increased chances of being a maternal and/or paternal orphan.	✓ Acquisition can be associated with increased stigma, discrimination and decreased support from family/ caregivers.	✓ Support and guidance (material and emotional) required from family and reliable, trustworthy of adults
3.	**HIV disease severity**	✓ More likely to have advanced disease with more co-morbidities as a result of lifelong HIV and/or cART exposure. ✓ The health status can be influenced by many factors including age at which cART was initiated, presence of co-morbidities, effective manage-	✓ Less likely to have advanced disease and may not yet meet criteria for initiation of cART. ✓ Likely to have fewer HIV-associated co-morbidities. ✓ Possibly more likely to use alcohol and tobacco.	✓ Health status (includes mental, emotional and physical) influenced by lifestyle, including issues such as living conditions, nutrition, exercise, substance abuse. ✓ Adherence and management of HIV will influence HIV progression.

		ment of OI, achievement and maintenance of viral suppression, cART regimens exposed to, and length of time on cART.		
4.	**Sexual and reproductive health: sexuality/relati n ships**	✓ May not be sexually active ✓ May be a time of sexual experimentation and sexual debut ✓ May be more inhibited, self-conscious and anxious about self-image and entering romantic/sexual relationships.	✓ If sexually active, more likely to require sexual and reproductive health services, including information, education, access to male/female condoms, hormonal contraception and screening for symptoms of STIs	✓ Issues related to risk, transmission and safe sex. ✓ Need to prevent unintended pregnancy ✓ Need to prevent secondary HIV infection ✓ **Sexual orientation** heterosexual, homosexual, bisexual and transsexual.
5.	**Familiarity with health services**	✓ Most likely will have been attending pediatric services since infancy, and will be familiar with health services. ✓ May be transitioning from a pediatric service.	✓ Most likely will come to the health service for an HIV test or because of another problem, (e.g. illness, STI, contraception, pregnancy) and will have/ had less contact with the health service.	✓ Require adolescent-friendly and responsive services
6.	**Antiretroviral treatment**	✓ Most likely to be on cART and may be on second line treatment. In younger adolescents treatment adherence may be overseen by carer but likely to be responsible for own treatment if older. ✓ Transition into adolescence may present adherence problem.	✓ Probably not yet required, or only recently initiated ✓ May be initiated as part of PMTCT.	✓ Adherence may be problematic in adolescence, especially as responsibility shifts from parents/ care givers to self-administration ✓ Need regular monitoring and management of drug side effects.

Use the 5 'A's in consultations with adolescents

Based on the WHO's Integrated Management of Adolescent and Adult Illness **(IMAI)** for the management of chronic care and the guidelines for engaging with clients include the 5 'A's: **Assess, Advise, Agree, Assist and Arrange**. This tool provides a useful framework to move through a process of identifying, exploring and problem-solving areas of concern, together with follow-up plans or Anti retroviral therapy. The clinical goals of ART are**,**

- To provide maximum and robust repression of viral load and,
- To restore and/or preserve immune function.
- To reduce HIV-related morbidity and mortality.
- To increase the lifespan and as well as enhance QOL.

These goals are only attained by complete repression of the viral replication for providing possible well tolerated and sustainable treatment. With prolonged viral suppression generally increases the CD4 lymphocyte count results in a remarkable reduction in the risk of HIV-associated morbidity and mortality. The opportunistic infections and related symptoms such as TB and diarrhea, affect the nutritional status as well as physical factors such as appetite and weight of PLHIV. The ART management with good nutritional support and the minimal physical exercises will enhance their QOL and longevity of life period of PLHA.[104]

Control of AIDS [99-104]

The following are the basic approaches to control the HIV/AIDS.

1. **Prevention**

   - Prevention is a key component of HIV education. The most important areas of Information, Education and Communication **(IEC)** and Behavior Change Communication **(BCC)** program are needed to improve the knowledge of HIV/AIDS and create awareness among ALHIV and also general adolescents
   - The access to health information regarding sexual and reproductive, education regarding safe sex and services is necessary for their well being.

- Also avoid use of shared razors and tooth brushes.
- Information to Intravenous drug users - Avoid to share the needles and syringes involves special risk.
- All mass media channels should be involved in educating the people on AIDS, its nature, transmission and prevention.
- People on high risk groups should be urged to abstain from donating the blood, sperms, body organs or other tissues.

2. Counseling and HIV testing and National level control program

- Integrated counseling and Testing centres (ICTCs) are a key entry point for a range of interventions in HIV prevention. The care like prevention of parent to child transmission (PPTCT), Referrals STD treatment / Reproductive Treatment Clinics (RTC), Care and Support for treatment of OIs and High risk groups are essential to treat and manage the problems before gets complicated.
- A common psychosocial concern includes disclosure status to the child, follow custody plans when the primary caregivers are infected, and anticipating loss of family members.
- Provision of psycho social counseling is essential in order to reduce the anger and depression towards the family members and rehabilitation and vocational counseling is needed to enhance their quality of life.

Apart from this, the government has taken initiation to create the awareness and control of HIV/AIDS started the programs like School AIDS Education program, Red Ribbon Express, Condom Promotion or Social Marketing System (SMS), Social mobilization, Youth Interventions and Adolescent Education Program are essential to control and prevent the HIV/AIDS among adolescents and youth.

3. Anti Retroviral Therapy (ART) management

The HARRT has brought new hope for PLHA. The ART is a combination of drugs that are used to manage patients with HIV. The ART does not totally eliminate the virus or alleviate the disease but it will decline the amount of virus in the body by prevent from replication. According to the National guidelines each countries are

following the own eligible criteria to start ART. Once ART initiated for people living with HIV/AIDS it can't be stopped at any level and it has to be continued as a lifelong commitment. There are several types of ART drugs are used to treat for PLHIV.

They are,

1. Nucleoside (and nucleotide) reverse transcriptase inhibitors (NRTIs)
2. Non-Nucleoside reverse transcriptase inhibitors (NNRTIs)
3. Protease inhibitors (PIs)
4. Fusion inhibitors

These are drugs used for the combination of first line and second line ART regions. The following table number 10 illustrates the commonly available ARV drugs in the ART clinic. Patients are primarily prescribed a three drug combination as first line therapy (1 NNRTI and 2 NRTIs). According to the patient's prognosis state, weight gain, viral load and side effects of the drugs the medical officers are to decide whether to continue same regimen or either one drug in the combination can be changed or change to the second line regimen (1 PI and 2 NRTIs). Currently the third line drugs are also available. They are, Raltegravir (RAL), Darunavir (DRV), Ritonavir (RTV) and Etravirine (ETV).

Table 10: Illustrates the Commonly available ARV drugs using for the ART patients

NRTIs	NNRTIs	PIs
Zidovudine (AZT)	Nevirapine (NVP)	Lopinavir (LPV)
Lamivudine (3TC)	Efavirenz (EFV)	Ritonavir (RTV)
Stavudine (d4T)		Saquinavir (SQVr)
Didanosine (ddI)		Nelfinavir (NFV)
Abacavir (ABC)		Indinavir (NFV)
Tenofovir (TDF)		
Emtricitabine / Entriva (FTC)		

The fusion inhibitors disrupt the interaction between the HIV virus and the cell surface, averting the fusion of the HIV virus to the cell. These drugs are not widely available and cannot be taken by mouth. Adherence is often more complicated for children born with HIV, who have been on ARVs longer than adolescents who

acquire HIV at older ages. The multidisciplinary team members should work together to create adherence support program for people living with HIV/AIDS. The nurses and counselors should re-address the barriers and promote the adherence for especially ALHIV since they are transiting to the adult care. The peer support groups could be particularly helpful in supporting adolescents to take their medication properly. The new technology or social media should also be explored as a potential platform for providing peer-to -peer support and counseling.

Section : 3.1.2- Literature Related To Adherence Assessment and Interventions to Improve the Adherence in HIV Infected Adolescents

Ferrand RA et al (2016) reviewed the literatures related to the adolescents achieving virological suppression after initiating ART from MEDLINE, EMBASE and Web of Science databases from the period of January 2004 and September 2014.Through the search result**,** the total of 5316 potentially relevant citations, 20 studies were included. Among that, only 8 studies were reported the percentage of adolescents that were virologically suppressed at a specified time point. The proportion of adolescents with virological suppression at 12 months varied from 27-89%.The study reports suggested that adolescent's achievement of HIV virological suppression was greatly variable. The improved reporting of virological outcomes from a wider range of settings is imperative to support efforts to improve HIV care and management for adolescents.[105]

Kukoyi O et al (2016) done a prospective longitudinal study on antiretroviral treatment outcomes and viral load monitoring in HIV infected children in Ghana. The total 140 children aged 5 to 17 years instigated ART were included. In analysis, 184 hospitalizations and 102 Opportunistic infections (OI) were reviewed among that the pneumonia being the most common causes (22.8 %) for hospitalizations and tuberculosis common OI (68 %). The total of 823 outpatient sick visits was renowned, with upper respiratory infections (14.2 %) being the most common causes. The 44% of participants had >4 log10 vireamia copy years (VCY). The sub-cohort children had a high frequency of sick visits compared with those with < 4 log10 VCY (P = 0.03). The 6.5 % of children with >4 log10 VCY had been recognized as treatment failure based on criteria of WHO clinical and immunological treatment failure.[106]

Okatch H (2016) evaluated the significance of adherence in association with treatment failure of HIV infected adolescents. The 300 HIV infected cohorts were involved for pill counts method for calculating adherence percentages and identified that many patients discarding pills to hide for non-adherence. The pill counts percentage of > 100% can signal "pill dumping." The study reports revealed that, HIV-infected adolescents as having >1/3 of pill counts with > 100% adherence throughout the follow-up suggested that "over-adherence". The apparent over-adherence was more frequently in virologic failure than those with suppressed viral loads (33% vs 13%, p=0.001). The study findings suggested that, pill count adherence frequently of >100% may indicate that increased risk of treatment failure in HIV-infected adolescents.[107]

Carly H & Cluver L (2015) analyzed a systemic review on factors related with adherence to ART among ALHIV (10-19 yrs) in LMICs. Among 15 studies and the total of 4363 participants, acknowledged 35 factors were significantly related with ART adherence in nine different LMICs. This review highlighting significant themes for factors affecting the ART adherence include, (1) cohort factors such as gender and cognitive level of zero status (2) caregiver and family related factors (3) medication related factors likes regimen fatigue, intolerance, and attitudes about drugs, and (4) ecological and physical factors, like urban versus rural location and loss of follow-ups. He concluded in this review ranged from 16% to 99% rates of adherence of adolescents across studies in LMICs.[108]

Córdova E et al (2015) evaluated safety and efficacy of ART in PIAs (12-18 yrs) in Argentina at baseline (2005-2011) and after 48 weeks of ART initiation. Among 37 adolescents, 23 (62%) had a virologic failure, median CD4 count 385 cells/ml (247-555) and median viral load: 3927 copies/ml (1534-6380). Only four patients had no history of undetectable viral load in their lives. At end of study, the median CD4 count was 447 cells/ml (261-1121), viral load <50 copies/ml was observed in 5 more (45%) patients and also observed that the most frequent HIV resistance associated mutations (RAM).The results findings concluded that the high rate of virologic failure could be attributed to the suboptimal adherence observed in almost all adolescents and especially in the PIAs in the study.[109]

Kim SH et al (2015) examined the significance of self-motivation and social support in medication adherence on HIV infected adolescents in United Kingdom. Among 138 adolescents aged 2–24 years were enrolled. Among this, 75% of adolescents were self reported on 7 days recall of sub optimal adherence of up to 85%. In analysis, the self-motivation of routine work was most supportive for 33% in medication compliance, followed by 25 % of reminders by family and friends with 20% recognized no specific factors were needed. Only 15% of participants chose interventions such as an mobile phone reminders or adherence diary as helpful factors, and 1% chose healthcare team input such as home visits. He concluded that motivation and educational strategies may decline the impact on sustained ART adherence among this vulnerable group.[110]

Marvin BE et al (2015) conducted a study on the feasibility and acceptability of a cell phone support intervention for non adherence to ART among youths (15–24 yrs). Among 19 youths, 37% discontinued the intervention due to missing over 20% of calls or missing 10 % consecutive calls. The 16 % participants only fulfilled exit interviews and only 13% reported that, after the 24-week intervention they would have liked to continue calls and all participants suggested they would advocate the intervention to friends. He concluded that, providing cell phone support to youth non adherent to ART was acceptable and feasible.[111]

Orrell C et al (2015) evaluated the effects of real time electronic adherence monitoring with text message reminders among adolescents and adults starting first line ART in South Africa. Around 230 participants, aged 18 and above were randomized to equally (n=115) in both groups. In analysis, the median adherence was 82.1% in the intervention arm, compared with 80.4% in control [AOR 1.08; 95% CI: 0.77 to 1.52]. The suppressed HIV RNA (<40 copies/ ml) happened in 69.6% of control and 65.2% of intervention group. When compare to control the [AOR for virological failure 0.77; 95% CI: 0.42 to 1.40] treatment interruptions of >72 hours was reduced [adjusted incident rate ratio, 0.84; 95% CI: 0.75 to 0.94] in intervention arm. The results concluded that, text message reminders related to late doses noticed by real-time adherence monitoring and decreased the frequency of treatment interruptions, but did not significantly improve adherence or viral suppression.[112]

Shet A et al (2014) assessed the impact of mobile phone reminders on treatment outcomes of HIV patients in south India. The HIV infected participants aged 18 years & above on first line ART were included. Through randomization, the total of 631 participants were assigned to mobile phone intervention (n=315) and standard care (n=316) followed for 2 years. In analysis, the rate of virological failure in the intervention and standard care groups was 10.52 and 10.73 respectively and it was found that no observed difference between the allocation groups. The suboptimal adherence was 81/300 in the intervention arm and 65/299 (27.0 & 21.7%) in the standard care arm and found that no difference in between groups. The result findings revealed that, no significant effect on mobile phone intervention either in virological failure or ART adherence at the end of study.[113]

Chaiyachati KH et al (2014) analyzed a systematic review on interventions can progress adherence to ART including individual - level interventions among PLHIV. The total of 124 studies were selected, among this eighty-six studies were RCTs and more than 20 studies were tested for the effectiveness of the following interventions, either separate or in combination with other interventions: directly observed therapy (DOT), education, active adherence reminder devices (such as mobile phone text messages), cognitive-behavioral interventions and buddy system. Even though there is strong facts that all five of these interventions can extensively enhance ART adherence in some settings and other notorious view each intervention has also been found not to produce momentous effects in several studies. Almost half (55%) of the 124 studies explored the effectiveness of combined interventions, tend to have same effects like single interventions.[114]

Intasan J et al (2014) evaluated the ART adherence through various assessment tools among 1-12 years of HIV-infected children (n=207) at Thai and Cambodia. In analysis, 13% had Viral Failure (VF) and it's co-related with announced pill count mean adherence (P = 0.03). In multivariate analysis, announced pill count was highly associated with sex, and education of caregivers are significantly influence poor adherence and VF with OR 4.56; 95% CI,1.78–11.69, expose a missed dose of 6 months in viral load assessment with OR 8.64; 95%CI 1.96–38.04 and barrier of adherence (according to PACTG questionnaire) with OR 7.08; 95% CI, 2.42–20.73. The study results recommended that, there is a strong association with development of VF in regard to self-report of any missed doses.[115]

Maduka O and Tobin-West C.I et al (2014) done mixed method study on barriers of HIV treatment adherence among PLHIV aged 18 and above in ART center at Nigeria .The data collection was via quantitative (n=96) and qualitative method by four focused group discussion were held with 27 purposively selected participants. In analysis, among 96 patients, the most common reason for missing medications were, 42.7% being away from home during medication times, 36.5% being busy with other things,34% forgetfulness ,26% running out of pills and difficulty taking pills,16% the need to avoid side effects and 15% lack of a social support system. The barriers identified by the focused group discussions (FGD) were alcohol use, poor understanding about the effects of drugs , fear of taking HIV drugs in front of others, forgetfulness, sharing drugs with infected spouse, financial challenges, poor attitude of health workers and long clinic hours. The study finding suggests that, the adherence counseling, use of reminder systems and treatment supporters are useful in public health interventions for improving adherence of youth on ART.[116]

Evans D et al (2013) conducted a retrospective analysis on outcome measures of HIV infected adolescents in South Africa. The total of 42,427 participants on ART was participated for the outcome of one year evaluation. In analysis compared to adults, both older adolescents and young adults (6 & 12 months RR 1.75 & 1.64, 95% CI) are more likely to have viral resistance and were more likely to get virological failure. The young adolescents were less likely to be LFT during the study period when compare to older adolescents and young adults. It results, between the age of 15 and 24 years have poorer ART treatment outcomes in terms of LFT, virological resistance and failure than adults receiving ART. The study finding suggests that, interventions are required to improve outcomes and retention in ART care in this special population.[117]

Maduka O et al (2013) done a randomized control trial on reminder text messages and motivational counseling among adolescents in Nigeria. The total of 104 participants aged 15 years and above were enrolled and randomized into intervention and control groups. Among this 45 males (43.3%) and 59 females (56.7%) were included. The experimental group received weekly twice of short message reminders for four months, monthly motivational adherence counseling and while the control group received only the conventional care. In pre- and post-intervention, the self-

reported adherence and CD4+ cell counts were measured. In analysis**,** after 4th month results revealed that adherence rate was increased to 76.9% in experimental & only 55.8% in control group (χ^2 = 5.211, RR = 0.75 , *P* = 0.022) Also, the intervention group median CD4+ cell count was improved from 193 cells/ml to 575.0 cells/ml whereas in control group 131.0 cells/ml to 361.5 cells/ml (*P* = 0.007).The study findings depicted that, text message reminders and motivational adherence counseling improved adherence among HIV participants.[118]

Donell. MK et al (2013) explored a cross sectional multisite study on barriers to medication adherence in behaviorally and perinatally infected adolescents and young adults in the age of 12-24 yrs and reported missing at least one dose of medication in the past 7 days. Among 484 participants, perinatally infected youth (M=3.68,SD = 2.62) reported significantly more barriers than behaviorally infected youth (M = 2.97 SD = 2.49). Forgetting (73.6 %) not want to be reminded of HIV infection (35.5 %) and not feeling like to take medication (39.2 %) were the most common barriers reported for both participants in the group. The significant barriers were missed dose (r = .27, p ≤ .00), viral load (r = .27, p ≤ .00), and psychological distress (r = .38, p ≤ .00) in perinatally infected youth but where as in behaviorally infected participants, missed dose (r = .35, p ≤ .00), psychological distress (r = .25, p ≤ .00), and substance use (r = .14, p ≤ .05), but not with viral load (r = .12, p = .08). He concluded that, multiple barriers were associated with viral load in perinatally infected youth, though both participants had significant associations between adherence and viral load.[119]

Shroufi A et al (2013) conducted retrospective cohort study on HIV-infected adolescents (10-19 yrs) on management outcomes of ART in Zimbabwe. In analysis, 1,776 adolescents were commenced on ART, 94% had no previous history of ART. The 97% adolescents diagnosed HIV after appearance of clinical symptoms and advanced HIV disease compared with adults [79.3 vs 65.2%, P< 0.001)]. Among those, 5.8% of adolescents were switched to a second-line regimen as a result of treatment failure, compared with 2.1% of adults (P<0.001) followed for 5 years or more. The study findings concluded that, with adolescent-focused services, are needed to achieve good outcomes for adolescents However, this age group has a high risk of treatment failure, so interventions to address poor adherence should be prioritized.[120]

Ugwu R, Eneh A (2013) conducted a correlation study on reasons for non adherences by using self-report of the caregiver/child among HIV children/adolescents at South Nigeria. The participants aged 3 months to 18 years and their 213 caregivers were enrollred. In analysis, 59.2% were completely had 100% adherence and 76.1% had adherence rates of ≥95%. The persistent caregiver-related factors for missing doses were forgetfulness (55.2%), travelled (25.3%), unavailable to collect the drugs (18.4%), caregiver ill (17.6%) and family problems (13.2%). Whereas the child-related factors were refused drugs (11.5%), slept and vomited (9.2%). The predictors of poor adherence includes were younger than 5years with 95% CI (OR 2.62; 1.30-5.31) and presence of a co-morbidity (OR 3.97: 1.92-8.33). Whereas the predicted better adherence includes with 95 % CI, medication reminder strategy (OR 6.34; 3.04-13.31) and regular clinic visits (OR 8.55; 4.01-18.45). The study finding suggests that, adherence rate among this age groups are still suboptimal. Since recognizing and managing these barriers aids to improve adherence and child outcomes.[121]

Buchanan AL et al (2012) evaluated the barriers of medication adherence in HIV infected children and youth based on caregiver's report from Pediatric AIDS Clinical Trial Group (PACTG). The total of 120 PIAs (aged 8 to 18 years) and their parents/caregivers were fulfilled a questionnaire about barriers of adherence to ARV regimens. In analysis, the most frequently reported barrier was "forgot reported either by the caregiver or youth" (k = 0.41, P <.001) and the other barriers are ," bitter taste" (k = 0.44, P <.001), "child refused (k = 0.26, P = .01)," "child was away from home" (k = 0.38, P<001), and "child felt good (k = 0.24, P = .02) when not taken medicine." The adolescents who knew their HIV status were more likely to report logistical barriers like scheduling issues. The children with a biological parent and their caregivers were more likely to report regimen related factors or fear of disclosure as a barrier. The study finding suggests a need for interventions that tasks of remembering to take medications, sustaining adherence are essential for transition to adult care.[122]

Dowshen N et al (2012) conducted a prospective pilot study on improving adherence using with personalized, interactive, daily text message remainders for youth (14-29 yrs) living with HIV/AIDS. The participants received personalized daily

SMS reminders and 1 hour later have follow up message for assessing the medication. Out of 25 participants, 21 (95%) participants were successfully completed the intervention. The Mean Visual Analysis Scale (VAS) scores compared with base line, appreciably increased at 12 and 24 weeks (week 0: 74.7, week 12: 93.3, $P < .001$; week 24: 93.1, $P < .001$) and ACTG questionnaire 4-day recall also improved (week 0: 2.33, week 12: 3.24, $P = .002$; week 24: 3.19, $P = .005$). But there was no considerable progress in CD4 cell count or decrease of viral load throughout the follow up. He concludes that, the daily SMS remainders useful to avoid missed doses and also it notably improved self-reported adherence.[123]

Kikuchi K et al (2012) done a cross sectional study on high risk of ART non adherence on HIV positive double orphans at Rwanda. The total of 717 HIV positive children aged 3 -12 years and their caregivers were participated. In analysis, among the 717 each orphan categories were (double orphan - 346, maternal (89), paternal (169) and non-orphan-(113) participated and the level of non adherence were 59.3%, 44.9%, 46.7%, and 49.7% respectively. The multivariate analysis indicated that maternal, paternal and non orphans were less likely to be non-adherent contrast to double orphans. The non adherences were more in double orphans who had a sibling as a caregiver. It's revealed that the double orphans were at highest risk of ART non-adherence and need more attention to enhance the optimal adherence level.[124]

Wasti SP et al (2012) done a mixed method study on factors affecting adherence among ART participants (aged 18 and more) and care providers in Nepal. Among 330 participants only 85.5% had optimal adherence. in quantitative analysis, the major factors listed for adherence are: not aware of HIV status with OR = 17.99, p = 0.014; being female and illiterate with OR = 6.91, 4.58 p = 0.001; ART started more than 24 months and side effects with OR = 3.18 , 6.04 p = 0.009; transport time > 1 hour with OR = 2.84, p = 0.035 and alcohol use (OR = 12.89, p =,0.001).In thematic analysis, the lack of awareness and negative attitude of ART also significantly associated non-adherence. The other common reasons for non adherence include side-effects, busy schedule, transport time and costs.[125]

Mellins CA et al (2011) examined behavioral health risks in perinatally HIV infected (PHIV +) and perinatally HIV-exposed, uninfected (PHEU) adolescents in the age of 10-16 yrs. Among 349 adolescents, nearly half of participants had one

behavioral health risks and most participants had psychological problems (28%), sexual activity and substance use (16%). Regarding the sexually active, 65% of PHIV + and 50% of PHEU adolescents reported unprotected sex. The 18% of PHIV and 14% of PHEU adolescents reported substance use. The majority of adolescents were reported alcohol use (PHIV 58% + PHEU 69%) and marijuana (PHIV 35% + PHEU 56%). The PHIV adolescents 34% reported history of ART non adherence of which 45% had detectable HIV RNA levels in blood. Finally the study suggests that the multiple behavioral health risks causes non adherence for both PHIV + and PHEU adolescents.[126]

Section: 3.1.3 - Literature Related to Nutritional Assessment and Interventions to Improve the Nutritional Status of HIV Infected Adolescents

Yengopal V et al (2016) reviewed the literature on Pediatric & adolescent HIV with a focus on oral lesions as indicators of the efficiency of HAART and QOL. The search strategy was developed form Pub Med and publications were limited from 2009 to 2014. In analysis, the prevalence of oral lesions not has standardization in diagnostic criteria and the prologue of HAART had significantly reduced prevalence; the oral lesions remain helpful predictors for HIV infection and as indicators for the efficacy of HAART. The indicator suggested that caries risk was increased with HIV infection; management of oral lesions also incompatible with available resources. The oral health QOL indicators for children and adolescents are more essential and oral HIV research needs to be prioritized with number of interventions available for management of oral lesions and as well as improve the dietary intake.[127]

Ifitezue LC and Sosanya ME (2015) done a study on nutritional assessment of HIV infected orphan children (0-17 years) and implement food based intervention to improve their nutritional status in Nigeria. The total of 196 participants was chosen by purposive sampling method. The data was collected by using anthropometry and food frequency questionnaire. In analysis, the children were respectively had moderate (28-14.4%) and severely underweight (18 - 9.3%), whereas regarding moderate and severely stunted were 34 (17.6%) and 5 (2.6%) respectively. Regarding the food frequency, the most habitually consumed cereals were rice (92.3%) and maize (88.7%), whereas the most commonly consumed tuber, animal protein, vegetables and fruits were yam (88.1%), meat (67%), and fish (66.5%), garden egg

(69.1%) and orange (75.8%) respectively. The twenty children were consumed for the intervention of giving kwash pap powder for a period of 1 month and the mean weight gain (0.99 ± 0.43 kg) was significantly improved after the study period ($p<0.001$).The findings recommended that, food based intervention can enhance the nutritional status of children orphaned by HIV/AIDS.[128]

Pires P et al (2015) conducted a quantitative study to evaluate the food security contribution to ART non adherence in Nampula. The total of 208 participants, aged > 15 years were participated. In analysis, 58% consider that they do not have enough food. The ART adherence for patients on treatment over the last 3 months was estimated at 69%. The last 24 hours of food intake survey shows that 21% had only one meal, 22% did not eat any vegetables, 24% did not eat any proteins, 56% any fruits. About economic income, 63% work in subsistence agriculture, 29 % have informal activity and 18% are employed. The report finding suggests that beans, peanuts, eggs, cabbage and fruits, locally available vegetables; as an ART adherence facilitator and recommend that implementing a nutritional education program and rural extension intervention with this group, in order to improve better families food security.[129]

Sales-Peres SHC et al (2015) done a comparative study on oral health status and anthropometric condition in adolescent's infected with and without HIV infection in Mozambique. The total of 43 adolescents aged 15-19 years, were divided into two groups namely, in experimental group have HIV infected adolescents with AIDS; and in control group have adolescents without HIV infection. In analysis, the experimental group had a higher degree of dental caries with OR= 5.902; 95% CI=2.859 -12.188; p=0.000, less periodontal diseases with OR=1.318; 95% CI=0.662-2.624; p=0.540, higher alterations in the soft tissue with OR=0.216; 95% CI=0.057-0.811, p=0.030 and lower normal BMI (OR=0.498; 95% CI=0.252-0.987; p=0.066) than the control group. The study results depicted that HIV infected participants even on ART are at major risk for dental caries or alterations of soft tissue and minor risk for periodontal diseases.[130]

Shet A et al (2015) evaluated the prevalence of anemia and effect of iron on HIV among children in southern India. The total 240 vertically infected children aged 2–12 years were enrolled and followed for 1 year. In analysis, the baseline

assessment of the median CD4 count of 25 % to 19.2 % had advanced disease and 45.5 % had malnutrition. Anemia was prevalent in 47.1 % children and severe anemia was seen in 6.7%. The majority (65.5%) of participants had iron deficiency anemia, 26.6% in vitamin A and 8.0 % vitamin B12 deficiency. After the baseline visit, among 113 anemic children; 77 children had peaked level of 11.3 mg/dl after 1 year. The prevalence of iron deficiency also declined from 66 to 49.2 % ($p = 0.04$). The study findings suggests that therapeutic iron intake for up to 6 months to be safe and are associated with favorable effects on anemia.[131]

Swetha GK et al (2015) done a study on health and nutritional status of HIV infected children (1.5- 15 yrs) at two orphanages in Hyderabad. Among 77 children, 44 children were on ART and 33 children were not on ART are included in the study. In analysis, 59.7% were stunted, 46.8% were underweight and 19.5% had low BMI for age. The Anemia (Hb <11 g/dl) was prevalent in 45.5% and micronutrient deficiencies includes vitamin D deficiency (< 20 ng/ml) was observed in 51.9 % , Vitamin A deficiency in 14.3% and zinc deficiency was in 16.9% children. The respiratory (36.6%) and dermatological illness (18.8) were the common co-morbidity of the HIV infected children.[132]

Anyabolu H. C. et al (2014) evaluated the micronutrient status of HIV infected children on ART compared with HIV negative controls. The total of 140 children aged 24 to 227 months were enrolled and 70 control children were matched with age and sex. In analysis, the prevalence of zinc, selenium, and vitamin C deficiency was 77.1%, 71.4%, and 70.0% respectively in HIV infected children as compared to 44.3%, 18.6%, and 15.7% in HIV negative controls. The study findings depicted that 70% of the children were deficient in both Zinc and selenium with 58.6% was deficient in the three micronutrients. This micronutrient deficiency is widely prevalent in HIV infected children on ART and suggests that additional supplementation is essential in these cohorts.[133]

Hillesheim E et al (2014) evaluated the nutritional status and dietary intake of HIV infected adolescents in Brazil. The 49 participants were aged 7–17 years were included. In analysis, the mean BMI-for-age was -0.26 ± 0.86 and height-for-age was -0.56 ± 0.92. The majority (85.6%) of the participants had nutritional deficiency i.e., energy intake (50.8%) above the estimated energy requirement and inadequate

ingestion of polyunsaturated fat (100%), cholesterol (57.1%), fiber (40.8%), calcium (61.2%) and vitamin C (26.5%) These data showed that, the low BMI-for-age and height-for-age z-scores, high energy intake and inadequate intake of important nutrients were significant in poor immune function, growth and control of chronic diseases.[134]

Modlin CE et al (2014) conducted a study on nutritional deficiencies and food insecurity among HIV-infected children (2-14 yrs) in Tanzania. The data was collected regarding anthropometric measurements and determined 24 hour macro and micronutrient intakes and food insecurity. Among 48 pairs of children and their caregiver(s), the median weight-for-height z-score for children ≤ 5 years was 0.69 and BMI-for-age z-scores for children >5 was -0.84. The macronutrient assessment reported that 60% children were deficient in dietary intake of energy; deficiency was more common in older children (p=0.004). The micronutrient evaluations showed that, over half of study participants were deficient in dietary intake of vitamin A, D, and E, thiamine, riboflavin, niacin, folate, vitamin B12, and calcium. The food insecurity was reported by 58% of caregivers. The study finding suggests that enhanced dietary counseling and provision of macro and micro-nutrient supplements will be necessary to achieve optimal nutrition for most of the HIV-infected children.[135]

Brainstein P et al (2013) evaluated the effects of nutritional status among orphaned and separated children and adolescents (OSCA) living in western Kenya. A total of 2862 participants (0-18 yrs) are included and the malnutrition measures were standardized with Z-scores (WHO). The findings showed that stunting was widespread i.e., 74% in this population and 59% of children were had abnormally low height and weight for-age at p=0.001. The study findings suggested that, the OSCA living in community households were 2–3 times more and street youth are roughly 6 times more likely to have height and weight stunting for their age compared to children living in Charitable children institutions (CCI's), suggests that, chronic under or malnutrition.[136]

Mudzinge D et al (2013) conducted a comparative cross sectional study on differences in serum levels of Magnesium, Phosphate and Albumin for HARRT experienced and Naïve female patients in Zimbabwe. The equal participants 40 HIV

infected women, aged 18 to 40 yrs were enrolled in both groups. The results revealed that, Magnesium, phosphate and albumin levels were considerably higher in the therapy naïve than in therapy experienced patients where as in calcium level of both groups no significant difference was found. The study evidence suggests that HARRT lowers levels of magnesium, phosphate and albumin but has no effect on serum level of calcium. It revealed that, the need of dietary counseling and provision of macro and micro nutrients supplements will be necessary to achieve the optimal nutrition for most of the PLHIV.[137]

Schtscherbyna A et al (2012) assessed the prevalence and factors associated with low bone mineral density (BMD) in HIV infected adolescents in Brazil. In analysis, 74 adolescents aged 17.3 + 1.8 years were participated. The Low BMD was present in 32.4% of them. The lumbar spine (LS) and total body (TB) BMD Z-scores were positively correlated with weight, BMI, BMI Z-score, total body fat, and nutritional status. The subjects on tenofovir had lower LS, TB and BMD Z-scores. There is no difference was found regarding levels of calcium, parathyroid hormone, or 25-hydroxyvitamin D according to BMD status. The study finding reveals that the body composition and nutritional status had a positive influence on BMD that was more evident in females, suggesting that nutritional intervention may have a positive impact on BMD.[138]

Barros Ramalho LC et al (2011) conducted a comparative study to identify abnormalities in nutritional status and body composition of HIV-infected children and adolescents on ART in Brazil. A group of 94 HIV-infected children and adolescents on ART and 364 healthy controls were participated. In analysis the HIV adolescents had higher risk of stunting [OR 5.33; 2.83–10.04) and thinness (OR 4.7: 2.44–9.06) with 95% CI, higher waist-to-hip ratios (medians 0.89 vs. 0.82 for boys and 0.90 vs. 0.77 for girls, P= 0.001), and lower prevalence of overweight or obesity (OR 0.33, 95% CI: 0.14–0.78). The study results revealed that the HIV-infected children on ART showed low in nutritional status and body composition abnormalities than the control group.[139]

Liu E et al (2011) analyzed the nutritional status and mortality among HIV infected participants aged > 15 years on ART in Tanzania. The total of 18,271 HIV infected adults and their changes in the first 3 months of ART were included. In

analysis lower BMI, MUAC, and Hgb concentrations at ART initiation were strongly associated with a higher risk of death within 3 months. Among patients who survived 3 months after ART initiation, those with a decrease in weight, MUAC, or Hemoglobin concentrations by 3 months had a higher risk of death during the first year. After 1 year, only a decrease in MUAC by 3 months after ART initiation was related with a higher risk of death. The weight loss was associated with increased risk of death across all levels of baseline BMI, with the highest risk observed among patients with BMI 17 kg/m^2 (relative risk 7.9; 95% CI, 4.4–14.4).The study finding suggest the role of nutritional counseling and interventions as adjunct therapies to ART are aids to reduce the mortality of HIV infected adolescents.[140]

Mohd Nasir MT et al (2011) conducted a cross-sectional study to determine the nutritional status of CLHIV in Malaysia. The total of 95 children aged one to eighteen years old on ART were participated. In analysis, the anthropometric assessment found that 32% of the children were under weight, 20.8% were stunted and 14.6% severely stunted. The biochemical indicators showed that 10.4% had deficiency in vitamin A while 12.5% had deficiency in selenium. The total cholesterol and HDL-C levels were found to be low in 30.5% and 10.5% of the children respectively. The study finding reveals that the dietary assessment showed almost all the participants did not achieve the recommended energy intake for their age groups and almost half of the children did not achieve the RDA for selenium and vitamin A.[141]

Souza et al (2011) assessed the nutritional status of the HIV/AIDS infected children and adolescents receiving HAART at São Paulo city. The 118 subjects aged 6-19 years are attending an outpatient clinic were included in the study. The following anthropometric measurements of weight, height, waist circumference and triceps and sub scapular skin fold thickness were assessed. In analysis only one (0.9%) adolescent was diagnosed with abdominal obesity based on waist circumference measurement; three (2.5%) adolescents were obese based on sub scapular skin fold thickness. According to the body mass index, the population studied was mainly eutrophic. The findings depicted that the prevalence of fat redistribution, a nutritional status of the HIV/AIDS participants under HAART, was very low.[142]

Banerjee T et al (2010) evaluated the impact of ART on endurance and immune response in HIV-infected children and the response to nutritional support. A total of 180 children were assessed, 100 (56%) of whom were on ART. The baseline body mass index was lower in the initial ART group ($p<0.05$). During ART, a CD4 *Z*-score increase of 1 SD was associated with a 0.35 increase in body weight *Z*-score ($p<0.001$). The increase in daily energy intake owing to nutritional supplementation was associated with increase in weight Z-score in both the no-HAART and HAART group. The study concludes that increased survival rates of children was correlated with an raised $CD4^+$ T-cell count synchronized with the extensive use of ART and nutrition supplementation improved the health status in both the no-HAART and HAART groups.[143]

Steenkamp L et al (2009) conducted a cross sectional study on nutritional, immune, micronutrient and health status of HIV infected children (3-12 yrs) in Mangaung. Among 35 participants, 41% were underweight, 81%were stunted and 3% was wasted. The most commonly observed clinical features were lymph adenopathy (84%), skin rashes (51%), hepato megaly (32%) and pallor in nails and conjunctiva (41%). Regarding OIs, 8% of children had features of TB and 19% had a lower respiratory tract infection. The median viral load of the group was 1, 17, 000 copies/ml and the CD4+ cell count was 477 cells/mm^3. It shows that, significant negative correlation between viral load and nutritional indicators. The children also had deficient serum levels relative to normal reference values for glutathione (91%), albumin (78%), vitamin A (63%), vitamin D (44%), zinc (38%) and vitamin E (13%). The 60% of the children were anemic and 30% were iron deficient. The study highlights needs to investigate early initiation of ART and nutrition interventions including supplementation in order to improve the prognosis of this children.[144]

Stephenson CB et al (2006) assessed the level of vitamin D in HIV infected adolescents and young adults. The total of 359 participants aged 14–23 yrs were randomly selected and divided to 238 HIV positive and 121 HIV-negative subjects from Reaching for Excellence in Adolescent Care and Health study (REACH). The results showed that, the intake of vitamin D from food did not differ significantly by sex, but intake was 30% greater for HIV-positive subjects than HIV negative subjects. The prevalence of vitamin D supplement use was 29% and did not differ significantly

by HIV status (P = 0.87). The prevalence of vitamin D insufficiency [plasma 25 (OH) D $\pm$ 37.5 nmol/L] in the study participants was 87% HIV infection did not influence vitamin D status. The study findings concludes that the prevalence of vitamin D insufficiency in both HIV-positive and HIV-negative subjects were high; perhaps largely urban youth have limited sun exposure.[145]

Kruzich LA et al (2004) evaluated the impact of nutritional supplementation on immune response and bioelectrical impedance in HIV-positive adolescents. The participants of 264 HIV-infected and 127 HIV-uninfected adolescents and young adults were selected from REACH study. The results revealed that half (49.0%) of the HIV-infected participants had $CD4^+$ T cells $\geq$ 500 cells/μl and decreased intake of iron (P< .05) vitamins C and E (P<10) compared with HIV-uninfected youths. He concluded that HIV infected youths should focus on intake of foods rich in micronutrients will aids to improve growth, slow disease progression, and increase survival.[146]

Section : 3.1.4 Literature Related to Quality of Life of HIV Infected Adolescents and Strategies to Enhance the QOL

Anmol G et al (2016) analyzed the pattern of physical activity among school going adolescents (10-18 years) in district Ambala, Haryana. The results found that, sedentary activity was higher in children aged >12 yr, while intensity of Moderate-to-Vigorous Physical Activity (MVPA) was higher in boys than girls. The physical activity significantly decreased (P<0.001) with increase in age. There was also a significant decrease in MVPA with increase in age, metabolic equivalents (MET-P<0.001) with interaction effects of age group (P<0.001) and gender (P<0.001). The study suggests that the level of MVPA was low in school going adolescents.[147]

Galanoa E et al (2016) conducted a qualitative study, on experiences of adolescent's sero positive for HIV/AIDS in the age of 13-20 yrs in Brazil. The total of 20 subjects was followed and collected data includes personal histories, experiences and difficulties they must face while living with HIV/AIDS. The themes derived were being ''normal'' and ''different'' when face the central issues. The normal life situation is guaranteed by being responsible with one's health, the condition that the diagnosis be kept secret and concerns about HIV transmission and dissemination to a

sexual partner. The adolescents have plans and projects that, HIV is considered a stressor, positive perspectives for the future prevailed. At the end, he concludes that, ‘‘living as an adolescent with HIV’’ involves delicate dimensions, such as silence and secrets, search for normality, virus transmission dilemmas and also the drug treatment management. Recognizing these aspects can be helped to guide the multidisciplinary team, especially to control of the disease, viral replication and ways to improve the QOL.[148]

Nicholas SL et al (2016) conducted a study to compare the learning and memory in youth with perinatally acquired HIV (PHIV). The total of 173 perinatally HIV exposed (PHIV, n=173) and uninfected (PHEU, n = 85) participants aged 9–19 years were completed age-standardized tests of verbal, visual learning and delayed memory. In analysis compared with PHEU there was a significantly lower visual recognition memory and verbal delayed recall for PHIV infected participants. For PHIV youth, current CD4% < 25 was related with poorer verbal learning, and older age at peak viral load was associated with poorer verbal delayed recall and design memory. The study finding suggests that current CD4% with poorer verbal learning had restrained possessions of HIV on learning and memory in youth with PHIV.[149]

Akpa OM et al (2015) explored the relationship of QOL with Psycho Social Functioning (PSF) and other factors among adolescents in families affected with HIV/AIDS (FAHA) and in families not affected by HIV/AIDS (FNAHA). The total of 960 adolescents was assessed by using WHO QOL - BREF questionnaire. In analysis the 27% of adolescents in FAHA had poor QOL (OR: 2.32; 95%CI: 1.67–4.09) and it was significantly higher than in FNAHA (p = 0.0001). The adolescents in FAHA have poor QOL than those in FNAHA and also face additional burden of psychosocial dysfunctions. The intervention focusing on economic empowerment and functional social support endorse adolescents in FAHA in the studied location.[150]

Buczynski AK et al (2015) evaluated the QOL in HIV-infected children & children with cancer and compared the results of children without systemic chronic disease. The total of 82 HIV-infected children, 31 children with cancer and 112 children without systemic disease aged between 11 and 14 years were enrolled. The tool includes the, auto questionnaire Qualité de Vie Enfant Imagé (AUQEI) and the short version of Child Perception Questionnaire (short-CPQ11-14) was completed and

all children were examined for oral in presence of any oral health problems. In analysis the HIV-infected children and children with cancer (AUQEI= 49.93 vs 50.45; short-CPQ11-14= 6.29 vs 6.81) had a lower quality of life and oral-health-related quality of life ((p=0.011 vs 0.043) when compared to children without systemic disease (AUQEI=52.18; short-CPQ11-14=3.82). The QOL and the oral HRQOL of children are negatively affected by the HIV-infection and cancer and oral health problems.[151]

Tanaka LF et al (2015) assessed the prevalence of physical inactivity among adolescents with HIV/AIDS, as well as associated factors in Brazil. The total of ninety-one adolescents (from 10 to 19 years old) was interviewed through the structured questionnaire and anthropometric data (weight, height, and waist circumference) were measured twice. In analysis, the prevalence was 15.4% in inadequate height for age (95% CI=8.0, 22.8), 9.9% in malnutrition (95% CI=3.8; 16.0), and 12.1% in overweight/ obesity (95% CI=5.4, 18.8). The most common physical activities were soccer, volleyball and cycling (44.4%, 14.4% and 7.8%) respectively. The median times spent with physical activity and walking/bicycling to school were 141 min and 39 min. The 31.9% adolescents said that they did not practice any type of physical activity. The high prevalence of physical inactivity was observed among the adolescents: 71.4% (95% CI=62.1; 80.7), with a higher proportion of girls (girls 80.0% versus 61.0%boys; p=0.046).The study finding suggests that promoting physical activity among adolescents principally among girls with HIV/AIDS and as well as monitoring should be part of the follow-up aids to reduce the onset of chronic diseases.[152]

Bharathi et al (2014) conducted a descriptive co-relational study to find the relationship between QOL and social support of CLHIV (10-18yrs). The total of 50 participants were selected by purposive sampling method, and Horizon's questionnaire was used to assess the variables. The results found that 60% of participants had poor QOL and 86% of the subjects were had low social support. The Pearson's correlation proved that statistically significant weak positive relationship (r= .293; p =.039) between QOL and social support of CLHIV. The study finding suggests that interventions to improve quality of life and social support could have a positive influence on CLHIV.[153]

Kumar SGP et al (2014) evaluated level of depression and its significant risk factors among orphaned adolescents at Hyderabad in India. The total of four hundred HIV infected adolescents aged 12-16 yrs were enrolled and equally from AIDS and non-AIDS groups. In analysis, children orphaned by AIDS were significantly reported that stigma related to friends or relatives and experiencing discrimination (50.3% &12.6%) was higher than those orphaned due to other reasons. The overall prevalence of depression score was 74.1% with 95% CI and it depicted that significantly higher for children orphaned by AIDS ($p < 0.001$). The findings could be used for planning the mental health interventions to meet the mental health needs of orphaned adolescents.[154]

Qiao S et al (2014) conducted a longitudinal study to examine perceived social support (PSS) in loneliness and self-esteem among children affected by HIV/AIDS in China. The children aged 6–18 years were assessed annually for 3 times. In analysis, the loneliness scores significantly lowered over time. The children with higher PSS reported significantly lower baseline loneliness score and experienced a slower rate of decline in loneliness over time. The children with higher PSS were more likely to report higher self-esteem scores at baseline. However, the self-esteem scores remained stable over time controlling for baseline PSS and all the other variables. The study findings reported that the positive effect of PSS on psychological modification may imply a promising approach for future intervention among children affected by HIV/AIDS, in order to promote psychosocial well being on children and families with lower social supports.[155]

Wu X et al (2014) analyzed the relationship between the perceived stigma, social support, and QOL in PLHIV. The total of 190 participants aged more than 15 years were enrolled in the study. The structured questionnaire of HIV-related Stigma Scale, Medical Outcomes Study - Social Support Survey (MOS-SSS-C), and the Medical Outcomes Study-HIV (MOS-HIV) were used. In analysis, the mean scores of the perceived stigma (104.32), social support (53.63), and QOL (61.97) were in moderate range. The multivariate regression analysis showed a low score of family stigma ($R^2 = .49$, $p < .01$) a high score ARV management and high CD4 count predicted better QOL. The study finding represents that the perceived stigma and social support are correlated with the QOL in PLHIV. The interventions designed to decrease perceived stigma and strengthen social support from family are necessary to improve the QOL in PLHIV.[156]

Gowda S et al (2013) conducted a cross sectional study on relationship between the CD4 counts in QOL of HIV/AIDS infected adolescents. The total of 255 HIV/AIDS infected adolescents aged 18 and more were recruited from ART centres in Mysore. The WHOQOL-BREF questionnaire was used to assess the QOL. In analysis out of 255 adolescents, 149 had their CD4 below 350 with a mean QOL score 50.6 and 106 adolescents had their CD4 count above 350 with mean QOL score 55.2. The positive correlation was seen with 'r' value of 0.31. The participants with higher CD4 count had better QOL than those with lower CD4 count. The't' test showed statistically significant association (P>0.05).[157].

Rajeev K H et al (2012) assessed the QOL of PLHA and correlated with socio-demographic and clinical variables in Chitradurga city. The total of 395 samples were selected, of them 231 (58.5%) participants were on ART and 164 (41.5%) were not on ART between the age of 15-72 yrs. The WHOQOL 120 questionnaire was used. The study findings depicted that the scores for all domains were intermediate for the PLHAs in both group mean scores were highest for psychological domain. There was a significant difference in QOL of PLHA who was on ART and not on ART in physical, psychological and spiritual domain. The PLHAs who were literates, married, employed, income >1500/month, not on ART, CD4 count >200 cells/mm^3; earlier stages of HIV, living with spouse had high mean scores.[158]

Imam MH et al (2011) conducted a cross sectional study to determine the level and factors associated with HRQOL among the people living with HIV. The total of 82 HIV infected people aged 18 and above was evaluated with "WHOQOL-HIV BREF instrument". In analysis, a most of the respondents were had low Quality of Life (QOL) in all the domains. The respondents with low QOL was highest in the domain of social relationship (64.6%) followed by psychological domain (59.8%), physical domain (58.5%), level of independence domain (56.1%), environmental domain (52.4%) and spirituality domain (52.4%) of HRQOL. The bivariate analysis revealed that the overall perception of QOL was better in the respondents living in urban areas, which were employed and asymptomatic of the centre for disease control (CDC) stage of HIV with a current CD4 count >200 cell/mm^3. This results finding highlighted that need for better environment and enhanced socio-psychosocial support for improving the HRQOL among PLHIV.[159]

Zhao G et al (2011) examined the importance of functions and sources of Perceived Social Support (PSS) among children affected with HIV/AIDS in China. The total participants of 1299 children aged between 6 to 18 years were enrolled. In analysis, the PSS score (r = 0.527) is highly associated with children's psychosocial wellbeing and as well as psychosocial outcomes. This strong association predicts adequate social support needed to ease stressful life events and improve psychosocial wellbeing of children affected by HIV/AIDS. The findings of the study suggested the roles of specific social support functions or resources may need to be evaluated in relation to specific psychosocial outcomes.[160]

Kumakech E et al (2009) evaluated the effects of peer-group support intervention improves the psychosocial well being of AIDS orphans in Uganda. The total of 326 AIDS orphans aged 10-15 years were assigned to either peer-group support intervention includes somatic healthcare (n=159) or control group (n=167) for follow-up assessment. The baseline and 10 week follow-up psychological assessments were conducted in both groups using self-administered Beck Youth Inventories. In analysis, the baseline scores and follow-up scores for the intervention group in comparison with controls showed significant improvement in depression, anxiety and anger but not for self-concept. This study depicted that peer-group support intervention decreased psychological distress, particularly symptoms of depression, anxiety and anger. Thus, the use of peer-group support interventions should be integrated into existing school health programs.[161]

Lee SJ et al (2007) done a randomized trial to assess the effect of social support on mental and behavioral outcomes among adolescents/ parents were infected with HIV/AIDS. The total of 307 parents who were HIV infected (25-70 years) and their 413 adolescents (11-18 years) were assigned to a coping skills intervention or a standard care group and assessed for 2 years. In analysis, the adolescents' social support dimensions (5.17 vs 5.27) frequency of contact (4.31 vs 3.89), satisfaction (0.94 vs 1.01), negative role model influence (0.76 vs 0.70) and positive support (2.42 vs 2.45) were comparable between the standard care group and the intervention group. The adolescents who had more social support providers reported significantly lower levels of depression (p=.035) and fewer conduct problems (p=.046); adolescents who had more negative influence from role models reported more behavior problems

(p=.085).The study finding suggests that the future prevention programs must focus on rising social support to reduce negative outcomes among adolescents affected by HIV/AIDS.[162]

Wig N et al (2006) evaluated the impact of HIV/ AIDS on QOL on HIV/AIDS patients in North India. The total of sixty-eight HIV/AIDS participants aged 18 and more were participated and evaluated by WHOQOL-BREF questionnaire by the HIV nurse coordinator. In analysis, the overall QOL mean score found to be 25.8. Similarly, the mean scores in the four domains were 80.9 in social; 27.5 in psychological; physical and environmental domain was 17.7 &11.65 respectively. The significance of better QOL scores in the physical ($p<0.040$) and environmental domain ($p<0.017$) were depended on the occupation of the patients. The study finding reveals that QOL has significance with occupation, income, education, family support and clinical categories of the participants.[163]

3.1.5 - Literature Related To Yoga in HIV /AIDS and Interventional Benefits of Yoga in Adolescents

Garg S and Chandla SS (2016) assessed the effect of Nadi shodhan pranayama on pulmonary functions among healthy volunteers at Rohtak, India. The thirty participants of both male and female in the age group of 17-21 yrs were practiced nadi - Shodhan pranayama twenty five minutes daily for three months. The Pulmonary Function Test (PFT) parameters include Vital Capacity (VC), Peak Expiratory Flow Rate (PEFR) and Maximum Voluntary Ventilation (MVV) is measured before and after pranayama practice. After 12 weeks, the results revealed that, there was a significant increase (p value < 0.05) in all the parameters at 6 weeks and as well as after 12 weeks. The study findings interpreted that nadi shodhan pranayama plays a significant role to increase in respiratory muscle strength and improving the various ventilator functions of lungs thus it helps to improve QOL.[164]

Sethi JK et al (2016) done a experimental study on yoga improves attention and self esteem (SE) among underprivileged adolescent girls in Mysore, India. The total of sixty high school girls (14 to 17 yrs) were enrolled and participated in the Integrated Yoga Module (IJM) for 5 days includes nadi shodhan pranayama and asanas. The Rosenberg self esteem (RSE) scale was used to measure the self esteem

and d2 test was used to measure attention and concentration. The data was collected before and after the 5 days of IYM. The results showed that attention (10.12% P < 0.001) and SE (9.04% P+0.001) were significantly increased in the post score when compared to the pre score. This study suggests that, of IYM can result in improvement of attention and self esteem among adolescent girls and thereby improving their academic achievement and enhancing their mental health.[165]

Felver J C et al (2015) conducted a comparative study on the acute effects of single yoga class versus a single standard physical education (PE) class on adolescent mood and affect. The forty seven high school students (14 -17 yrs) were enrolled and completed Brunel University Mood Scale (BRUMS) and Positive and Negative Affect scale for children (PANAS-C) before and after one week of session. The results showed that the participants reported significantly greater decrease in anger (Z = 2.48, P=0.013), depression (Z=2.20, P=0.028) and fatigue (T=2.20, p=0.034) from before and after participating in yoga compared to the physical education. The study findings revealed that school based yoga may provide unique benefits when compare to the physical education for students. The recommendation should elucidate the distinct of physiological and psychological effects of yoga when compare to the physical education activities in future research.[166]

Joseph B et al (2015) evaluated the outcome of yoga interventions and naturopathy on CD4 count of the PLHIV (6 - 75 yrs) at Pune. The total of 96 subjects were grouped in to four groups 'viz, G1, G2, G3 and G4 according to the number of days the treatment as received and the total duration were 180 days. The results found that, G2 and G4 had statistically significant improvement in CD4 counts (*P* = 0.052, and P = 0.00038) respectively. The non significance shown in the group of G1 and G3 may be due to the baseline difference in age, stage of disease etc. The study findings concludes that, naturopathy and yoga interventions when taken for 30 days or more can enhance CD4 counts in PLHIV.[76]

Mawar N et al (2015) done a randomized control trial on Sudarshan kriya yoga (SKY) improves QOL of PLHIV (> 18 yrs). The total of 61 participants were divided equally in to, 31 in SKY intervention group (I-SKY) and 30 in standard of care (O-SOC) as control groups. The I-SKY participants were taught for 6 days to

prepare for daily practice of 30 minutes at home. The results were measured at baseline to three visits at 4 week intervals. The outcomes are, an total of 6% improvement of QOL scores was observed in experimental group as compared to control group and also there is a significant improvement in physical (12%,P=0.004), psychological (11%, p=0.023) and level of dependence (9%, p=0.001) domains. He concludes that, the low cost approach of yoga enhanced physical and mental status of PLHIV. [167]

Unniraman P et al (2015) evaluated the effect of yoga on menstrual problems in adolescent girls in a Government vocational higher secondary school in kerala state. The total of 300 participants were randomly selected and equally divided into experimental group had yoga class of three times a week for three months and in control group no yoga section. The data was collected on 22 menstrual related problems from both the groups, for the period of before starting yoga and after three months of yoga classes using same questionnaire. After 3 months the study results showed that the yoga reducing the following menstrual related problems in adolescent children namely absenting from school, bleeding, abdominal pain, leg/back pain, muscle cramps, nausea, anxiety , anger , fatigue , diarrhea, lack of appetite, loss of interest during menstruation and in maintaining proper menstrual interval. This study finding suggests that yoga can also be made a part of the school curriculum to help the students in achieving physical and mental health improvement.[168]

Cramer H et al (2014) appraised a bibliometric analysis of RCT in yoga for the period of 1975-2014. The total of 366 papers, two hundred sixty-four randomized controlled trails (84.6%) were conducted with healthy volunteers remained in various disease conditions. Among this 335 RCTs were conducted i.e., 90.1% with youth & older adults and 9.9 % with children. In that 47.3% RCTs did not name the style of yoga used, 9.6% RCTs used Hatha yoga postures with meditations, 8.2% RCTs used yoga breathing and breath control and The remaining 34.9% RCTs used 46 various yoga styles, with a median intervention length of 9 weeks (range1 day to 1 year; IQR = 5 and 12).Apart from this, 21% varied control interventions were used in the remaining RCTs. The results shows that, yoga-based RCTs will enhance and marked improvement in the health aspects of individuals.[169]

Gupta V et al (2014) evaluated the immediate effect of Nadi-shodhana pranayama on cardio respiratory and mental efficiency among healthy volunteers. The total of 30 participants aged 17-20 years from SMS Medical College, Jaipur were enrolled. The outcome measures were peak expiratory flow rate, systolic and diastolic blood pressure, heart rate and simple problem solving ability to explain mental efficiency were measured before and after 20 minutes practice of nadi- shodhana pranayama. The results shows that pre and post test, there was statistically imperative difference ($p<0.05$) in heart Rate (79.47 + 1.08 vs 73.73 + 2.39), systolic blood pressure(78.27 + 3.473 vs 72.8 + 3.916), diastolic blood pressure (118.1 + 3.748 vs 110.1 + 6.279), peak expiratory flow rate (3.673 + .3331 vs 3.973 + .3173) and reaction time (70.13 + 15.55 vs 62.63 +13.89). The study finding suggests that nadi-shodhana pranayama practice for 20 minutes can be advocated to improve cardio respiratory efficiency and also higher functions of brain of healthy individual.[170]

Trivedi I (2014) assessed the impact of Manomay Kosh sadhana yoga on adolescent's mental health. The thirty adolescents (13-19 years) were selected from quota sampling in swami satyamitrananda school from Uttarakhand. The one group of pre and post design was adopted and Mental Health Battery questionnaire by AK Singh and Alpana was used in the study. The yoga practice time was 30 minutes in the morning and the duration of the practice was 90 days. The posttest results revealed that significant effect at 0.01 levels on mental health of the adolescents. The study concludes that, the practice of yoga would be a significant improvement of positive feeling, positive attitude and self confidence which improves mental health of adolescents.[171]

Menon A J et al (2013) evaluated the yoga based peer support group for human immune deficiency virus (HIV) for positive Zambian adolescents. The adolescents' aged 11 to16 years (n=34) were randomized to peer group with yoga, peer support only group/social support group. The outcomes were measured in pre intervention, post intervention and at 10 weeks follow-up. The peer only group had fewer emotional symptoms after the intervention ($p<0.05$), while combination of yoga and peer support group had a beneficial effect on CD4 count ($p<0.05$). The study results revealed that the peer / social support along with yoga interventions were associated with short term benefits for the psychological and physical well being in HIV positive adolescents suggesting the need for sustained support.[172]

Babu N et al (2013) measured the outcomes of cyclic meditation (CM), yogic relaxation technique, when compared to supine rest (SR) among adolescents (10-16 yrs) at Bangalore. The 60 high school adolescents of both genders were included and examined for reduction of anxiety, using Spielberger's State-Trait Anxiety Inventory (STAI). They were divided into SR and CM groups and tested on the STAI, immediately before and after 22 to 30 min of practice of CM on 1 day, and immediately before and after an equal period of SR on the other day**.** The results showed that**,** there was a significant decline on STAI scores within group of CM (4.27%, *P* = 0.016) session and no changes in SR session. Further subgroup analysis based on genders revealed that the female group had a significant decrease following both sessions, but male group had no significant decline in STAI score. The study finding reveals that the CM found to be a useful method to combat the state of anxiety in gender wise with different age groups.[173]

Shaju S and Umarani J (2013) conducted a quasi experimental study to assess the effectiveness of pranayama on stress among adolescents (15-17 yrs) at Mangalore. The total of 70 participants were divided equally into experimental and control group. The SQ stress scale was used to evaluate the pre and post test stress level in both groups. In analysis there was a statistically significant variation in the post test stress score in study group. As the calculated 't' value (t=17.016) was higher than the table value (t 68=1.668) at 0.05 level of significance, there was a significant decline in the level of stress in the experimental group after the practice of pranayama. But there was no significant reduction in the level of stress in the control group of pre and post rest.[174]

Somarriba G et al (2013) analyzed the physical fitness among CLHIV an associations with HAART. Te total of 45 HIV-infected children and 36 uninfected children aged 10-16 years were participated in the study. In analysis, HIV-infected children had lower peak oxygen consumption (VO2 peak 25.92 vs. 30.90ml/kg/min, p < 0.0001), flexibility (23.71 vs. 46.09%, p = 0.0003) and lower-extremity strength-to-weight ratio (0.79 vs. 1.10 kg lifted/kg of body weight, p = 0.002).In multivariable analysis among the HIV-infected children, showed VO2 peak was 0.30ml/kg/min lower per unit increase in percent body fat (p < 0.0001) and VO2 peak decreased 29.45 (– 1.62), 28.70 (– 1.87), and 24.09 (– 0.75) ml/kg/min across HAART exposure

categories of no exposure, < 60, and >60 months, respectively ($p < 0.0001$). The study findings reported that HIV-infected children had low measures of physical fitness compared to uninfected children.[175]

Sushant S and Khyati SS (2013) overviewed the asana and Pranayama practice among healthy volunteers in the age of 18-25 yrs in Gujarat. It has been reported that, the increase in respiratory muscle strength, improve the lung functions, enhance the neuro-muscular system and increase nerve conduction velocity. The respiratory benefits includes the prolongation of breath holding time, increase in PEFR (Peak Expiratory Flow Rate), FVC (Forced Vital Capacity), FEV1 (Forced Vital capacity in 1 second), MVV (Maximum Voluntary Ventilation) and lowered respiratory rate. The abdominal breathing uses the diaphragm primarily and is congruent with the shape of the lungs and the capacities of the breathing muscles. It executes respiration with the least effort and is associated with mental stability and calmness. The chronic lung diseases like Asthma, Bronchitis, Emphysema, COPD, etc. may get colossal benefits from these changes in pulmonary functions.[176]

Anand U and Sharma MP (2011) examined the Mindfulness Based Stress Reduction (MBSR) program in reducing stress and enhancing well-being in adolescents in an Indian school setting. The thirty three adolescents aged 14-15 yrs were included in the eight week sessions approximately of 40 minutes intervention program. The School Situation Survey and the Personal Well-being Index for School Children were used at Pre, post and 3 month follow-up assessments. In analysis, the results evidenced that MBSR program is significantly plummeting physiological and emotional manifestations of stress, anger, sadness, frustration, anxiety, fear, stress due to peer interactions, academic stress and enhancing academic self-concept and well-being. The study suggests that regular practice of MBSR is essential to enhance the QOL of adolescents.[177]

Gopal A et al (2011) evaluated the outcome of integrated yoga practices on immune responses in examination stress among first year MBBS students. Through randomization the total of 60 participants were assigned to yoga and control group. The yoga group underwent integrated yoga practices for 35 minutes for 12 weeks whereas in control group did not undergo any kind of yoga practice on stress management. The physiological parameters like heart rate, respiratory rate and blood

pressure were measured. The Spielbergers state anxiety and Global Assessment of Recent stress score were assessed at baseline and during the examination. The results showed that a significant improvement was observed in experimental group whereas in control group no significant changes were noted. Similarly, the psychological stress showed highly significant difference in yoga group (P<0.001) compared with significant difference in control group (P< 0.05).The study concludes that yoga resists the autonomic changes and impairment of cellular immunity seen in examination stress. [178]

Mueller J et al (2011) evaluated the efficacy of the Make A Difference (MAD), a community ART program for children affected by HIV/ AIDS in South Africa. The total of 297 children aged 8–18 years (177 in study and 120 in control group) were participated in the study. The program runs for ART and education activities to build self-concept, self-esteem, and self-efficacy for 6 months. In analysis, the intervention program showed significantly higher self-efficacy (B=3.71 vs 3.61, p<0.05), but it was not associated with differences in self-esteem, depression or emotional ⁄ behavioral problems. The double parental death remained a powerful effect on child psychosocial health for lower self efficacy. However, an interaction was found between bereavement status and self-efficacy, indicating that the intervention program may ameliorate some of the psychosocial vulnerabilities associated with becoming an orphan. The study finding suggests that this kind of interventions may offer opportunities to enhance the self efficacy of vulnerable children to protect their psychological health.[179]

Cade PT et al (2010) conducted a study on yoga life style intervention reduces blood pressure in HIV infected adults with cardiovascular risk factors. The sixty HIV infected men and women (18-70 yrs) were randomly assigned to 20 wks of yoga practice or standard of care treatment. The results found that, the yoga group resting systolic and diastolic blood pressures were reduced more (-5 +/- 2 and -3 +/- 1 mmHg) than in control group (+1 +/- 2 and+2 +/- 2 mmHg). There is no greater reduction in body weight, fat mass, lipid level and quality of life after yoga. The study concluded that low cost, non pharmacological , behavior intervention of yoga can lower blood pressure in pre hypertensive HIV infected adults with mild – moderate Cardio vascular disease risk factors.[180]

Mendelson. T et al (2010) reported the preliminary and feasibility outcomes of a school-based mindfulness intervention to reduce the stress for urban youth in Baltimore city. The 97 participants were equally randomized to both groups. In Intervention group, received the 12 - week intervention and for each session lasted for 45 minutes and youth were taught yoga-based physical activity, breathing techniques, and guided mindfulness practices whereas the control group received conservative management. The Stress and Short Mood & Feelings Questionnaire was used to assess the outcomes. The results showed that the intervention group had significant improvements on the overall responses to stress scale of involuntary engagement than the control group. In addition, significant differences were found on three of the five subscales– intrusive thoughts, rumination, and emotional arousal and also the intervention group had reduction in involuntary stress reactions. He concluds that mindfulness-based practices were effective in helping youth to self-regulate their emotions and reduce worrying thoughts.[181]

Ross A and Thomas S (2010) done a comparative research literature on health benefits of yoga and exercise in both healthy and diseased populations. The results showed that, among 81 studies yoga may be as effective as or better than exercise in improving a variety of health related outcome measures in healthy and as well as diseased populations. The study concludes that future clinical trials are required to observe the difference between yoga and exercise and explore the physical and mental benefits of yoga.[182]

Yarasheski E K (2010) studied the safety and efficacy of yoga life style intervention on fasting lipid profile / lipoprotein levels, oral glucose tolerance, body composition, cardiovascular function, QOL, viral load and CD4 T cell counts in HIV infected men and women with components of the metabolic syndrome. The sixty participants aged 18-70 years were selected by randomization for a 16 week of yoga intervention program. The results showed that yoga life style intervention (breathing exercises, yoga postures / positions or Hatha / Ashtanga yoga) improved the metabolic, anthropometric, cardiovascular disease parameters and quality of life domains without adversely affecting immune or virologic status in people living with HIV.[183]

Heather B (2009) found that the Mindfulness Based Stress Reduction (MBSR) program helped the people with HIV to maintain immunity. The total of 48 HIV positive adults (43men and 5 women) with T cell in between the counts of 600 - 700 cells/mm^3 were involved in study. One group participated in an eight week MBSR program that offered weekly instruction on mindfulness practices including the meditation techniques and the yoga postures. They were also given audio CDs with instructions for practicing the meditation and yoga routine everyday on their own. The other group received a one day MBSR seminar in which subjects were given cursory instruction in meditation techniques but not encouraged to practice on their own. After the eight weeks, the results showed that the MBSR group T cell counts remained high while the other groups T cells plummeted.[73]

PART - II

3.2 CONCEPTUAL FRAMEWORK

Theoretical and conceptual frameworks play several interrelated roles in science and their overall rationale is to make research findings meaningful and generalizable. A conceptual framework or a model is made up of concepts which are mental images of the phenomenon. These concepts are linked together to express the relationship between them. The important purpose of conceptual framework is to communicate clearly the interrelationship of various concepts. They also help to stimulate research and the extension of knowledge by providing both direction and impetus and thus may serve as a springboard for scientific advances in nursing practice.[98]

3.2.1 Conceptual frame work based on King's Goal Attainment Theory [184-185]

The **Goal Attainment theory** was developed by **Imogene king** in the early 1960s. She described about the theory as, "dynamic, interpersonal relationship in which a patient grows and develop to attain certain life specific goals". In 1971, King's published a conceptual framework for nursing and structured as personal, interpersonal and social systems. The concepts were expanded to include of information, communication, interpersonal relationships, energy, social organizations, role and status.

Later, King (1981) initiated a theory of goal attainment, as middle -range theory derived from the conceptual system. The conceptual model contains three types of dynamic, interacting systems: personal systems (represented by individuals); interpersonal systems (characterized by such dyadic interactions as nurse – patient dialogue); and social systems (stand for by larger institutions, such as hospitals and families). The social system provides a context in which nurses work. The central concepts in this theory are perception, communication, interaction, transaction, self, role, growth and development, stressors/stress, time and space. The concepts of perception, interaction, and transactions are the core of a transaction process model. Transactions are significant antecedents to goal attainment.

The Theory of Goal Attainment (1981) defines nursing as "a process of action, reaction and interaction by which nurse and client share information about their perception in a nursing situation" and "a process of human interactions between nurse and client whereby each perceives the other and the situation, and through communication, they set goals, explore means, and agree on means to achieve goals." For this definition, action is a sequence of behaviors involving mental and physical action, and reaction is included in the sequence of behaviors described in action. This process results in a dynamic ongoing interpersonal process in which the nurse client/patient are viewed as a system with each affecting the behavior of the other and both being affected by factors within the situation/environment. This model deals with interactions between nurse and patient which results in meeting the patient's goals. At the end of this process of communication and perceiving, if a goal has been set, final transactions have occurred.

King states that the goal of a nurse is to help individuals to maintain their health so they can function in their roles. The domain of the nurse "includes promoting, maintaining, and restoring health, and caring for the sick, injured and dying." The function of a professional nurse is "to interpret information in the nursing process to plan, implement, and evaluate nursing care." The purpose of this study reflected in transaction whether the human beings achieved the goal through the mutual goal setting.

Most of the people pursue a career in nursing because they want to be instrumental in helping patients get healthy. In order to do that, it is necessary to set health goals with the patient, and then take steps to achieve those goals. In hospital settings, as nurses, we have proved that when the nurse and client communicate and work together toward mutually selected goals, the goals are more likely to be attained. So, the investigator decided to implement King's goal attainment theory is suitable to interpret the present study.

3.2.2: Application of the King's Goal Attainment Theory to the Present Research Study

The King's **Goal Attainment Theory** originated from the elements or concepts in her interacting systems framework. But it focuses on the interpersonal system includes the interactions, communications and transactions between the nurse and the patient. The essence of her theory is that the nurse and the patient come together, communicate and make transactions to set goals and work to achieve the goals. They each have a purpose, they perceive, judge, act and react upon each other. At the end of their communication, a goal will be set and with this transactions are made. The King believed that the goal of nursing is "to help individuals to maintain their health so they can function in their roles" **(King, 1981)**. The transactions occur to set goals related to the health of the patients, and end in enhanced growth and development for the client.

King's used the following major concepts from the personal and interpersonal systems to support the theory of Goal Attainment. The concepts are,

PERCEPTION- a process of organizing, interpreting, and transforming information from sense data and memory that gives meaning to one's experience, represents one's image of reality, and influences one's behavior.

In this study, the researcher felt the need of HIV interventional package (Adherence counseling, Nutritional counseling, Strategies to improve the QOL includes the selected asana, maintenance of diary) for HIV infected adolescents attending ART Clinic.

The caregivers of HIV infected adolescents perceived the need of HIP to increase adherence rate, nutritional status and improve quality of life of HIV infected adolescents.

JUDGMENT- a dynamic and systematic process by which a goal directed choice of perceived alternatives is made and acted upon, by individuals or groups to answer a question and attain a goal.

In this study, the researcher sets mutual goal setting that HIV interventional package (HIP) improves ART Adherence rate, CD4 count, nutritional status and enhance the quality of life of HIV infected adolescents.

The caregivers of HIV infected adolescents, judges that HIP improves immunity level, height and weight and increase quality of life HIV infected adolescents.

ACTION - It's a sequence of behavior involving mental and physical action.

In this study, the researcher divided equally the HIV infected adolescents in to the control and experimental group by simple random technique and plan to implement HIV Interventional package for experimental group alone but for both groups informed consent obtained.

REACTION - refers to the sequence of behavior described in action.

In this study, the researcher prepared the structured questionnaires to assess the demographic details, and assess the baseline values ('0' month) of the adherence rates nutritional status & quality of life of HIV infected adolescents from caregivers/adolescents for both control and experimental group.

INTERACTION- It's a fact of two or more persons in mutual presence; a sequence of verbal and nonverbal behaviors that are goal directed.

In the **Experimental group**, adolescents received a HIV interventional package along with standard care from ART centres. It includes adherence counseling, nutritional counseling and educational strategies to improve the QOL. After counseling session the investigator demonstrated asana to the adolescents and instructed to practice it every day on their own and to document the practice and drug intake in the diary daily and plan to evaluate the assessment at the 3^{rd} and 6^{th} month intervals. Whereas in the **Control Group**, the adolescent's received only a standard care from the ART centres as a conventional management and evaluate the assessment at same intervals. At the end of the 6^{th} month, the cursory instructions were given to adolescents regarding HIV interventional package.

TRANSACTION - a process of interaction in which human beings communicate with the environment to attain goals that are valued; goal-directed human behaviors.

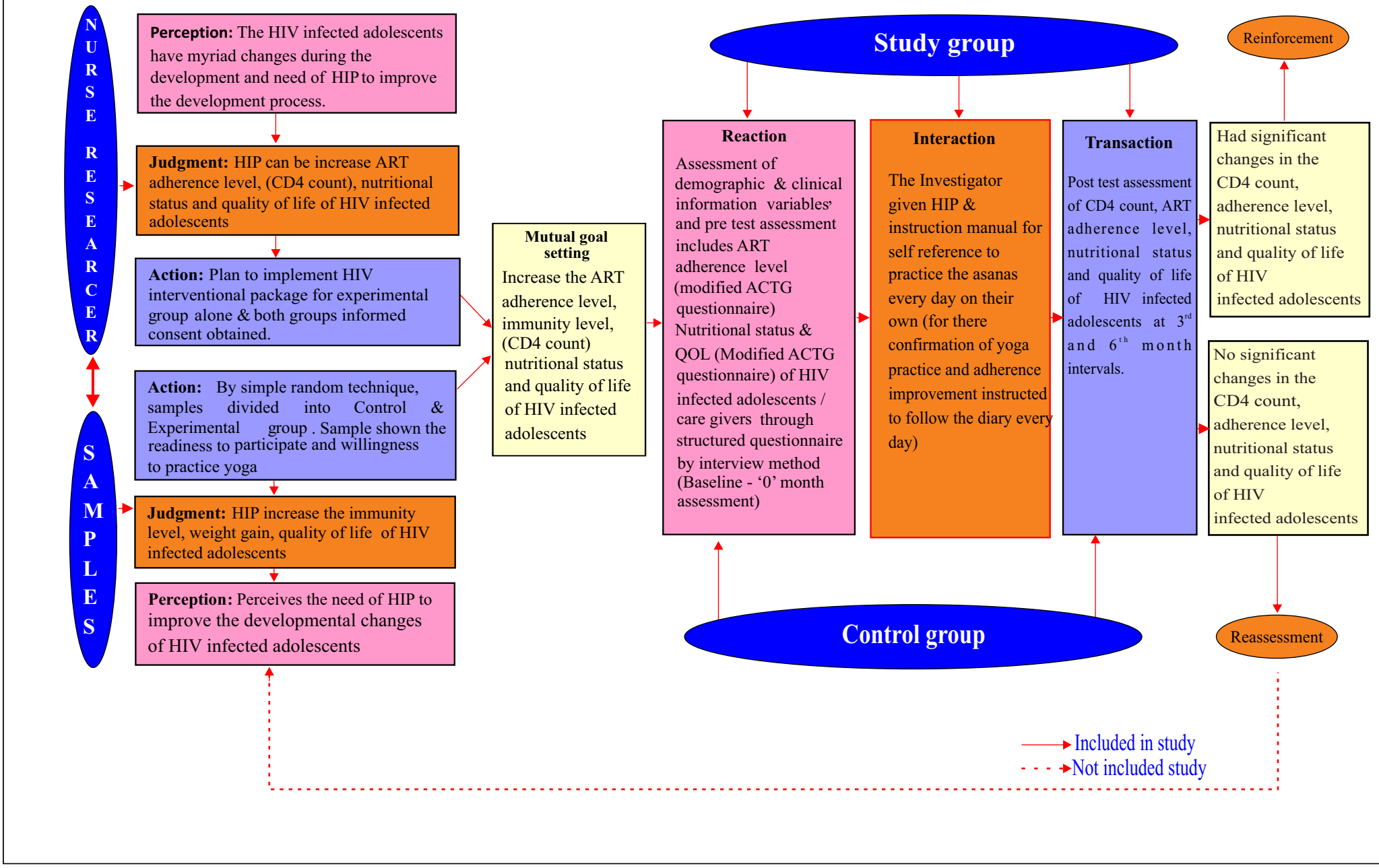
In this model, humans are in constant interaction with their environment but adjustment to life and health are influenced by individual's interaction with environment. Every human being perceives the goal as in making transactions with the individuals and environment.

In this study, the adolescents in the experimental group attained in their goal and had significant changes in the HIP components. Whereas in the control group, the adolescents were not attained the goal and not had significant changes in the HIP components.

FEED BACK - the outcomes of the transaction, decided to further decide to plan for perception.

In this present study, the experimental group of adolescents attained the significant gain in the goal and there is no need for the feedback, whereas in the control group not attained the significant gain in goal leads to again plan for perception. But it's not included in this study.

KING'S GOAL ATTAINMENT THEORY



Chapter - IV

Materials and Methods

CHAPTER - IV

MATERIALS AND METHODS

Verbal and non verbal activity is a unified whole, and theory and methodology should be organized or created to treat it as such.

Kenneth L. Pike

Research methodology is the conceptual structure which gives guidelines to conduct research. It constitutes the blueprint for the data collection, measurement and analysis of data. It is the overall plan for obtaining answers for objectives of the research study. The methodology of research indicates the general pattern for organizing the procedure to gather valid data for the problem under investigation. This chapter deals with the methodology that includes steps, procedures and strategies for gathering and analyzing the data in the research investigation. The present study was evaluating the effectiveness of nurse initiated HIV interventional package (HIP) on HIV infected adolescents attending the ART clinic in Chennai, Tamilnadu.

This research incorporates some of the most important methodological decisions that includes research approach, research design, variables under study, research setting, population, sample, sample size, sampling technique, criteria for sample selection, method of developing the questionnaire, description of developing tool, validity of tool, ethical considerations, pilot study, reliability of the tool, method of data collection and plan for data analysis procedure.

4.1 RESEARCH APPROACH

In view of nature of the problem and to accomplish the objective of the study, Quantitative Evaluative Research approach was adopted for this study. The Evaluative research investigates how well a program, practice or policy is working. In this study, the investigator evaluates the effectiveness of nurse initiated HIV Interventional Package (HIP) on HIV infected adolescents. This study is intended to explore the effectiveness of the HIV interventional package hence the evaluative research approach was more appropriate to this study.

4.2 RESEARCH DESIGN

The research design is the researcher's overall plan for obtaining answers to all research questions for testing the hypothesis. It spells out the basic strategies that the research adopts to develop information that is accurate and interpretable.[98] The organization of a scientific investigation used for the present study was **Experimental design - Randomized Controlled Trial** as shown in table 11. The basic distinctions in the design are Manipulation, Control and Randomization. The effectiveness can be proved only if there is a comparison; hence the investigator intended to explore the effectiveness of the HIP among HIV infected adolescents between the study and control group for giving an equal opportunity to the adolescents through the simple random sampling allocation.

Table 11: The Research Design Adopted for this study is depicted below

	Group	**Pretest (Baseline at 'O' month)**	**Intervention**	**1st post test at 3rd month**	**2nd post test at 6th month**
R	E	O_1	X	O2	O3
	C	O_1	--	O2	O3

Key:

R- Randomization , **E**- Experimental group, **C**- Control group, **X**- HIV interventional package, **O1, O2, O3** - Observation points of data collection.

4.3 VARIABLES UNDER STUDY

4.3.1 Independent Variable

It is a variable that is believed to cause a change in dependent variable.[98] In this research study the independent variable is a HIV interventional package which comprises of adherence counseling, nutritional counseling, educational strategies to improve their QOL, practice of selected asana and maintenance of dairy every day.

4.3.2 Dependent Variable

It is a variable that is hypothesized to depend or manipulate by another variable.[98] In this research study HIV infected adolescent is a dependent variable, because it can be manipulated by HIV interventional package (HIP).

4.3.3 Extraneous Variable

It is a variable factor that is not the part of the study, but it may affect the measurement of the study variables.[98] In this present study, the opportunistic infections and other Complementary Alternative Management (CAM) will influence the study variables. In this research study no study subjects were influenced by extraneous variables.

4.4 RESEARCH SETTINGS

The setting is the physical location and condition in where the data collection takes place.[99] The study was conducted in the four ART centres in Chennai, Tamilnadu, India. The south India region encompass of Tamilnadu. The Chennai city is a capital of Tamilnadu and located in southeast coast of India and in the northeast corner of Tamil Nadu. The National AIDS Control Organization (NACO) directs Tamilnadu State AIDS Control Society (TANSAC) for rendering the services for PLHIV. In 2015, the total number of ART centres in Chennai is six, among this the researcher was selected the maximum adolescents registered in four main ART centres. They are,

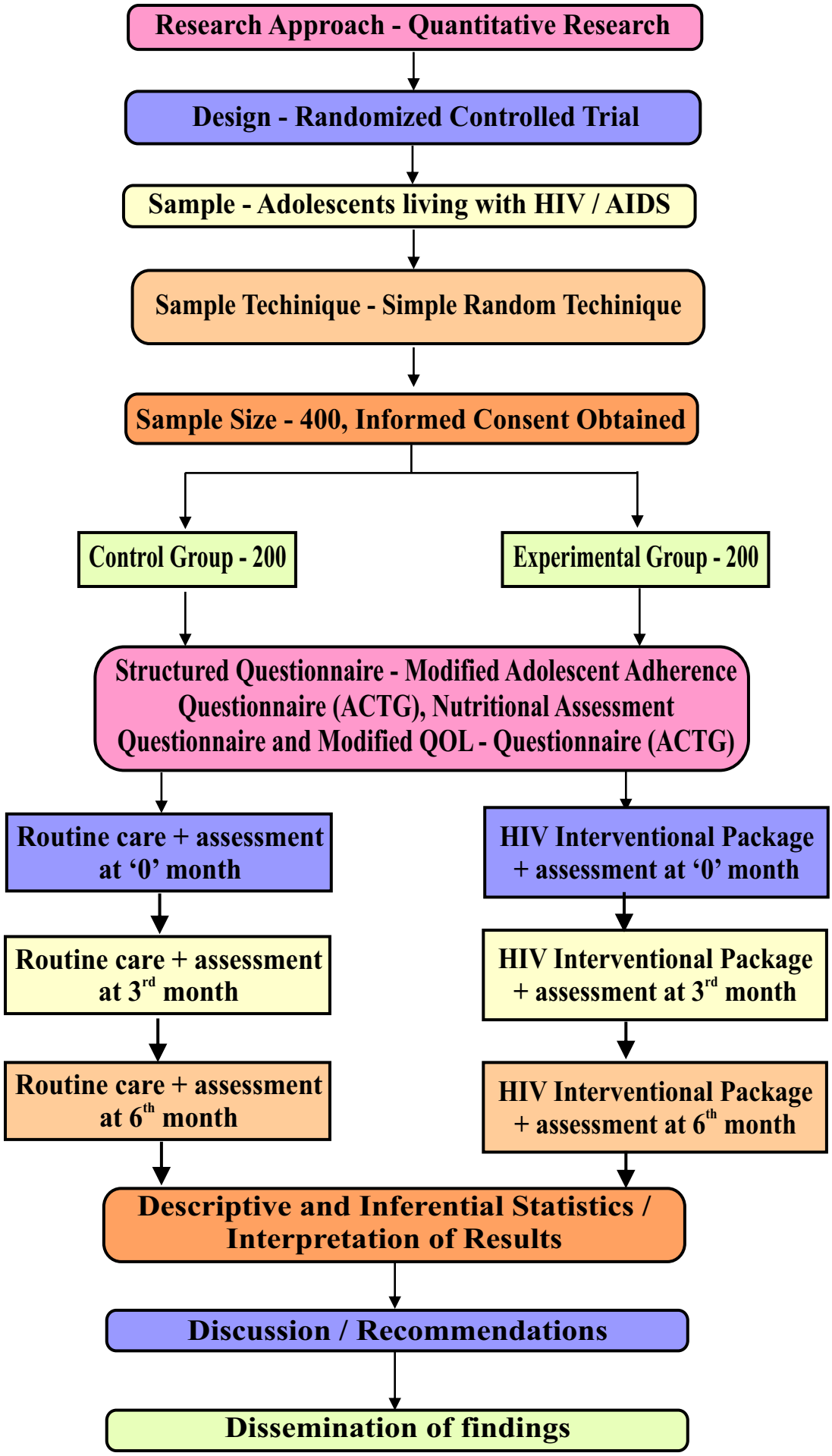
1. **Institute of Child Health and Hospital For Children (ICH)Egmore, Chennai-8.** It's a one of the Pediatric Centre's of Excellence (PCOE) in ART, India. It was started in the year of 2007 and now having the total population CLHIV is 497 and the number of children alive on ART is 317.

2. **Rajiv Gandhi Government General Hospital (RGGGH) Chennai-3**. This ART centre was started in the year of 2004, and now having the total population of CLHIV 259 and the number of children alive on ART is 116.

3. **Kilpauk Medical College and Hospital, (KMCH) Chennai - 10.** This ART centre was started in the year of 2005 and now having the total population of CLHIV 187 and the number of children alive on ART is 102.

4. **Government Hospital Of Thoracic Medicine (GHTM) Chennai - 47** It's a one and only ART Centre of Excellence (COE) in Tamilnadu, Chennai. In this centre the registered PLHIV were not only in Chennai, moreover it covers all the districts of Tamilnadu. This ART centre was started in the year of 2004 and having the total population of CLHIV 883 and the number of children alive on ART is 831.

Schematic Representation of Research Design



4.5 POPULATION

The term population refers to the aggregate or totality of all subjects or members that conform to set specification.[98] In this study, a heterogeneous group of HIV/AIDS infected individuals attending ART centres in Chennai, Tamilnadu has been considered as population.

4.5.1 Target Population

It is the aggregate of subjects about the investigation would like to generalize the findings. In this present study, the target population consists of all Adolescents Living with HIV (ALHIV) and attending ART centres in Chennai, Tamilnadu

4.5.2 Accessible Population

It is the aggregate of subjects that confirm to designate criteria that are accessible as subjects of the study. In this present study, the accessible populations are ALHIV in selected main four ART centres in Chennai.

4.6 SAMPLE

A sample is a subject of the units that compare the population.[98] In this study, the both genders of HIV / AIDS infected adolescents who fit in to the criteria for sample selection were selected.

4.6.1. Criteria for Sample Selection

4.6.1 (a) Inclusion criteria

The subjects who are all,

1. in the age group of 10 to 18 years.
2. on ART for more than 3 months attending the ART clinic.
3. know Tamil and English and also including the caregivers.
4. willing to participate in the interventional package.

4.6.1(b) Exclusion Criteria

The subjects who are all,

1. not on ART attending ART clinic.

2. in IV clinical stage of HIV/AIDS and hospitalized HIV infected adolescents
3. in transgender group.
4. got married and teenage pregnancy.
5. physical and mentally challenged.

4.7 SAMPLESIZE

The sample size was calculated by using power analysis method.

Sample Size Estimation

Anticipated common SD	=	σ
Level of Significance	=	**100 (1-α) %**
Power of the Test	=	**100 (1-β) %**
Medically Meaningful Difference	=	**d**

$$n = \frac{2\sigma^2 (Z_\alpha + Z_\beta)^2}{d^2}$$

σ = **7.6**

α = **2.58**

β = **1.28**

d = **3**

$$n = \frac{2 \times 7.6^2 (2.58 + 1.28)^2}{3^2} = 191 \text{ per group}$$

With 10% dropout rates final required sample size is 191+19 =210 per group (minimum). For statistical significance, the investigator fixed sample size as 200 per group. i.e., 200 for experimental and 200 for control group, so the total sample size were 400.

4.8 SAMPLING TECHNIQUE

It's a process of selecting the sample from the population to represent the entire population. The sampling technique employed in this study was simple random method.

4.9 DEVELOPMENT OF INSTRUMENTS

The investigator adopted following steps was carried out in preparing the questionnaires.

1. Literature review
2. Experts opinion

4.9.1 Literature review

Literature from books, journals and newspaper articles were received and used to develop the assessment tools. The assessment of adherence and quality of life questionnaires were standardized tools.

4.9.2 Experts opinion

The investigator discussed with the experts and incorporated their valuable suggestions in the format of the assessment tool.

4.10 DESCRIPTION OF DATACOLLECTION INSTRUMENTS

The instruments has consists of IV parts. They are,

PART I : It consists of three sections. They are,

Section A: Its deals with Socio Demographic Data. The structured interview schedule was used to collect the data from HIV infected adolescents/care givers from experimental and control group. The socio demographic variables were age, gender, education, religion of adolescents and caregiver's age, sex, caregiver's relational ship of adolescents, education, occupation, income and residence were considered as demographic variables

Section B: It consists of structured questionnaire for clinical information of adolescents includes diagnosis of HIV in years, probable route of transmission, HIV stage, On ART, History of ATT drugs, and level of CD4 count.

Section C: It comprises of structured questionnaire for back ground information of adolescents, social and financial support and knowledge about basic information about HIV/AIDS.

PART II: The modified Adolescent Adherence Questionnaire which was designed by AIDS Clinical Trial Group (ACTG) was used in this study. According to the expert's view and based on our regional back ground some modifications was done in this study. It includes self appraisal, assessment of adherence in various methods (Five point response scale, visual analog method '3' days recall method and Pill count method) reason for non adherence and aids used to improve the adherence.

PART III: The nutritional assessment questionnaire consist of two sections,

Section A: It includes anthropometric assessments of Height, Weight, Body Mass Index, Mid Upper Arm Circumference, Waist Circumference, Skin Fold Thickness (Triceps) and 'Z' score. All the anthropometric measurements were taken according to standard procedures of National Institute of Health (NIH).

- The stadiometer was used to determine the height of the subjects.
- An ISO certified digital weighing machine was used to measure the weight of subjects.
- The BMI is a ratio of weight relative to height and calculated by the standard formula of weight in kilograms divided by the square of height in meters.
- The waist circumference, mid upper arm circumference was measured by measuring tape.
- The skin fold thickness was measured with Harpenden caliper.
- The 'Z' score was calculated by the formula of observed value subtracted by median of the reference population divided by SD of the reference population.

Section B: It covers the structured questionnaire of clinical assessments to rule out the nutritional deficiency disorders.

PART IV - The modified QOL assessment questionnaire which was designed by the AIDS Clinical Trial Group (ACTG) was used in this study with some modifications suggested by experts. The questionnaire includes 2 categories viz., 5 to 11 years and 12 to 20 years related to the following areas of General Health Ratings, Physical Functioning, Psychological Well Being, Social Role Functioning, Health Care Services and Symptom Distress Management.

4.10 (a) SCORING KEY

The scoring key format was based on the type of questionnaires used in the HIP.

Regarding basic information of HIV

- ✓ In Part I, section III had 30th question of basic information about HIV/AIDS, consist of five multiple choice questions (30 a to e). For each question the exact correct answer has score of '1' and wrong answer has score of '0'.The overall maximum score was '5' and minimum score was '0'. It was interpreted as good, moderate and poor knowledge in the respective score of > 75, 50-75 and < 50.

Regarding Assessment of Adherence level,

- ✓ Item 1 to 10 was used to assess the subjective information regarding adherence questionnaire. For each question a positive score has '1' and negative score has '0'
- ✓ Item 11, 12, 13 and 14 was used to assess the adherence to HIV medication. In that item 11 questionnaires have 5 Point rating scale. The responses are scored as follows, Never - 0, Rarely -1, Sometimes -2, Often-3, Always-4.The score ranges from 0-16.
- ✓ Item 12 is the exact percentage mentioned as adherence from the Visual analogue instrument.
- ✓ Item 13 used to assess the adherence by '3'days recall method and exact percentage has given respectively.
- ✓ Item 14 represents the adherence by Pill count method and exact percentage to be mentioned as adherence level. For all these assessments, the optimal adherence was considered as > 95%, 80-95 % as sub optimal adherence and < 80 % as poor adherence.

Regarding Assessment of Nutritional Status

- ✓ The anthropometric measurements of Height, Weight, and BMI were compared with National Centre of Health Statistics (NCHS, 1970s)
- ✓ The reference value for Waist Circumference, Mid Arm Circumference (MAC) and Skin Fold Thickness for adolescents are still in controversial view, the investigator taken '0' month assessment as a baseline value

and further assessment of at 3rd and 6th month was considered as improvement value in order to assess the nutritional level of HIV infected adolescents in both groups.

- ✓ The 'Z' - scores were generated by using NCHS (1970) growth standards as indicator of nutritional status of adolescents. The Z score was interpretation mentioned as,

Normal - 2.0 < Z score,
Moderately malnourished - 3.0 < Z score < - 2.0
Severely malnourished - Z score < -3.0

Regarding Quality of Life assessment

The following table 12 shows the QOL domain score in both age group of 5 -10 and 12-20 years.

Table 12: Quality of Life Domain Score

S.No.	QOL Domain	Minimum score	Maximum score
1.	General Health Rating	11	61
2.	Physical Functioning	6	30
3.	Psychological Wellbeing	28	84
4.	Social Role Functioning	2	19
5.	Health Care Services	4	24
6.	Symptoms Distress	20	120
	Total	**71**	**338**

- ✓ As usual normal scoring was calculated in general health ratings and psychological wellbeing domain. Whereas remaining domains of physical functioning, Healthcare services, symptoms distress and social role functioning part - A are scored reversely in order to indicate the increased score in better QOL.
- ✓ In psychological domain aspect item no 24 to 27 has different questions in these two categories and Social Role Functioning part B item no 3 has different options because of age difference but scores are same.
- ✓ In social role functioning part B item no 3 to 6 and health care services item no 5 are calculated for each positive outcome the score as '1' and negative outcome as '0'

- ✓ The QOL maximum score was 338 and minimum score was 71. Each domain is scored separately, summed and then transformed to a scale ranging from 0 to100 with higher scores indicating better QOL. The total scoring was interpreted as

  0 - 50% Poor QOL,
  51 - 75 % Moderate QOL and
  76 - 100 % Good QOL.

4.11 ETHICAL CONSIDERATIONS

The investigator considered and followed the ethical principles throughout the study investigation. The investigator adhered to the following actions in order to protect the ethical rights of the study participants.

4.11.1 Human Rights

1. Ethical committee approval was obtained from Madras Medical College and Hospital, Chennai.
2. Permission also obtained from National AIDS Control Organization (NACO) and Tamilnadu State AIDS Control Society. (TANSAC)
3. The trial has been registered in Clinical Trial Registry of India (CTRI), New Delhi. The trial registration number is CTRI/2015/02/005521.
4. To execute the study, the research protocol with research instruments and a sample of informed consent, assent form, with all necessary administrative letters were submitted to all the four research centres and obtained all head of the department permission.

4.11.2 Beneficence and Non- Maleficence

5. Explained about the importance of adherence and nutritional counseling and strategies to enhance QOL of HIV infected adolescents/caregivers.
6. Potential benefits and risks were explained to the HIV infected adolescents/caregivers.

   - ➢ The counseling and the behavior modification of yoga improve the immunity, decrease the viral load, reduce the opportunistic infections, increase appetite, promote the digestion and enhance the QOL.

- There may chance to get pain in the muscles due to strain in doing the asana in the initial stage (3 to 5 days) and it will be subsided automatically by doing the regular practice of yoga.

4.11.3 Dignity

7. Informed consent was obtained from all subject caregivers related to study purpose, type of data, and willingness to participate in counseling, yoga & maintenance of diary
8. Assent form obtained only if the subject know their disclosure status.
9. Anonymity of each individual and the privacy was maintained.
10. The subjects have been informed about the freedom of withdrawal from the study at any time.
11. The investigator contact information was disseminated to all participants.

4.11.4 Confidentiality

12. Confidentiality pledge was maintained throughout the data collection process.

4.11.5 Justice

13. The HIV interventional package cursory instructions were informed to all participants in the control group after 2nd post test and those shown their willingness to learn yoga the investigator also thought to the control group subjects. The adolescents with low adherence, poor nutritional status were motivated to come for routine checkup.

4.12 CONTENT VALIDITY

Content Validity is the degree to which the items in the instrument adequately represent the content for the concept being measured.[98] The tool was validated for its content by panel of 15 experts from various fields from Nursing, Medicine, Nutrition and Alternative Medicine Department. In nursing, a total of 4 professors working in academic side have given their consent, whereas in medicine 3 ART medical officers and 3 eminent professors from department of medicine, head of academic and research and 2 pediatric pulmonologist have given their valuable suggestions. Apart

from these, 1 person from department of clinical nutrition and 2 more medical officers from alternative medicine department have given their informative suggestions. The various suggestions from experts were incorporated and with minor modifications of the tool have been approved by the doctoral advisory committee members were finalized to execute in the main study.

4.13 PILOT STUDY REPORT

It's is preliminary trial to the actual study. The pilot study was conducted in Institute of Child Health and Hospital For Children, Egmore. By simple random technique the 10 % of samples i.e., 40 subjects were selected and divided equally into experimental and control group. The data were collected from both groups and it was interpreted in the improvement range of experimental vs. control group for the following components of adherence rate were 6.4 % vs. 2.2 % and for QOL 7.2 % vs. 0.4%, it's was significant at 95 % confidence interval. The other component of nutritional gain score was increased to 4.5% vs. 0.8%. This study reports revealed that the setting and tools used in the study was found to be feasible to conduct the main study. There was no modification done in the tool after the pilot study.

4.14 RELIABILITY

Reliability is the degree of consistency with which an instrument measures the target attributes for what it is designed to measure.[98] After pilot study, the reliability of the tool was assessed by using Cron bach alpha method and inter rater method. In the present study, correlation coefficient 'r 'values for the following tools were, ART adherence was 0.87, nutritional status was 0.90 and QOL was 0.88. It shows that the correlation of coefficient value is very high and the internal consistency of the tool was reliable to execute the main study.

4.15 SAMPLE SELECTION PROCEDURE

The data collection was obtained from the four ART clinics in the period of Feb 2015 to May 2016 by two phases. In phase I, the ICH, RGGGH and KMCH ART clinics were included .The investigator collected the data in all working days from 8

am to 3 pm. The subjects who were come on even days are taken as experimental group and odd days were in control group. The first 2 weeks the data were collected in ICH, since more subjects were registered and it's one of the PCOE in India and the other next two weeks for RGGGH & KMCH and followed for the first six months period of evaluation. In phase II, the data was collected in all the four centres respectively for each week one ART centre and followed for the another six months period of evaluation. Approximately the total adolescents selected per day were 8-10 and the average time taken for the each subject is 30-45 minutes. The samples selected from ART centres were shown in the table 13 and the drops out reasons were analyzed**.** The samples were selected for pilot study was excluded from the main study.

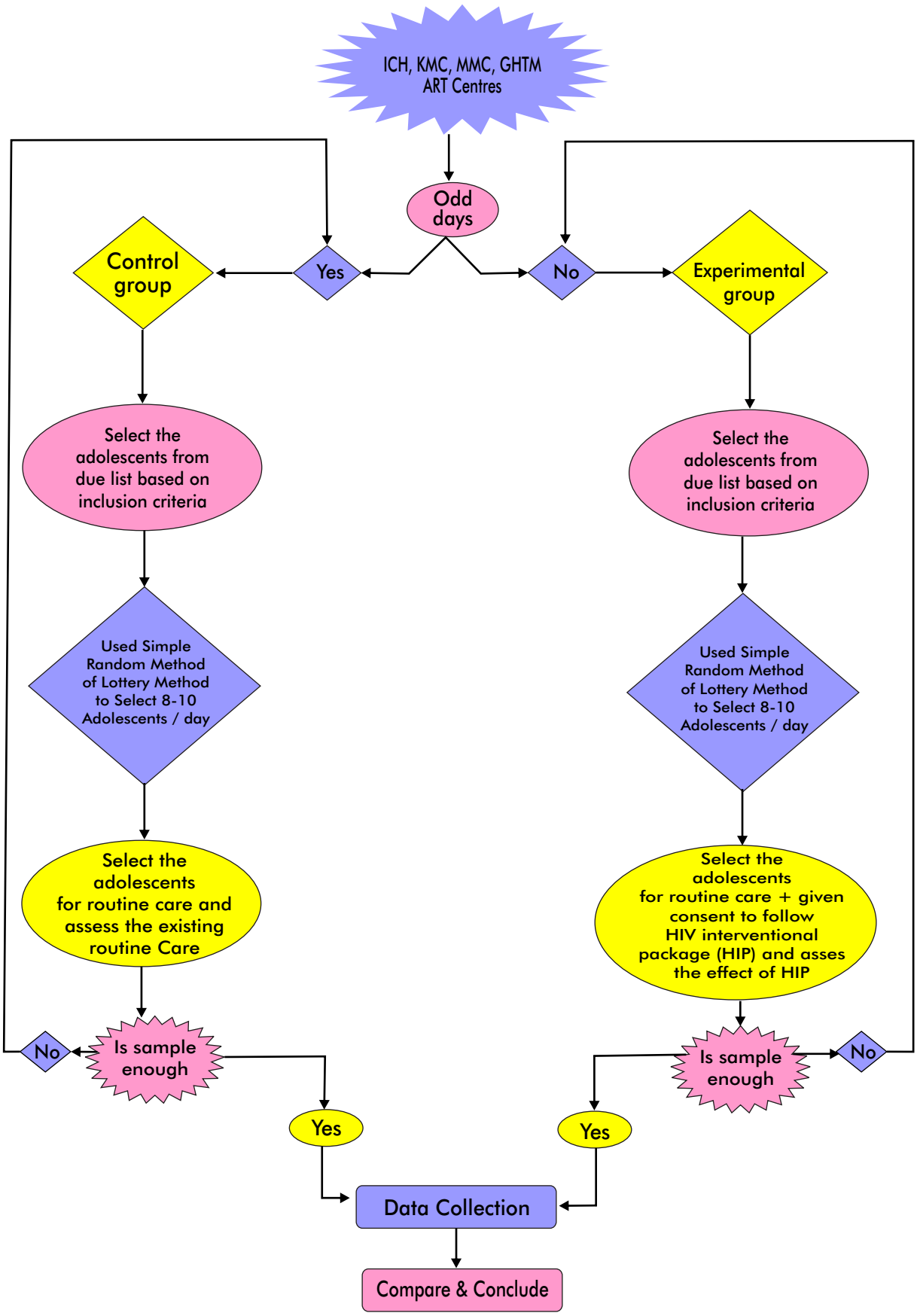
Table 13: The selected study sample size and dropout rates in research settings

S. No.	Places	Total number of samples			Dropout samples			Final sample size		
		Exp	Control	Total	Exp	Control	Total	Exp	Control	Total
1.	**ICH&HC**	75	78	153	3	2	5	72	76	148
2.	**RGGGH**	39	36	75	1	1	2	38	35	73
3.	**KMCH**	34	31	65	-	2	2	34	29	63
4.	**GHTM**	52	55	107	1	2	3	51	53	104
	Total	**200**	**200**	**400**	**5**	**7**	**12**	**195**	**193**	**388**

4.15 (a) Drop out Analysis

The total dropout sample size was 12. The main reasons are, transfer to other ART centres, busy daily schedule and not practiced the yoga daily. Once the child reached the age of 16 years they were prefer to continue the treatment with biological parents who are all taking drugs in their nearest ART centres. The adolescents in the age group of 16-18 years were not able to continue the HIP instructions since this age group was busy in their school scheduled when compare to the other age groups. In gender wise the male adolescents were had more dropouts when compare to the females since they don't have patience to do the asana and practice the diary every day.

PROCEDURE ADOPTED FOR SAMPLE SELECTION



4.16 DATA COLLECTION PROCEDURE

After getting the informed consent and assent form the pertinent data was collected from the care givers / adolescents through in depth structured interview method and observation of hospital records. The adherence assessment and QOL assessment was collected with necessary questionnaire and the assessment of nutritional status were taken by anthropometric measurements. The initial assessment score was taken as pretest or baseline value at '0' month. The HIV interventional package (HIP) was given on same day to experimental group includes the counseling sections of adherence improvement, increase nutritional status and strategies to enhance the QOL. The selected asanas of Padmasana, Vajrasana, Trikonsana, Ardhamatsyendrasana, Ushtrasana, Bhujangasana, Shavasana & Pranayama were demonstrated by the researcher and instructed to do re demonstration by study subjects. They were also given brochures for practicing the selected asana every day for minimum 15-20 minutes on their own at home. The investigator had been given a diary for an interventional aid to improve adherence and instructed to maintain daily after the drug intake and yoga practice.

The investigator had given special attention to few adolescents those who had learning difficulties in practicing the asana. For these adolescents, the investigator had given extra time for 15 minutes for maximum to learn the asana on the same day itself i.e., total time taken for each sample was 45 minutes to1 hour. Every month when the subjects were come for the pharmacy refill, the investigator monitored the dairy and continuing the HIV interventional package interventions as reinforcement counseling and redemonstration of the asana. The HIV interventional package was given to the study group for up to 6 months, however in control group subjects were in routine care as conventional management. The effect of the HIV interventional package was assessed at 3^{rd} & 6^{th} month intervals by collecting required data from the care givers and adolescents in the study group. Simultaneously the data also collected from control group at the same intervals. The cursory instructions were given to the control group at the end 6^{th} month.

4.17 DATA ANALYSIS PROCEDURE

The data analysis is the systematic organization and synthesis of research data by testing with null hypothesis. [98] Here the investigator used the Statistical Package

for the Social Sciences (SPSS) version16 for analyzing the present study data. The collected data were analyzed by using of both descriptive and inferential statistics.

4.17.1 Descriptive Statistics

1. Number and percentage distribution was used to analyze the demographic, clinical and background information of HIV infected adolescents/caregivers in both groups.
2. Mean and standard deviation was used to compute level of pre and post test score of HIP components of HIV infected adolescents in both groups.

4.17.2. Inferential Statistics

3. Chi square test was used to identify the similarities of demographic variables of HIV infected adolescents / caregivers in both groups.
4. Repeated measure of nutritional variables were analyzed by ANOVA 'F' test and bonferroni 't' test was used to find out the significant difference between the baseline to 6^{th} month and 3^{rd} vs. 6^{th} month of nutritional variables.
5. Student Independent t-test was used to evaluate the effectiveness of HIV interventional package of HIV infected adolescents.
6. Differences between pretest and post test score was given in mean difference with 95 % Confidence interval (CI) and percentage distribution with 95 % CI.
7. Karl Pearson correlation coefficient was used to correlate the ART adherence with nutritional status and QOL of HIV infected adolescents in both groups.
8. One way ANOVA / student independent t- test/ chi square test was used to associate the gain score of HIP components with demographic variables of HIV infected adolescents and their caregivers in both groups.
9. Uni & Multivariate logistic regression method was used to identify the influencing factors gain score in experimental group of HIV infected adolescents and it was given in unadjusted and adjusted odds ratio with 95 % CI.
10. Simple bar diagram, multiple bar diagram, subdivided bar diagram and box plot was used to represent the study data.

Chapter - V

Data Analysis and Results

CHAPTER – V

DATA ANALYSIS AND RESULTS

The goal is to turn data into information, and information into insight.

- Carly Fiorina

This chapter deals with analysis and interpretation of collected data from adolescents/caregivers in order to identify the effectiveness of HIP includes adherence rate, nutritional status and QOL. Analysis is a method for rendering quantitative, meaningful and providing intelligible information, so that the research problem can be studied and tested including the relationship between the variables.

Data analysis usually begins with descriptive statistics. The descriptive statistics are used to describe and synthesis data. Whereas, inferential statistics which are based on the laws of probability aids to draw meaningful conclusion or inferences about the population and to determine relationship between two variables in order to interprets the data.[98] In this study, both descriptive and inferential statistics were used to analyze the data. Based on the objectives, the findings of the present study were organized and presented under the following sections were outlined below,

Section-I: 5.1

This section deals with, demographic variables HIV infected adolescents/caregivers, clinical and background information related to HIV infected adolescents in both groups.

5.1.1 Demographic variables of HIV infected adolescents/caregivers in both groups.

5.1.2 Clinical information related to HIV infected adolescents in both groups.

5.1.3 Back ground information of HIV infected adolescents in both groups.

Section-II: 5.2

This section assess and evaluate the pre (baseline) and post test (3^{rd} & 6^{th} month) level of ART adherence, nutritional status and QOL in both groups of HIV infected adolescents.

5.2.1 Assessment of information related to the ART adherence in both groups of HIV infected adolescents.

5.2.2 Assess and evaluate the pre and post test level of ART adherence in both groups of HIV infected adolescents by '5' point response scale, visual analog, '3' days recall and pill count methods in both groups.

5.2.3 Assess and evaluate the pre and post test level of nutritional status in both groups of HIV infected adolescents by anthropometric variables.

5.2.4 Assessment of clinical histories and presence of clinical signs and symptoms related to nutrition in both groups of HIV infected adolescents.

5.2.5 Assess and evaluate pre and post test level of QOL in both groups of HIV infected adolescents.

Section III : 5.3

This section compares and determines the effectiveness of HIV interventional package on HIV infected adolescents in experimental and control group.

5.3.1 Compares the number and percentage distribution of overall level of CD4 count in both groups of HIV infected adolescents.

5.3.2 Determine the effectiveness of HIP in mean and SD level of CD4 count in both groups of HIV infected adolescents.

5.3.3 Compares the number and percentage distribution of overall level of ART adherence in both groups of HIV infected adolescents used by various methods

5.3.4 Determine the effectiveness of HIP in the level of mean ART adherence score in both groups of HIV infected adolescents.

5.3.5 Compares the number and percentage distribution on Interpretation of 'Z' score in both groups of HIV infected adolescents.

5.3.6 Determine the effectiveness of HIP in the level of nutritional gain score in both groups of HIV infected adolescents.

5.3.7 Compares the number and percentage distribution of level of mean QOL score in both groups of HIV infected adolescents.

5.3.8. Determine the effectiveness of HIP in mean QOL score in both groups of HIV infected adolescents

5.3.9 Evaluate the overall effectiveness of HIP components in both groups of HIV infected adolescents.

Section IV: 5.4

This section correlates the HIP components of ART adherence with nutritional status and QOL in both groups of HIV infected adolescents**.**

5.4.1 Assess the correlation between ART adherence with nutritional status in both groups of HIV infected adolescents

5.4.2 Assess the correlation between ART adherence with QOL in both groups of HIV infected adolescents

Section V: 5.5

This section associates the relationship between the HIP components of ART adherence; nutritional status and QOL score with demographic variables of HIV infected adolescents/caregivers in both groups**.**

5.5.1 Associates ART adherence gain score with demographic variables of HIV infected adolescents/caregivers in both groups**.**

5.5.2 Associates the nutritional status gain score with demographic variables of HIV infected adolescents/ caregivers in both groups**.**

5.5.3 Associates QOL gain score with demographic variables of HIV infected adolescents/caregivers in both groups**.**

Section VI: 5.6

This section identifies the influencing factors for HIP components by using Uni and Multi variate logistic regression in experimental group of HIV infected adolescents/care givers.

5.6.1 Identification of the influencing factors for ART adherence by using Uni and Multivariate analysis in experimental group of HIV infected adolescents/care givers.

5.6.2 Identification of the influencing factors for nutritional status by using Uni and Multivariate analysis in experimental group of HIV infected adolescents/care givers.

5.6.3 Identification of the influencing factors for QOL by using Uni and Multivariate analysis in experimental group of HIV infected adolescents/care givers.

SECTION – I

5.1: This section deals with, demographic variables of HIV infected Adolescents/Caregivers, Clinical and Background information related to HIV Infected Adolescents in both groups.

5.1.1:Demographic Variables of HIV Infected Adolescents / Caregivers in Experimental and Control group.

Table 5.1.1 (a): Number and Percentage distribution in the demographic variables of HIV infected adolescents in both groups.

S. No.	Demographic variables of Adolescents		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
2.	**Age**	10 -12 years	60	30.8%	68	35.2%	χ^2=1.58 p=0.45
		13 -15 years	91	46.7%	78	40.4%	DF=2
		16 -18 years	44	22.6%	47	24.4%	**NS**
3.	**Sex**	Male	97	49.7%	109	56.5%	χ^2=1.76 p=0.18
		Female	98	50.3%	84	43.5%	DF=1 **NS**
4.	**Education**	Primary	44	22.6%	43	22.3%	χ^2=1.13
		Middle	77	39.5%	85	44.0%	p=0.76
		Secondary	59	30.3%	50	25.9%	DF=3
		Higher secondary	15	7.7%	15	7.8%	**NS**
5.	**Religion**	Hindu	165	84.6%	148	76.7%	χ^2=4.44 p=0.10
		Muslim	26	13.3%	36	18.6%	DF=2
		Christian	4	2.1%	9	4.7%	**NS**

Not significant P >0.05

Table 5.1.1(a) shows the number and percentage distribution in the demographic variables of HIV infected adolescents in both groups. In experimental group, out of 195 samples, the majority of 91(47%) are in the age group of 13-15 yrs, 60 participants (31%) are in the age group of 10-12 yrs and 44 samples (23%) are in the age group of 16-18 yrs. In gender wise nearly 50% are equally distributed in both categories. Regarding educational status, the majority 77 and 59 (40% and 30%) samples are in the middle and in the secondary level of education, 23% are in primary level education, and only 8% are in higher secondary level education. Considering the religion aspect, the majority 165 (85%) are belong to Hindu, 13% Muslim and 2% Christian.

Whereas in control group, out of 193 samples the majority of 78(40%) are in the age group of 13-15 yrs, 68 samples (35%) are in the age group of 10-12 yrs and 47

Fig 5.1.1(a -i): Percentage wise distribution in Age of HIV infected adolescents in both groups

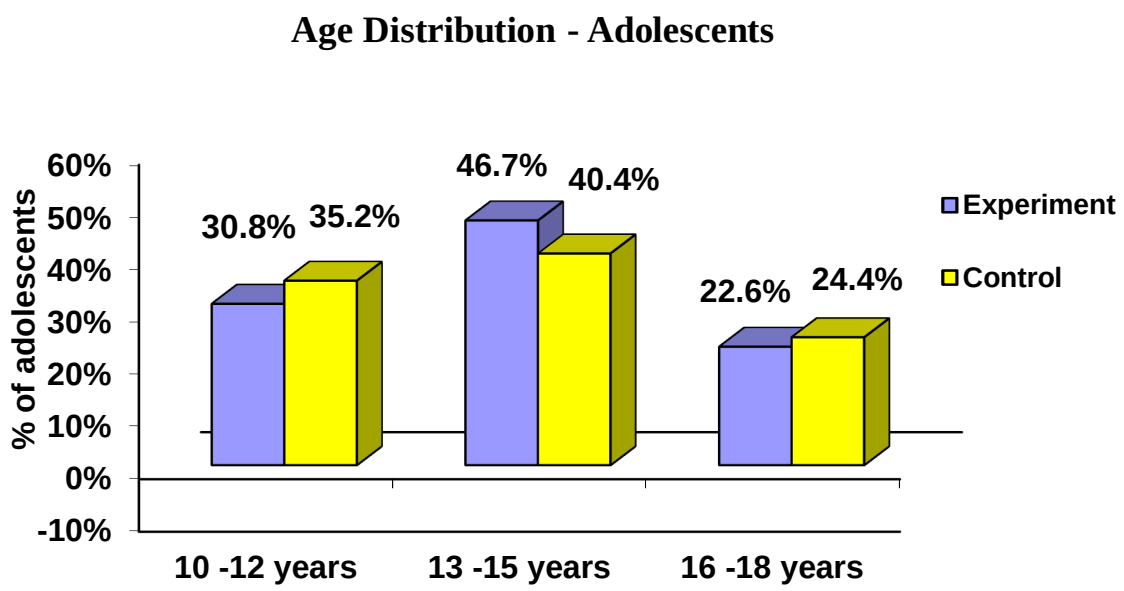


Fig 5.1.1(a-ii): Percentage wise distribution in gender of HIV infected adolescents in both groups

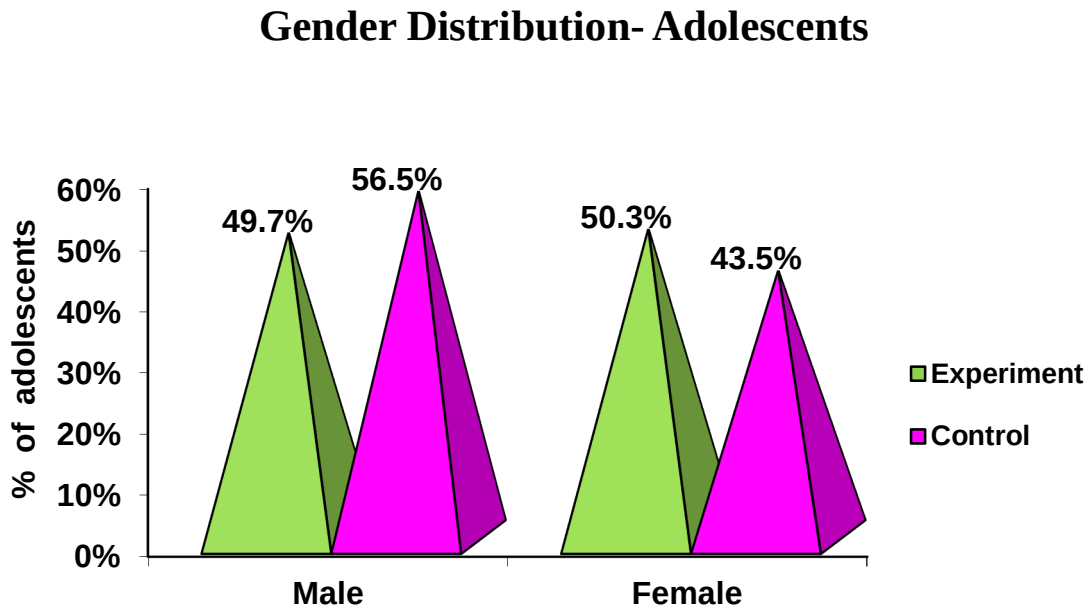


Fig 5.1.1(a-iii): Percentage wise distribution in educational status of HIV infected adolescents in both groups

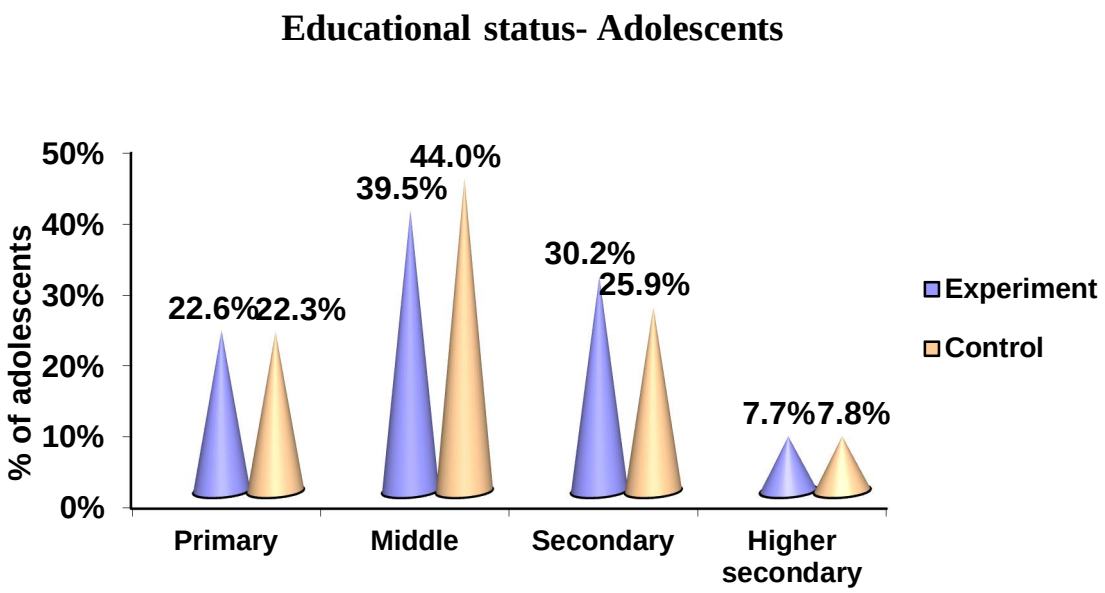
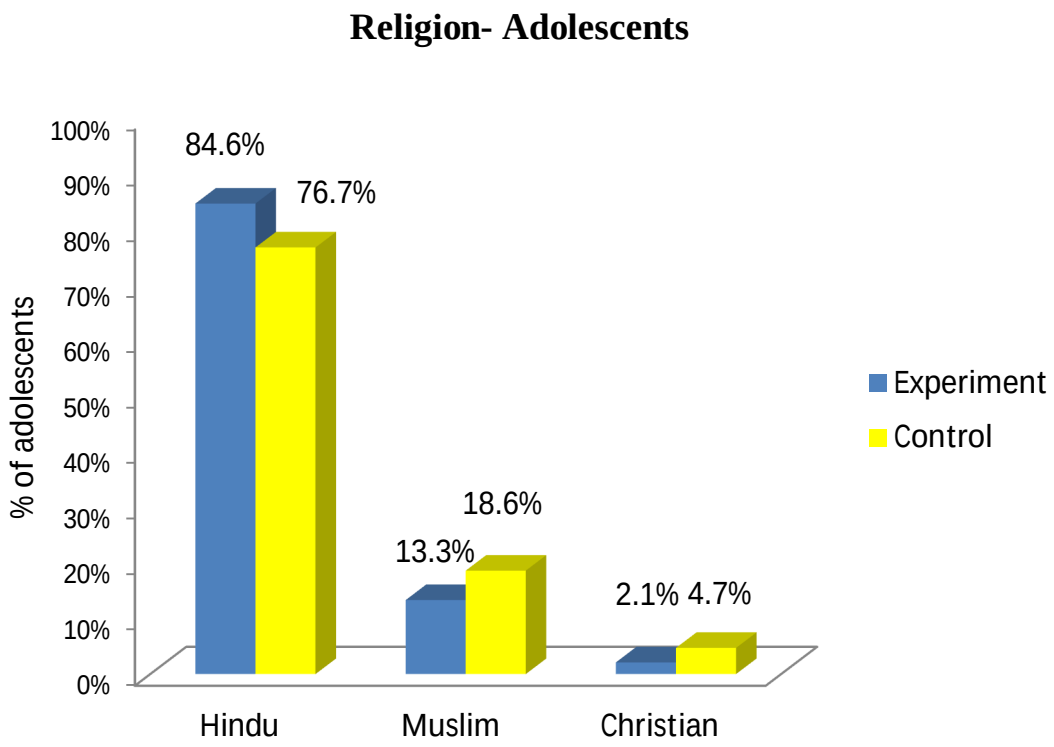


Fig 5.1.1 (a-iv): Percentage wise distribution in religion of HIV infected adolescents in both groups



samples (24%) are in the age group of 16-18 yrs. In gender wise, the majority of 109 (57%) are in male and 44 % are females. Regarding educational status, the majority 85 and 50 (44% and 26%) participants are in middle and secondary level of education, 22% are in primary level education, and only 8% are in higher secondary level education. Considering the religion aspect, the majority 148 (76%) are belongs to Hindu, 19% are Muslim and 5 % are in Christian. In all the demographic variables showed the 'p' value is less than the calculated χ^2 value and it's not significant at the level of 5%. It revealed that both groups are similar.

Table 5.1.1(b):Number and Percentage distribution in the demographic variables of caregivers of HIV infected adolescents in both groups

S. No.	Demographic variables of caregivers		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
7.	**Age of caregivers**	20 -35 years	49	25.1%	49	25.4%	χ^2=3.24 p=0.19
		36 -50 years	136	69.8%	125	64.8%	DF=2
		> 50 years	10	5.1%	19	9.8%	**NS**
8.	**Sex**	Male	59	30.3%	65	33.7%	χ^2=0.52 p=0.47
		Female	136	69.7%	128	66.3%	DF=2 **NS**
9.	**Relationship with Adolescents**	Father	24	12.3%	22	11.4%	χ^2=1.25
		Mother	52	26.7%	43	22.3%	p=0.53
		Caregivers	119	61.0%	128	66.3%	DF=2,**NS**
10	**Education**	No formal education	38	19.5%	53	27.5%	χ^2=4.35
		Up to school level	97	49.7%	94	48.7%	p=0.11
		Up to college level	60	30.8%	46	23.8%	DF=2**NS**
11.	**Occupation**	Employed	85	43.6%	94	48.7%	χ^2=1.54
		Not Employed	28	14.4%	21	10.9%	p=0.46
		Not applicable	82	42.1%	78	40.4%	DF=2**NS**
12.	**Annual income**	Up to Rs.12000	31	15.9%	25	13.0%	χ^2=4.35
		Rs.12000 - 24000	70	35.9%	83	43.0%	p=0.11
		> Rs.24000	12	6.2%	7	3.6%	DF=2
		Not applicable	82	42.1%	78	40.4%	**NS**
13.	**Residence**	Rural	88	45.1%	90	46.6%	χ^2=2.63
		Urban	107	54.9%	103	53.4`%	p=0.10 DF=2 **NS**

Not significant P >0.05

The table 5.1.1 (b) shows number and percentage distribution in the demographic variables of caregivers of HIV infected adolescents in both groups. In experimental group, the majorities (70%) of the caregivers are in the age group of 36-50 yrs, 25% are in 20-35 yrs and only 5% are more than 50 yrs. In gender wise, the majorities (70%) of the caregivers are females and 30% are males. Regarding relationship with adolescents, the majority of 61% are caregivers, 27% are mothers and only 12% are fathers.

Considering about educational status, nearly half of participants (49%) were completed school level education, 31% were completed the college level and 20% were not gone to formal education. Regarding occupational status and annual income the majority of 42% lives in nongovernmental organization and annual income is not applicable in this category, apart from this 47% of caregivers are employed and 14% are not employed. In regard to annual income, the 36% are in Rs 12,000-24,000, 16 % are Rs 12,000 and only 6% are getting more than Rs 24,000/-. The nearly equal percent of participants i.e., 55% are residing in urban areas and 45% in rural areas.

In control group, the majorities (65%) of the caregivers are in the age group of 36-50 yrs, 25 % are in 20-35 yrs and only 9% are more than 50 yrs. In gender wise, the majorities (66%) of the caregivers are females and only 34% are males. Regarding relationship with adolescents, the majority of 66% are in caregivers, 22% are mothers and only 11% are fathers. Considering about educational status, nearly half of the participants (49%) were completed school level education, 24% completed the college level and 28 % were not gone to formal education. Regarding occupational status and annual income the majority 40 % lives in nongovernmental organization and annual income is not applicable in this category, apart from this 49% of caregivers are employed and 11% are not employed. In regard to annual income, the 43 % are in Rs.12,000-24,000, 13% Rs.12,000 and only 4 % were getting more than Rs.24,000/-. The near equal percent of participants i.e., 53% are residing in urban and 47% in rural areas.

In all the demographic variables of the caregivers, the ‘p’ value is less than the calculated χ^2 value and it’s not significant at the level of 5%. It denotes that both groups are similar.

Fig 5.1.1(b-i) : Percentage wise distribution in caregiver's age of HIV infected adolescents in both groups.

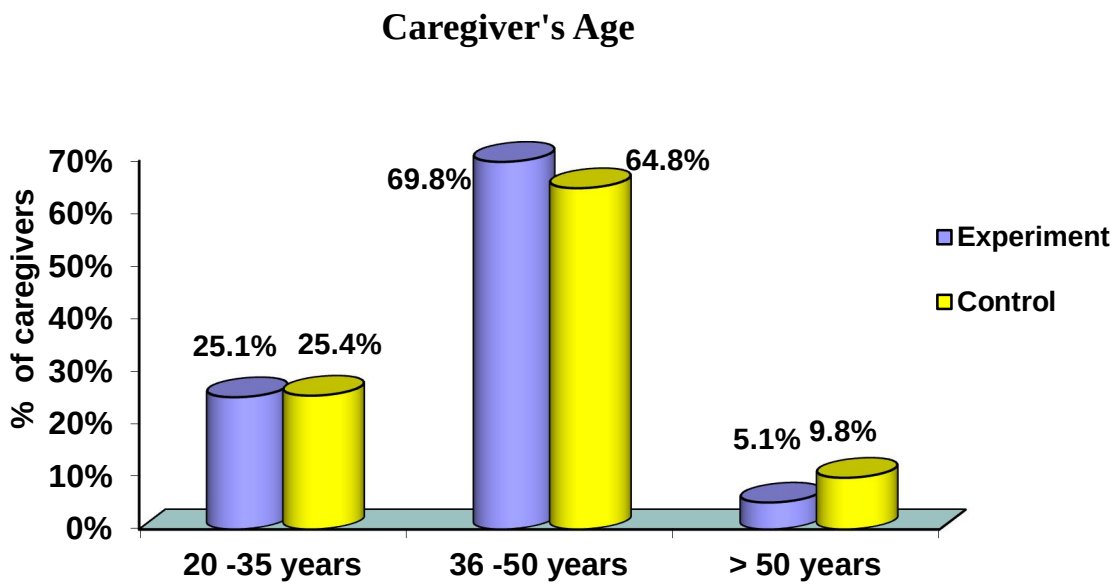


Fig 5.1.1(b-ii): Percentage wise distribution of caregiver's gender in both groups of HIV infected adolescents.

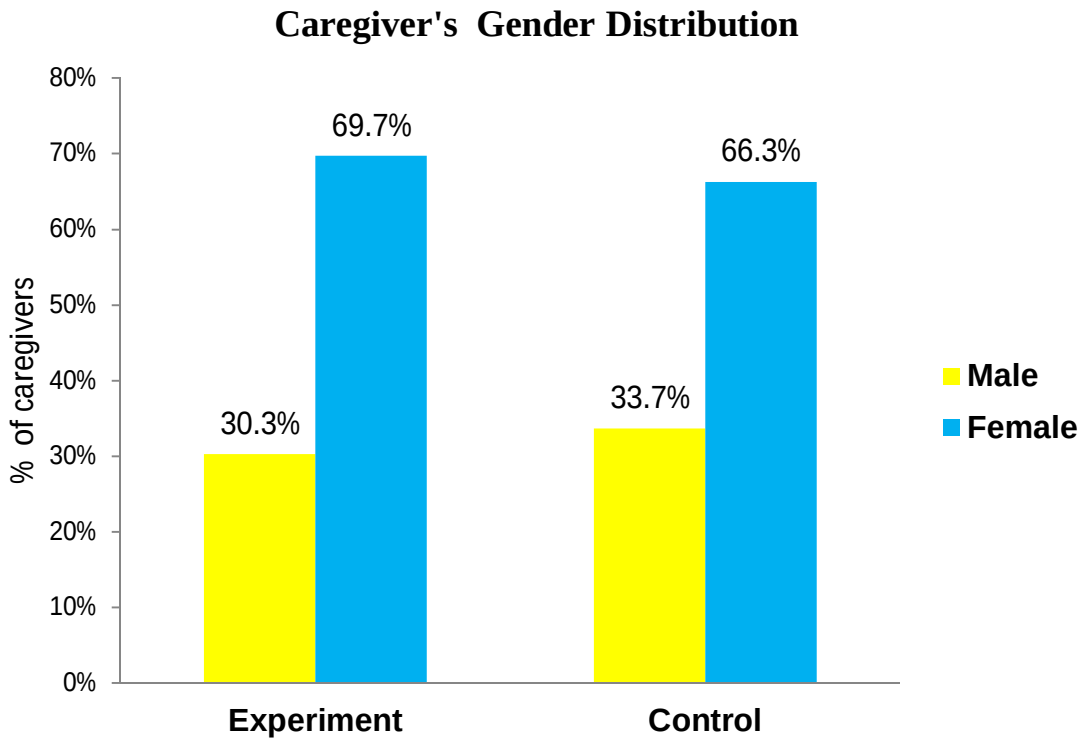


Fig 5.1.1(b-iii): Percentage wise distribution in caregiver's relationship of HIV infected adolescents in both groups

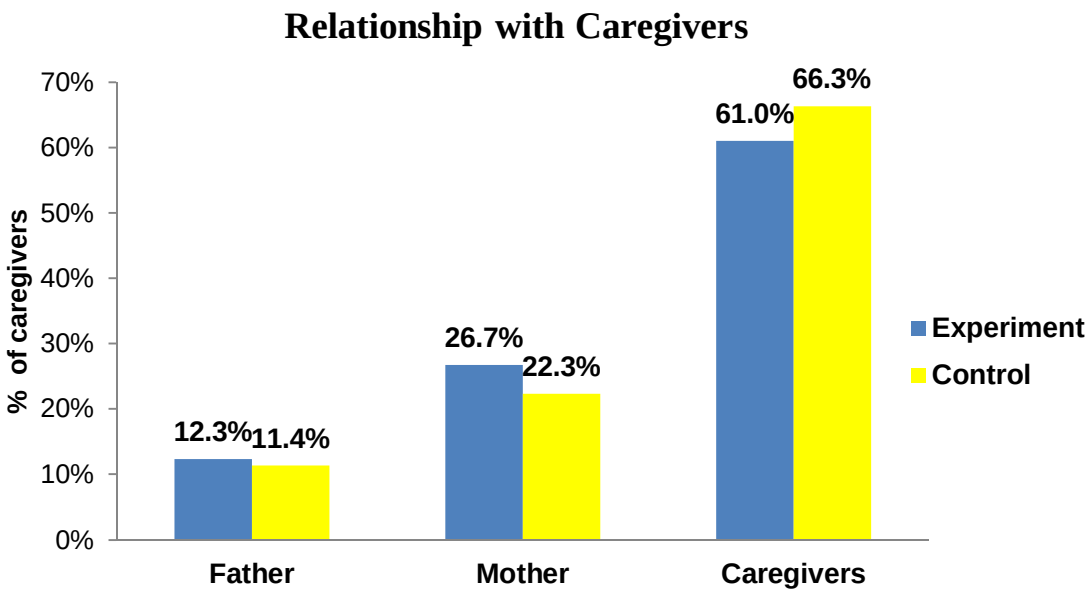


Fig 5.1.1(b-iv): Percentage wise distribution in caregiver's educational status of HIV infected adolescents in both groups.

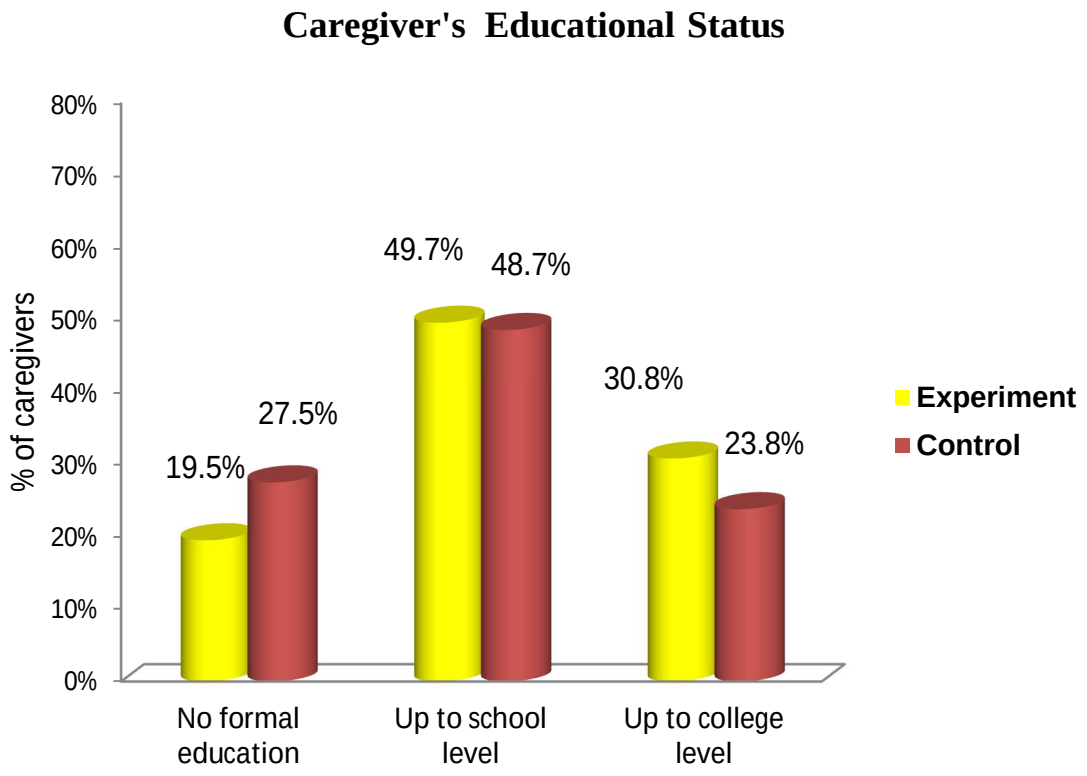


Fig 5.1.1(b-v): Percentage wise distribution in caregiver's annual income of HIV infected adolescents in both groups

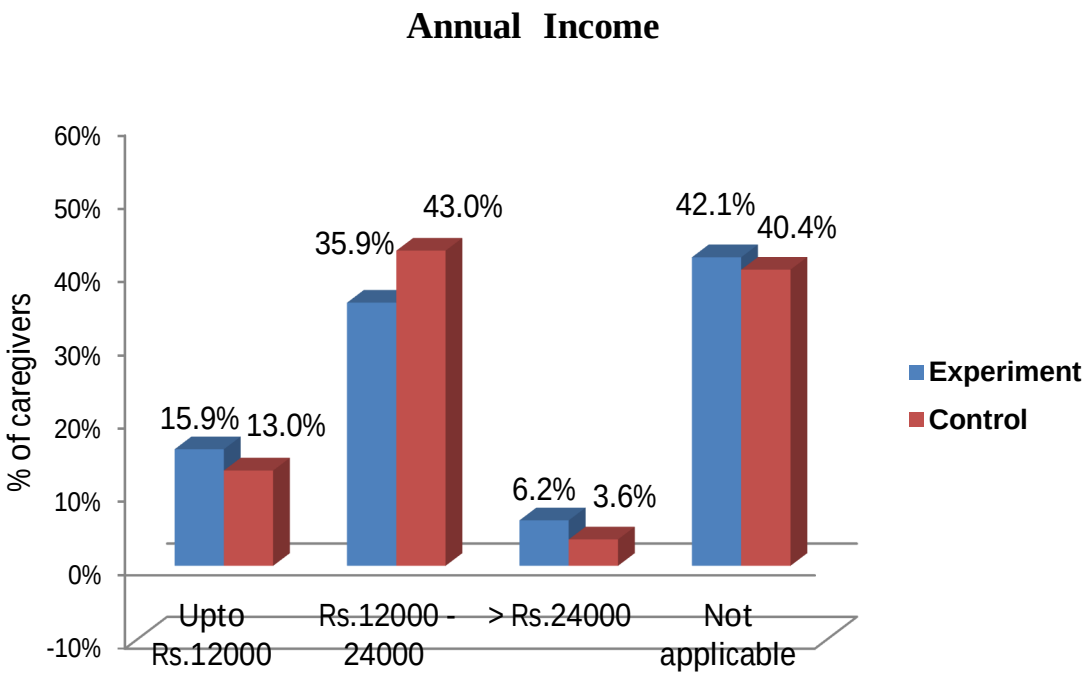
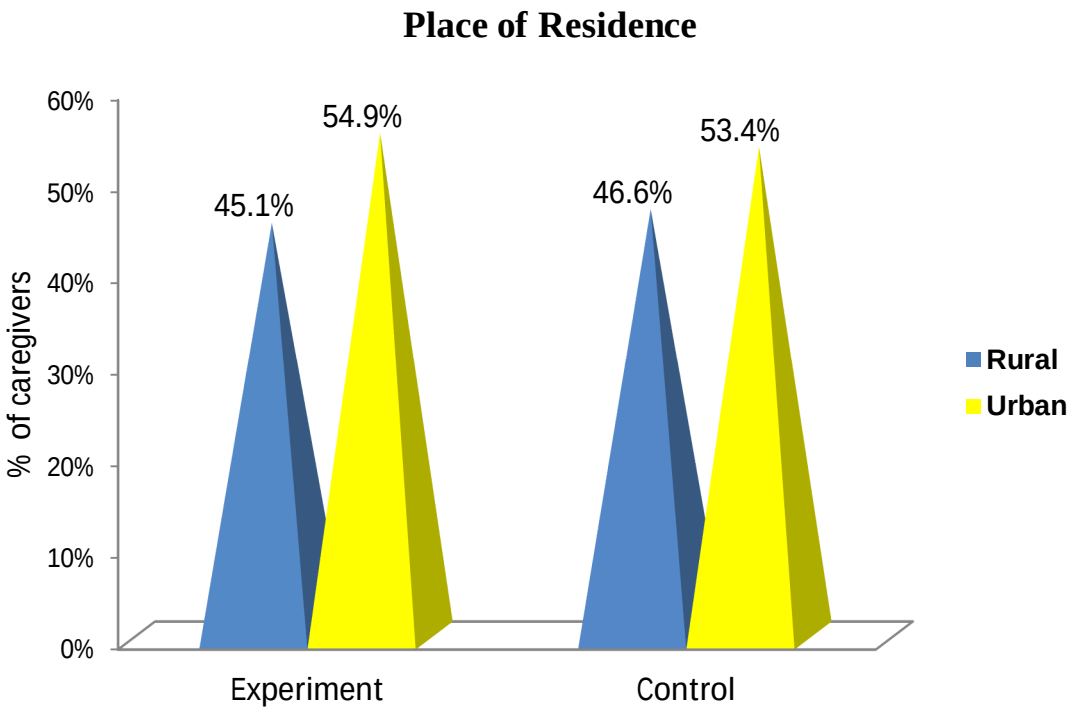


Fig 5.1.1(b-vi): Percentage wise distribution in place of residence of HIV infected adolescents in both groups.



5.1.2: Clinical information related to HIV infected adolescents in both groups.

Table 5.1.2 (a): Number and Percentage distribution in the clinical information of HIV infected adolescents in both groups

S. No.	Clinical Information of HIV Infected Adolescents		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
14.	**Diagnosed as HIV positive**	< 5 years	32	16.4%	42	21.8%	χ^2=4.13 p=0.13 DF=2 **NS**
		5 -10 years	108	55.4%	112	58.0%	
		>10 years	55	28.2%	39	20.2%	
15.	**Route of Transmission**	Mother to child transmission	190	97.4%	192	97.9%	χ^2=2.80 p=0.24 DF=2 **NS**
		Blood transfusion	4	2.1%	1	2.1%	
		Sexual transmission	1	0.5%	0	0.0%	
16.	**Stage of Adolescents**	Stage I	138	70.8%	125	65.8%	χ^2=1.80 p=0.17 DF=1 **NS**
		Stage II	56	29.2%	68	35.2%	
17.	**On ART**	3 months - 1 year	14	7.2%	11	5.7%	χ^2=0.91 p=0.63 DF=2 **NS**
		1 - 5 years	131	67.2%	138	71.5%	
		> 5 years	50	25.6%	44	22.8%	
18.	**History of TB**	Yes	108	55.4%	107	55.4%	χ^2=0.01 p=0.97 DF=1 **NS**
		No	87	44.6%	86	44.6%	
18.a	**If yes, History of ATT drugs**	Completed	108	100.0%	107	100.0%	χ^2=0.00 p=1.00 DF=1 **NS**
19.	**Disclosed information**	Yes	133	68.2%	124	64.2%	χ^2=0.67 p=0.41 DF=1 **NS**
		No	62	31.8%	69	35.8%	

Not significant P >0.05

The table 5.1.2 (a) shows the number and percentage distribution in the clinical information of HIV infected adolescents in experimental and control group. In experimental group, the majority (55%) of the adolescents is diagnosed 5-10 years before, 28 % are less than10 yrs and only 16% are less than 5 yrs. In route of transmission, the majority (97%) of adolescents had the infection through mother to child transmission, 2 % through blood transfusion and only 0.5% through sexual transmission. Regarding HIV stages of adolescents, the majority of 71% are in stage I and the remaining 29 % in stage II and none of them in stage III. Considering about consumption of ART, the majority of participants (67%) are taking in 1-5 years, 26 % are in more than 5 years and only 7% are in 3months to 1 year. Regarding the history of tuberculosis, nearly half of the participants (55%) had history of tuberculosis and completed their treatment successfully. In regard to disclosure status, the majority (68%) of participants do not know their status.

In control group, the majority (58%) of the adolescents was diagnosed 5-10 years before, 22 % were less than 5 years and 20% were diagnosed more than 10 years. In route of transmission, the majority (98%) of adolescents had the infection through mother to child transmission and remaining 2 % had through blood transfusion. Regarding HIV stages of adolescents, the majority of 65% are in stage I and the remaining 35 % are in stage II and none of them are in stage III. Considering about consumption of ART, the majority of 138 participants (72%) are taking drugs in 1-5 years, 23% are in more than 5 years and 6% are in taking for 3months to 1 year. Regarding the history of tuberculosis, nearly half of the participants (55%) had history of tuberculosis and completed their treatment successfully. In regard to disclosure status, the majority of 124 (65%) participants do not know their status.

The chi square test in the all variables of the 'p' value is lower than the tabulated value and it's not significant at the level of P >0.05. It shows that the distributions of the clinical histories of HIV infected adolescents in both groups are similar.

Table5.1.2 (a -i) : Percentage of age wise distribution in disclosure information of HIV infected adolescents in both groups

S. No. 19.	Age	Disclosure information								Chi square test
		Experimental group				Control group				
		Yes		No		Yes		No		
		No	%	No	%	No	%	No	%	
1.	10-12 yrs	28	21.1%	32	51.6%	29	23.4%	39	56.5%	χ^2=3.16
2.	13-15 Yrs	71	53.4%	20	32.3%	53	42.7%	25	36.2%	p=0.20
3.	16-18 Yrs	34	25.6%	10	16.1%	42	33.9%	5	7.3%	**NS**

Not significant P >0.05

Table5.1.2 (a -i) shows percentage of age wise distribution in disclosure information of HIV infected adolescents in both groups. In experimental group, the total of 105 (71+34) adolescents in the age of 13-15 yrs and 16-18 yrs are known for their status and 32 participants (52%) in the age group of 10-12 yrs not known their status. But in control group, the total of 95 adolescents in the age of 13-15 yrs and 16-18 yrs are known their status and 39 participants (56 %) in the age group of 10-12 yrs not known their status. The chi square value of 3.16 is not significant in the level p>0.05. It depicts that the distribution of HIV infected adolescents in both groups are similar.

Fig 5.1.2 (a-i): Percentage wise distribution of diagnosed as HIV positive in both groups of HIV infected adolescents

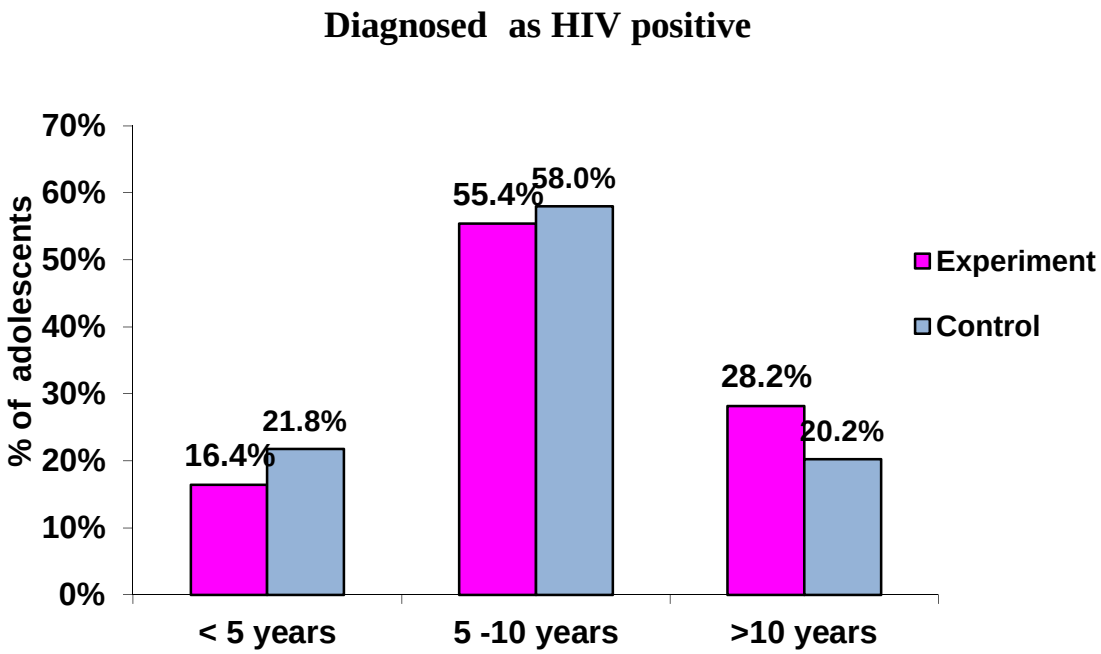


Fig 5.1.2 (a-ii): Percentage wise distribution of route of transmission of HIV infected adolescents in both groups.

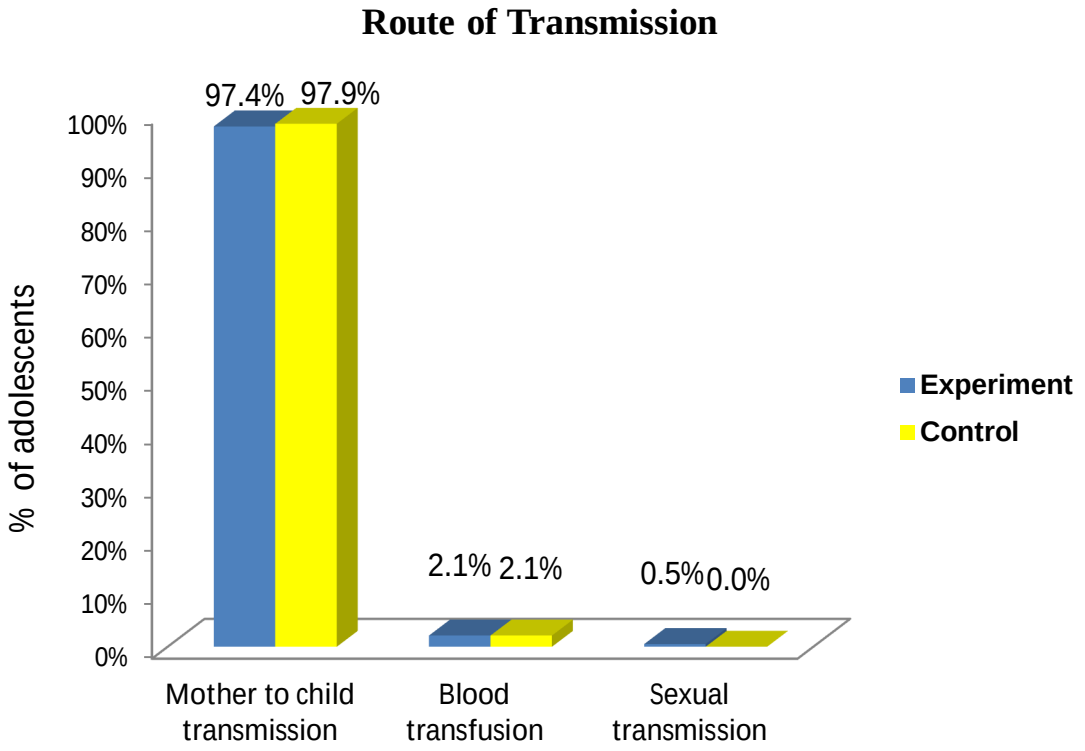


Fig 5.1.2(a-iii): Percentage wise distribution in stage of HIV infected adolescents in both groups

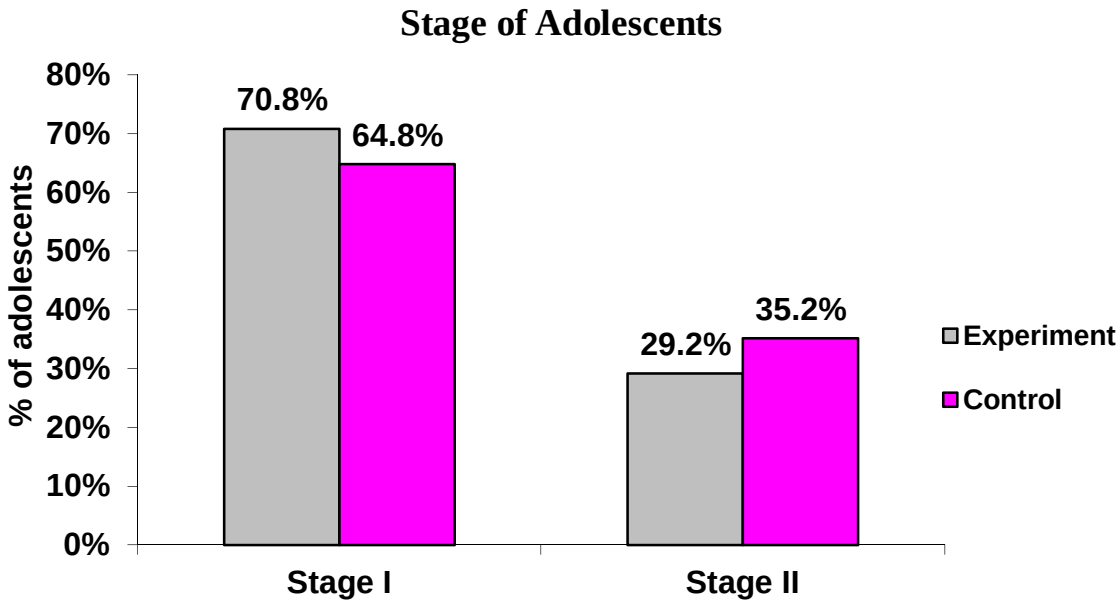


Fig 5.1.2 (a-iv): Percentage wise distribution on ART treatment in both groups of HIV infected adolescents.

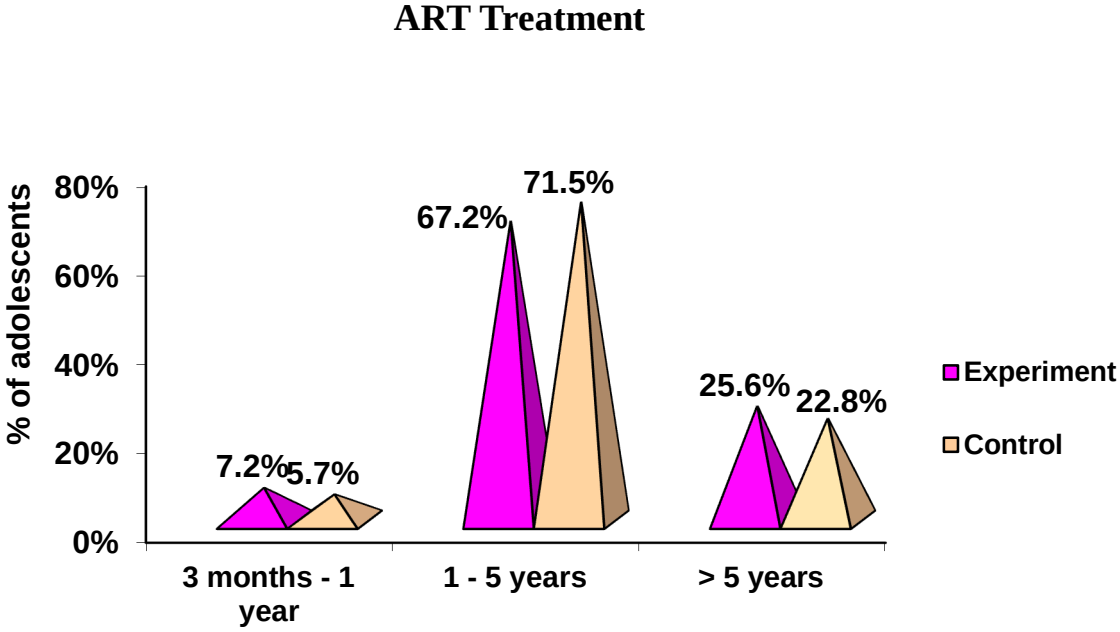


Fig 5.1.2 (a- v): Number and Percentage wise distribution in disclosure information of HIV infected adolescents in both groups

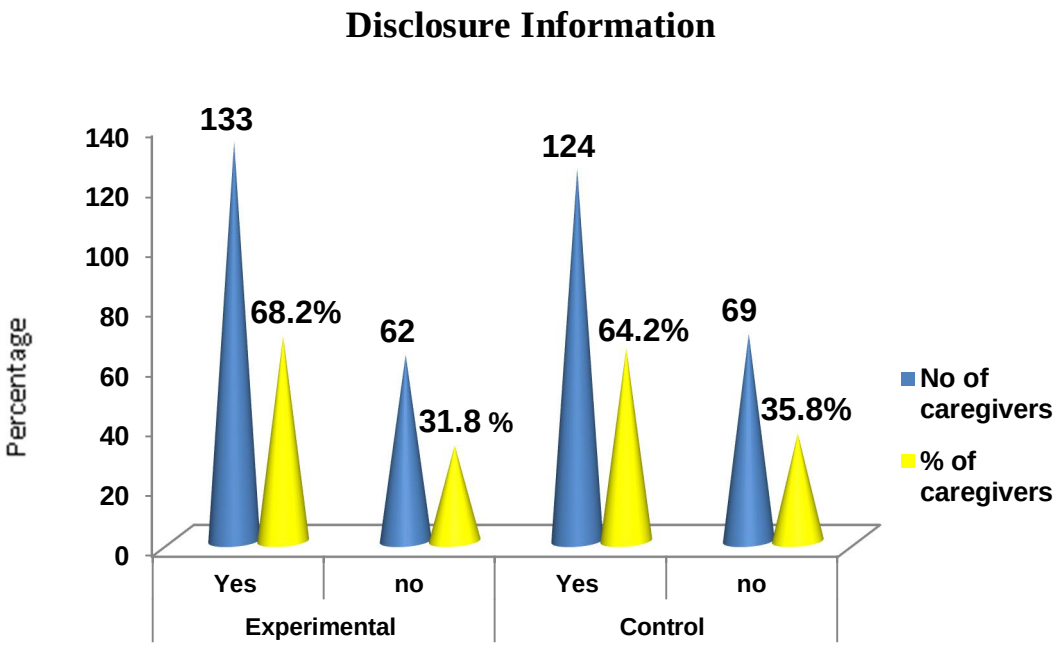
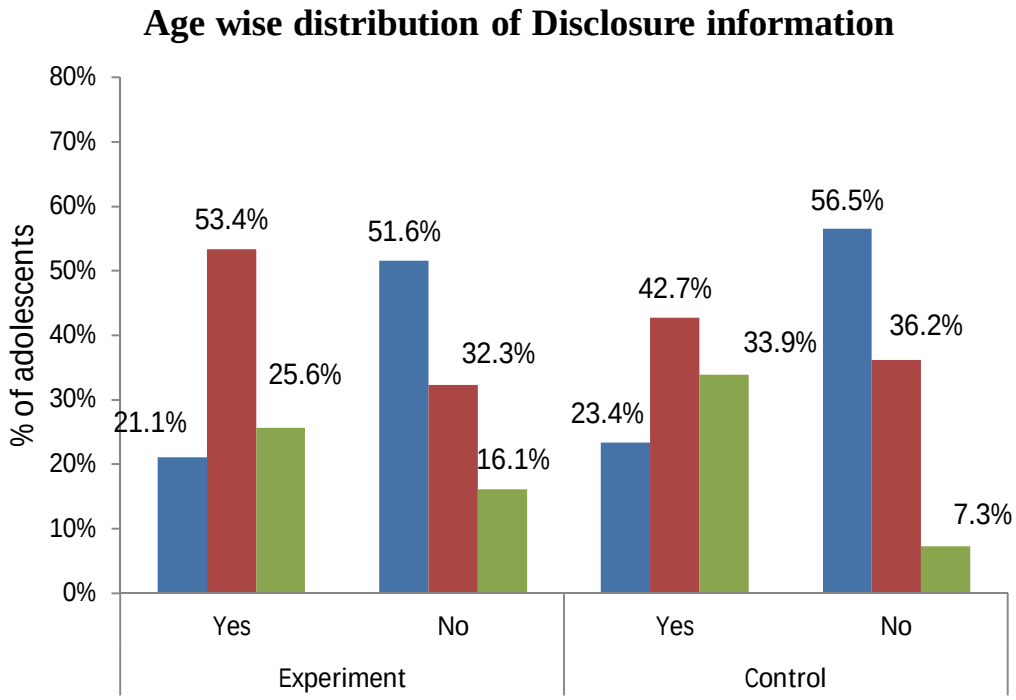


Fig 5.1.2(a-vi): Percentage of age wise distribution in disclosure information of HIV infected adolescents in both groups



5.1.2 (b): Level of CD4 count of HIV infected adolescents in both groups

Table 5.1.2 (b-i) : Number and percentage distribution in the level of CD4 count before initiating ART in HIV infected adolescents in both groups

S. No 20.	Level of CD4 Count before initiating ART	Group				Chi square Value
		Experimental		Control		
		No	%	No	%	
1.	< 300cells	133	68.2%	137	71.0%	χ^2=0.36
2.	301-600 cells	60	30.8%	54	28.0%	p=0.83,DF=2
3.	601-900 cells	2	1.0%	2	1.0%	**NS**

Not significant P >0.05

The table 5.1.2 (b-i) shows the number and percentage distribution in the level of CD4 count before initiating ART in HIV infected adolescents in experimental and control groups. In both groups, the majority (68 & 71%) were in < 300 cells/mm^3, 31% and 28% were in the level of 301-600 cells/mm^3, and only 1% in level of 601-900 cell/mm^3 in both groups. The chi square value is 0.36 at the 'p' level of 0.83 shows that it's not significant.

Table 5.1.2 (b-ii): Mean difference level of CD4 count before initiating ART in HIV infected adolescents in both groups.

S. No.		Level of CD4 count Before Start of ART		Mean difference	Student Independent 't' test
		Experimental	Control		
1.	Mean	272.15	267.79	4.37	t=0.54
2.	SD	78.635	79.336		p=0.58 **NS**

Not significant P >0.05

The table 5.1.2 (b-ii) shows the mean difference level of CD4 count before initiating ART in HIV infected adolescents in both groups. In experimental group, the mean value is 272.15 with SD of 78.635 and in control group the mean value is 267.79 with SD of 79.336. The mean difference is 4.37.The student independent 't' test is 0.54 at 'p' value of 0.58. It shows that it's not significant at P >0.05.

Table 5.1.2(b-iii): Number and Percentage distribution in the level of CD 4 count at baseline assessment in both groups of HIV infected adolescents

S. No. 21(a)	Level of CD4 Count	Group				Chi square value
		Experimental		Control		
		No.	%	No.	%	
1.	300-600 cells	92	47.2%	95	49.2%	χ^2=4.17 p=0.24 DF=3 **NS**
2.	601-900 cells	77	39.5%	80	41.5%	
3.	901-1200 cells	19	9.7%	13	6.7%	
4.	> 1200 cells	7	3.6%	5	2.6%	

Not significant P >0.05

The table 5.1.2 (b-iii) shows the number and percentage distribution in the level of CD4 count at baseline assessment in both groups of HIV infected adolescents. In experimental group, 47 % participants are in 300-600 cells/mm^3, 40% in 601-900 cells/mm^3, 10% in 901-1200 cells/mm^3 and only 3.6% in >1200 cells/mm^3. Whereas in control group, the nearly 50 % participants are in 300-600 cells/mm^3, 42% in 601-900 cells/mm^3, 7 % in 901-1200cells/mm^3 and only 3% are in > 1200 cells/mm^3. The chi square value of 4.17 is not the significant at P>0.05. It shows that there is no statistical variation in the level of CD4 count of HIV infected adolescents in both groups.

Table 5.1.2 (b-iv): Baseline mean difference level of CD4 count in both groups of HIV infected adolescents

S. No.		Level of CD4 count baseline level at '0' month		Mean difference	Student Independent t-test
		Experimental	Control		
1.	Mean	664.86	669.72	4.86	t=0.24, P=0.81 **NS**
2.	SD	221.688	174.703		

Not significant P >0.05

The table 5.1.2 (b-iv) shows the baseline mean difference level of CD4 count in both groups of HIV infected adolescents. In experimental group, the mean value is 664.86 with standard deviation of 221.688, whereas in control group the mean value is 669.72 with standard deviation of 174.703. The mean difference is 4.86. The Student Independent t- test is 0.24 and its is not significant at p > 0.05. It reveals that the distribution for baseline level of CD4 count of HIV infected adolescents in both groups are similar.

Table 5.1.2 (b-v) : Number and Percentage distribution in the level of CD4 count after HIP at 6th month in both groups of HIV infected adolescents.

S. No. 21(b)	Level of CD4 Count	Group				Chi square value
		Experimental		Control		
		No.	%	No.	%	
1.	300-600 cells	18	9.2 %	58	30.1%	χ^2=44.56 p=0.001*** DF=3 **S**
2.	601-900 cells	119	61.0%	109	56.5%	
3.	901-1200 cells	46	23.6%	23	11.9%	
4.	> 1200 cells	12	6.2%	3	1.5%	

***** very high significant at P≤0.001**

The table 5.1.2 (b-v) shows the number and percentage distribution in the level of CD4 count after HIP at 6th month in both groups of HIV infected adolescents. In experimental group, the majority (61%) participants are in 601-900 cells/mm^3, 24% in 901-1200 cells/mm^3, 9% in 300- 600 cells/mm^3 and 6 % in >1200 cells/mm^3. Whereas in control group, the 57% of participants are in 601-900 cells/mm^3, 30 % in 300-600cells/mm^3, 12% in 901-1200cells/mm^{3}and 2%in >1200 cells/mm^3. The chi square value of 44.56 shows the significant at P= 0.001***. It reveals that there is a marked improvement in the level of CD4 count of HIV infected adolescents in experimental group than the control group.

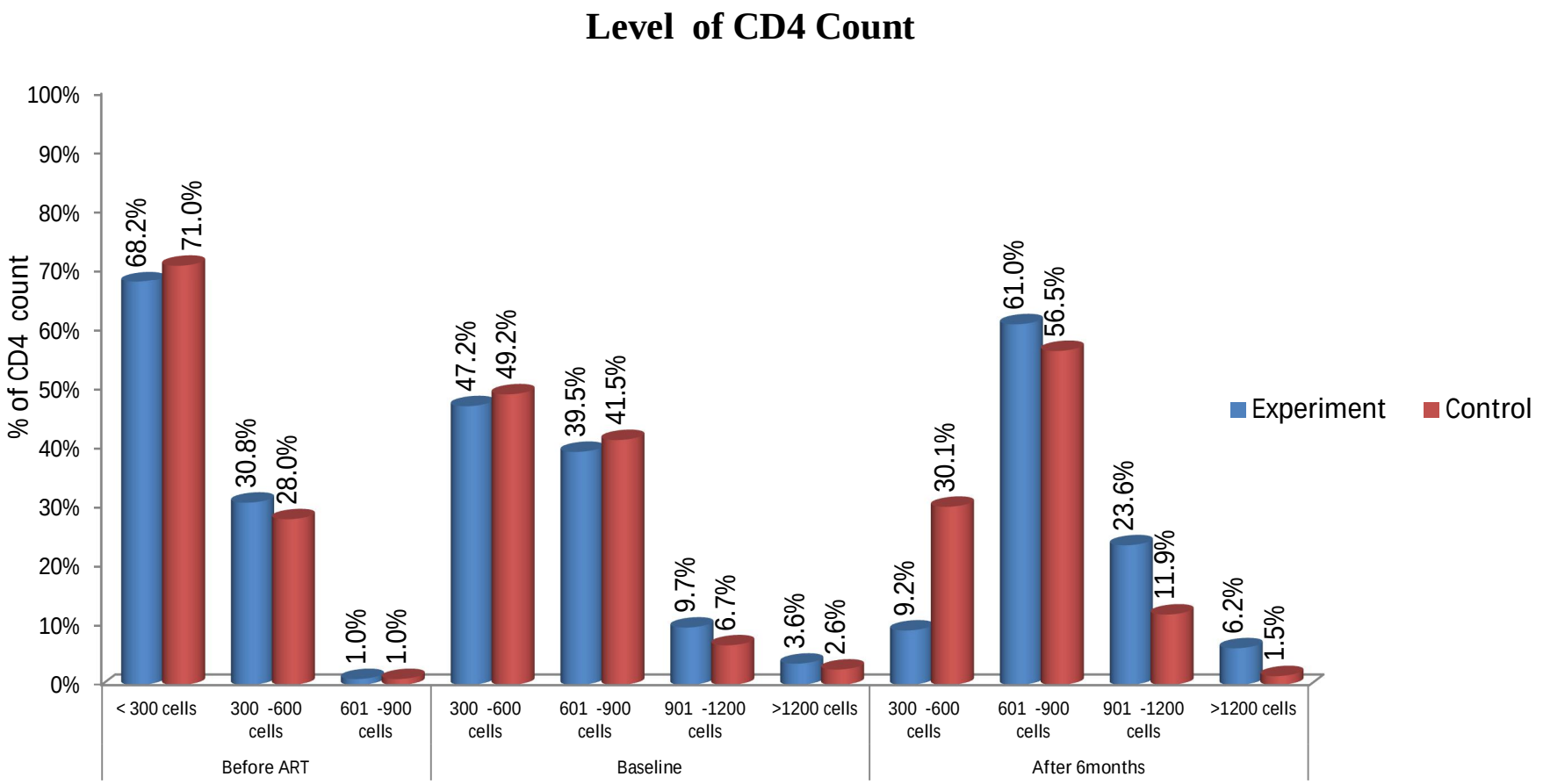
Table 5.1.2 (b-vi): Mean difference level of CD4 count at 6th month in both groups of HIV infected adolescents

S. No.		Level of CD4 count baseline level at 6th month		Mean difference	Student Independent test
		Experimental	Control		
1.	Mean	840.30	703.35	136.96	t=6.67 p=0.001*** **S**
2.	SD	232.671	165.724		

***** very high significant at P≤0.001**

The table 5.1.2 (b-vi) shows the mean difference level of CD4 count at '6th' month in both groups. In experimental group, the mean value is 840.30 with standard deviation of 232.671, but in control group the mean value is 703.35 with Standard deviation of 165.724. The mean difference is 136.96. The Student Independent test score is 6.67 it's significant at p=0.001***. It's depicts that there is statistical improvement in the level of CD4 count of HIV infected adolescents in experimental group than the control group.

Fig 5.1.2 (b): Percentage wise distribution in level of CD4 count of HIV infected adolescents in before ART, in baseline and after 6th months in both groups of HIV infected adolescents.



5.1.3: Background information of HIV infected adolescents in both groups

Table 5.1.3(a): Number and percentage distribution of family members living status in both groups of HIV infected adolescents

S. No.	Family members Living status		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
22.	a. **Father**	Alive	78	40.0%	94	48.7%	χ^2=3.84p=0.15
		Dead	112	57.4%	97	50.3%	DF=2
		Unknown	5	2.6%	2	1.0%	**NS**
	b. **Mother**	Alive	100	51.3%	122	63.2%	χ^2=5.7 p=0.06
		Dead	90	46.2%	68	35.2%	DF=2
		Unknown	5	2.6%	3	1.6%	**NS**
	c. **Siblings**	Alive	66	69.5%	60	69.8%	χ^2=1.86p=0.39
		Dead	27	28.4%	26	30.2%	DF=2
		Unknown	2	2.1%	0	0.0%	**NS**

Not significant P >0.05

Table 5.1.3 (a) shows number and percentage distribution of family members living status in both groups of HIV infected adolescents. In experimental group, regarding living status of fathers the most of them (57%) were died, 40% are only alive and remaining 3% are unknown for their status. Whereas, in control group, the half of percentage (50%) were died 48% are only alive and remaining 1% are unknown for their status. Regarding the living status of mothers in experimental group, nearly half of percentage (51%) are alive, 46% were died and remaining 3% of unknown for their status. But in control group, the majority of 63% are alive, 35% died and remaining 2% unknown of their status. Considering about the living status of siblings in experimental group, the majority (70%) are alive, 28% were died and remaining 2% did not know their living status. while in control group, the majority (70%) of are alive and remaining 30% died. The chi square value of the all the variables shows that the distribution are similar in both groups.

Table 5.1.3 (b): Number and percentage distribution of family members HIV status, residing information in both groups of HIV infected adolescents

S. No.	Family members HIV status		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
23.	a. **Father**	Positive	191	97.9%	190	98.4%	χ^2=0.13 p=0.71
		Negative	4	2.1%	3	1.6%	DF=1 **NS**
	b. **Mother**	Positive	190	97.4%	190	98.4%	χ^2=0.49 p=0.48
		Negative	5	2.6%	3	1.6%	DF=1 **NS**
	c. **Siblings**	Positive	71	80.0%	71	82.5%	χ^2=2.06 p=0.15
		Negative	25	20.0%	12	17.5%	DF=1 **NS**
24.	**Residing with biological parents**	Yes	76	39.0%	71	37.8%	χ^2=2.06 p=0.15
		No	119	61.0%	122	62.2%	DF=1 **NS**
24.a	**If No**,	Family members	32	26.9%	43	35.2%	χ^2=4.34 p=0.11
		NGO	82	68.9%	78	63.9%	DF=2
		Adopted	5	4.2%	1	0.8%	**NS**

Not significant P >0.05

Table 5.1.3 (b) shows the number and percentage distribution of family members HIV status, residing information in both groups of HIV infected adolescents. Regarding father and mother HIV status, the majority (98%) was positive and nearly 2-3% was negative in both groups. Considering with siblings HIV status, majority of 80% were positive and 20% & 18% were negative in both groups. Considering with the residing information of HIV infected adolescents in experimental group, the majority of 119 participants (61%) are not residing with biological parents and remaining 39% are only residing with parents. Among 119 participants, the majority of 69% got accommodation through NGOs, 27% are along with family members and remaining 4 % living with adopted parents. While in control group, only 71(38%) are residing with biological parents, and remaining 122 (62%) participants are residing respectively in 35%, 63% and 0.8% in family members, NGO and adopted parent. The chi-square value of all the variables shows that, the distributions are similar in both groups.

Fig 5.1.3 (a-i): Percentage wise distribution of family members living status in both groups of HIV infected adolescents.

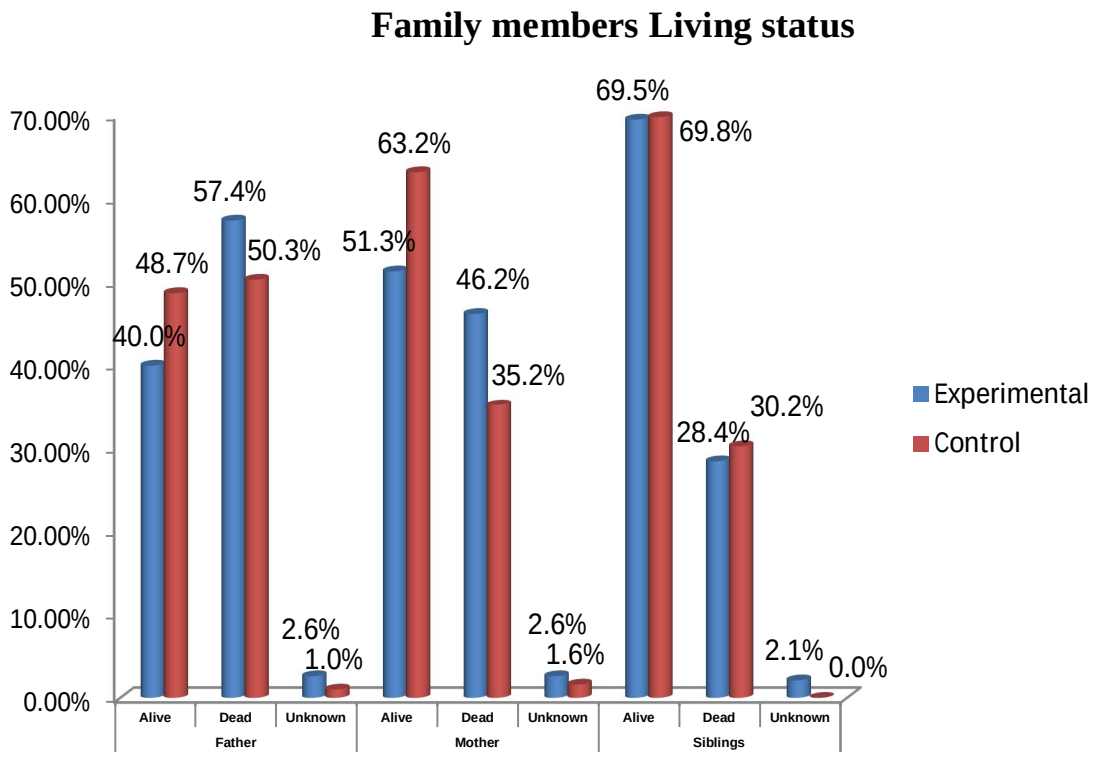


Fig 5.1.3 (b-i): Percentage wise distribution of family members HIV status in both groups of HIV infected adolescents

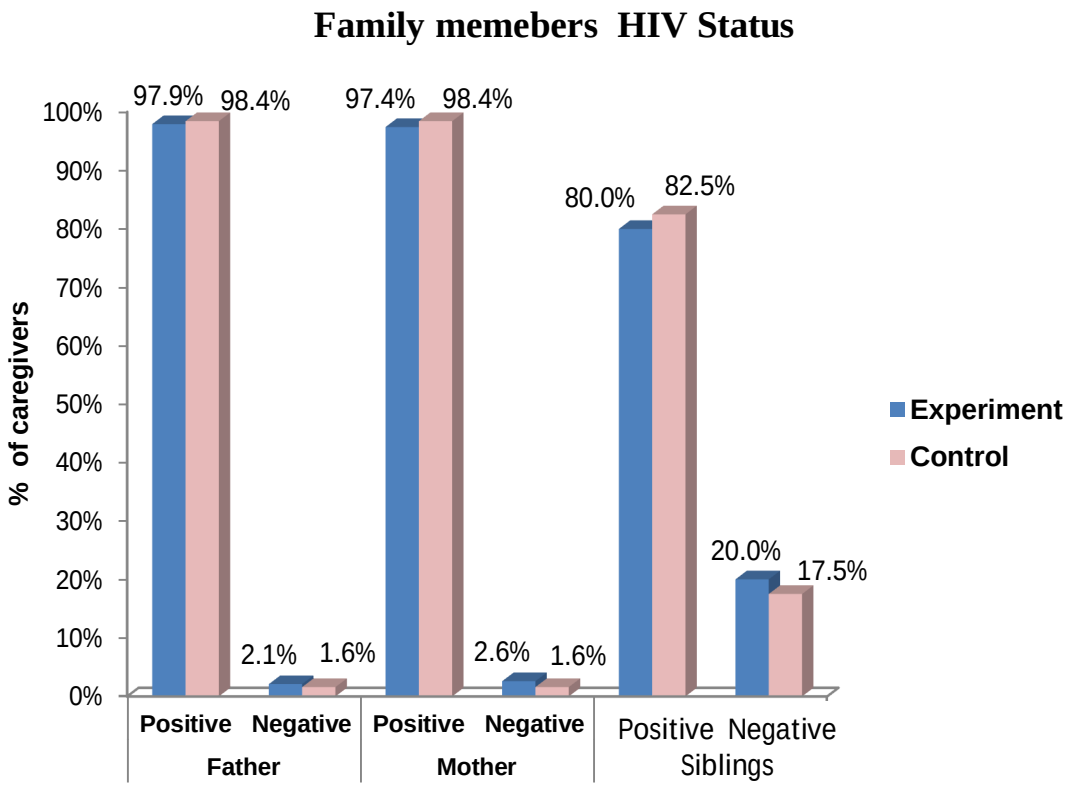


Table 5.1.3 (c): Number and Percentage distribution of the Health Care Facilities and Financial and Social Support in both groups of HIV infected adolescents

S. No.	Back Ground Information		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
25.	**Healthcare facilities**	Yes	191	97.9%	186	96.4%	χ^2=0.87 p=0.34
		No	4	2.1%	7	3.6%	DF=1 **NS**
26.	**Financial support**	Yes	102	52.3%	107	55.4%	χ^2=0.38 p=0.53
		No	93	47.7%	86	44.6%	DF=1 **NS**
27.	**Satisfied social Support**	Yes	103	52.8%	108	56.0%	χ^2=0.38 p=0.53
		No	92	47.2%	85	44.0%	DF=1 **NS**
a.	**If yes, Relatives & Neighbor**	Yes	59	57.3%	65	60.2%	χ^2=0.87 p=0.34
		No	44	42.7%	43	39.8%	DF=1 **NS**
b.	**Governmental Support**	Yes	97	94.2%	85	88.0%	χ^2=2.55 p=0.11
		No	6	5.8%	23	12.0%	DF=1 **NS**
c.	**NGO support**	Yes	83	80.6%	76	70.4%	χ^2=2.96 p=0.09
		No	20	19.4%	32	29.6%	DF=1 **NS**
d.	**Discriminated by**	Yes	38	36.9%	47	43.5%	χ^2=0.96 p=0.32
		No	65	63.1%	61	56.5%	DF=1 **NS**
e	**Satisfied social support**	Yes	87	84.5%	84	77.8%	χ^2=1.53 p=0.21
		No	16	15.5%	24	22.2%	DF=1 **NS**

Not significant P >0.05

Table 5.1.3 (c) shows number and percentage distribution of the health care facilities and financial and social support in both groups of HIV infected adolescents**.** In experimental group, the majority of 191 participants (98%) are utilizing health care facilities and remaining 2% not getting proper health care facilities. Considering with financial support, 52% are receiving financial sources from government and NGOs and the remaining 48% are not receiving any help. But in control group the majority of participants (96%) are utilizing and remaining 4% not received proper health care facilities. Considering with financial support, 55% are receiving financial sources from government and NGOs and the remaining 45% are not receiving any help from any other private and public sources.

Regarding social support, nearly half of percentage (53%) participants are receiving social support and the remaining 47% are not received in the experimental group. Among 103 participants, 57% are receiving social support from relatives and neighbors, 94 % are from the way of government and 81 % are from NGOs. In regard to discrimination, the majorities (63%) of participants were not discriminated and the

Fig 5.1.3(b-ii): Number and Percentage wise distribution of residing information in both groups of HIV infected adolescents.

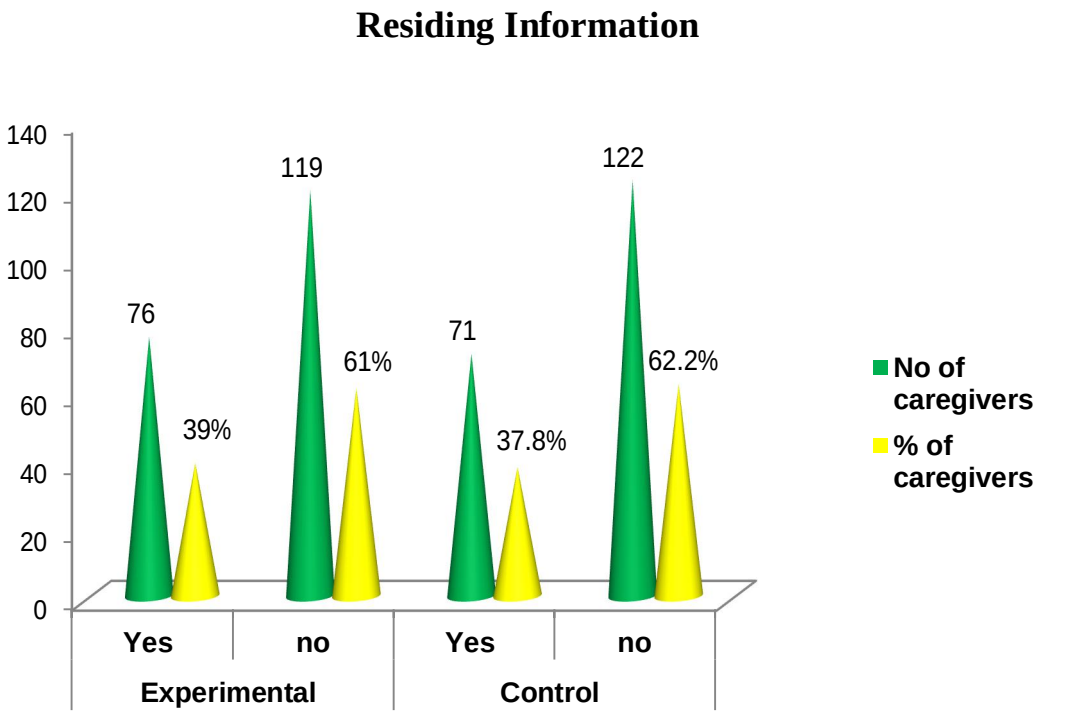
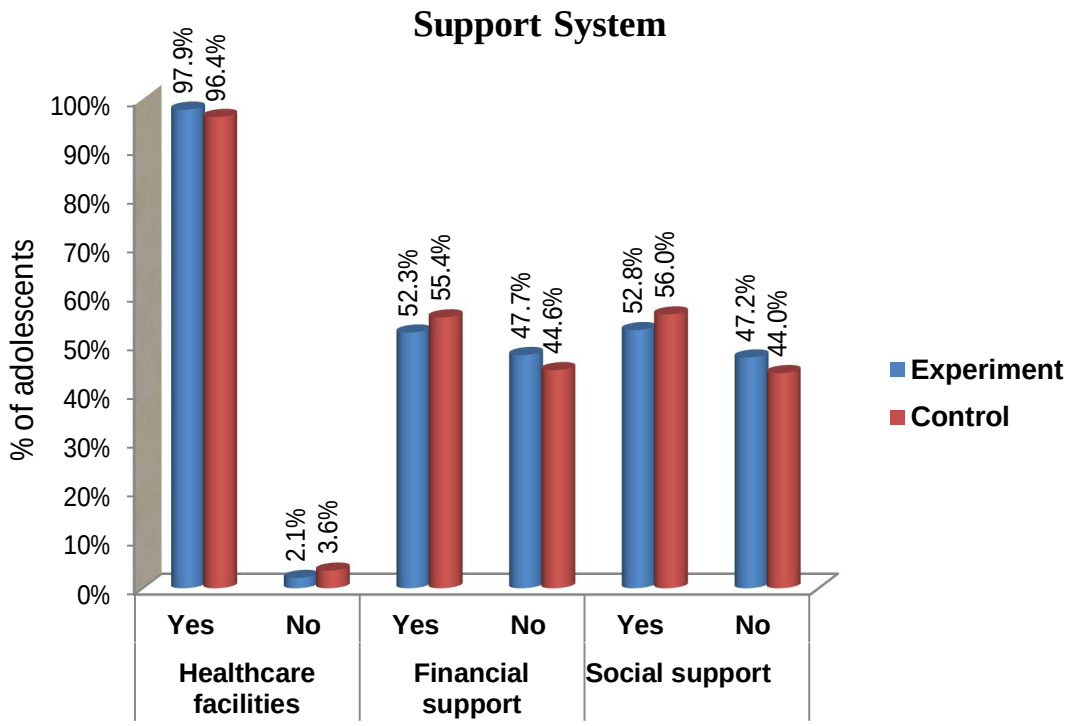


Fig 5.1.3(c -i): Percentage wise distribution of support system in both groups of infected adolescents



majorities (85%) are satisfied with social support. Whereas in control group, the 56% participants are receiving social support and the remaining 44% have not received. Among 108 participants, 60% are receiving social support from relatives and neighbors, 88 % are from the way of government and 70% are through NGOs. Consider about discrimination, the 57% participants were not discriminated and 78% participants are satisfied with available social support. The chi square value of all the variables are not significant at P>0.05. It depicts that the distribution of these variables are similar in both groups.

Table 5.1.3 (d): Number and percentage distribution of the information regarding HIV / ART in both groups of HIV infected adolescents/caregivers

S. No.	Background information		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
28.	**Information on**	**Newspaper**	24	12.3%	28	14.5%	χ^2=2.31
	HIV/ART	**TV/cinema**	20	10.3%	28	14.5%	p=0.31DF=2
		HCP	151	77.4%	137	71.0%	**NS**
29.	**Information and**	**Doctors**	24	12.3%	32	16.6%	χ^2=4.22
	benefits on ART	**Nurse**	49	25.1%	51	26.4%	p=0.12DF=2
		Counselors	122	62.6%	110	57.0%	**NS**

Not significant P >0.05

Table 5.1.3 (d) shows number and percentage distribution of the information regarding HIV/ART in both groups of HIV infected adolescents / caregivers. Considering with basic information on HIV/ART are known through, 77 % from health care professionals, 12% from news paper and remaining 10% from public medias of TV/cinema in experimental group. But, in control group the majority (71%) are through health care professionals and equal percentage (15%) from newspaper and as well as TV/cinema.

In regard to the dissemination of information and benefits of ART, the majority (63% and 57%) are through counselors, 25% and 26 % by nurses and remaining 12 % and 16% from doctors respectively in both groups. The chi square value of these variables is not significant at $p < 0.05$.It shows that both variables are similar.

Table 5.1.3. (e): Number and percentage distribution in the level of Knowledge regarding basic information of HIV/AIDS in both groups of HIV infected adolescents/caregivers.

S. No.	Basic Information on HIV/ART		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
30.	**Basic Information on HIV/ART**	**Yes**	195	100.0%	193	100.0%	χ^2=0.00 p=1.00 DF=1 **NS**
a.	**Caused by**	**HIV virus**	195	100.0%	193	100.0%	χ^2=0.00 p=1.00 DF=1 **NS**
b.	**Transmitted through**	**Sexual Intercourse**	195	100.0%	193	100.0%	χ^2=0.00 p=1.00 DF=1 **NS**
c.	**Prevention by**	**Condom**	195	100.0%	193	100.0%	χ^2=0.00 p=1.00 DF=1 **NS**
d.	**Diagnosed by**	**Yes**	148	75.9%	144	74.6%	χ^2=0.08 p=0.76 DF=1 **NS**
		No	47	24.1%	49	25.4%	
e.	**Controlled**	**Yes**	180	92.3%	175	90.7%	χ^2=0.33 p=0.56 DF=1 **NS**
		No	15	7.7%	18	9.3%	

Not significant P >0.05

Table 5.1.3 (e) shows number and percentage distribution in the level of knowledge regarding basic information of HIV/AIDS in both groups of HIV infected adolescents/caregivers. All the participants (100%) knew the basic information of HIV/AIDS in both groups. In split of view, the cause, transmission and prevention part, all the participants in both groups where answered correctly. Whereas regarding diagnosis, the majorities (75%) of the participants have answered correctly, but remaining 25% have confusion in both groups. Considering with management of ART in both groups, still 8-9 % believe that it can be cured. The chi square value is not significant at P >0.05. It reveals that the distributions of knowledge of HIV infected adolescents in both groups are similar.

Table 5.1.3 (f) : Number and Percentage distribution in overall level of Knowledge regarding the basic information of HIV/AIDS among HIV Infected adolescents/caregivers in both groups

S. No.	Level of Knowledge	Experimental group		Control group		Chi square test
		No.	%	No.	%	
1.	Poor	-	-	-	-	χ^2=0.44 p=0.50 DF=1 **NS**
2.	Moderate	40	20.5%	45	23.3%	
3.	Good	155	79.5%	148	76.7%	

Not significant P >0.05

Table 5.1.3 (f) shows number and percentage distribution in overall level of knowledge regarding the basic information of HIV/AIDS among HIV infected adolescents/ caregivers in both groups. In experimental group, the majority (80%) of participants had adequate knowledge and 20% in moderate knowledge and none of them in poor knowledge. Whereas in control group, the majority (77%) of participants had adequate knowledge and 23% in moderate knowledge and none of them in poor knowledge. The chi square value of 0.44 it's not significant at $p<0.05$. It reveals that the distribution of knowledge regarding the basic information of HIV/AIDS infected adolescents/ caregivers in both groups are similar.

Fig 5.1.3(d-i): Percentage wise distribution in source of information of HIV/ART among HIV infected adolescents/caregivers in both groups

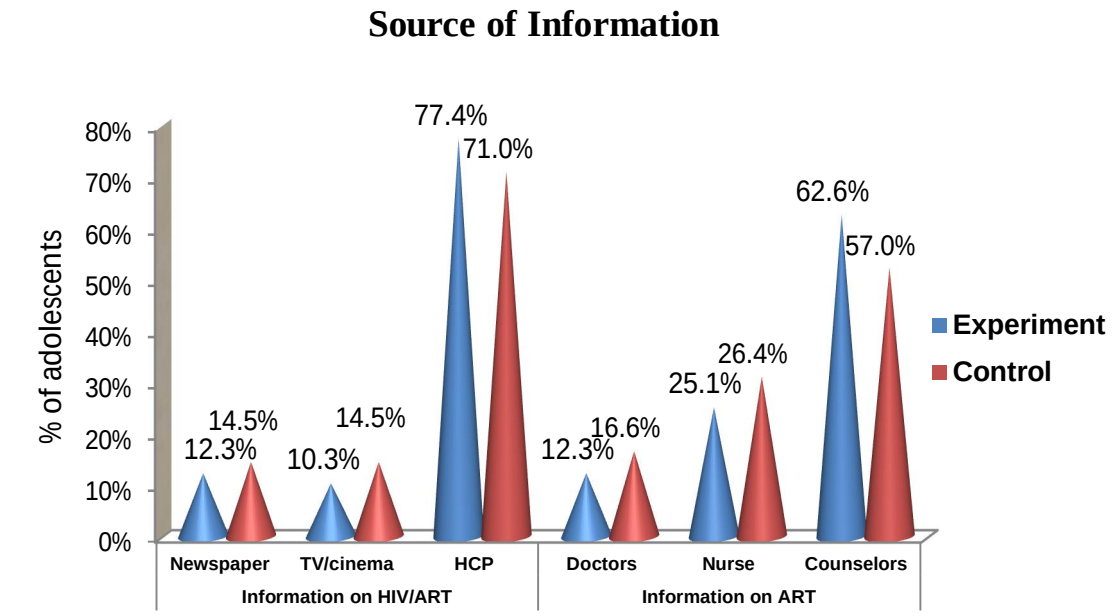
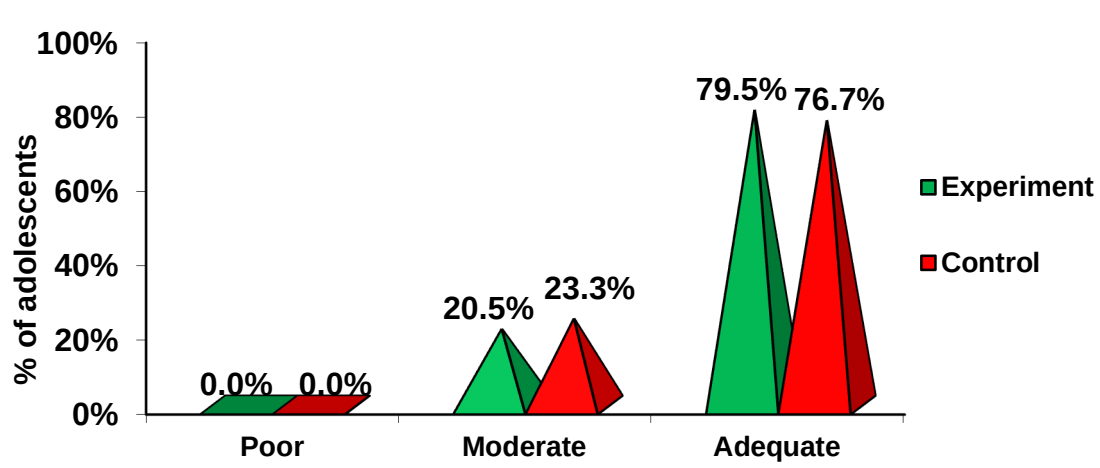


Fig 5.1.3(f-i): Percentage wise distribution in overall level of knowledge of HIV/AIDS among HIV infected adolescents/caregivers in both groups



SECTION II

5.2: This section assess and evaluate the pre (baseline) and post test (3rd & 6th month) level of ART adherence, nutritional status and QOL of HIV infected adolescents in both groups.

5.2.1:Information related to assessment of the ART adherence level in both groups of HIV infected adolescents.

Table 5.2.1(a): Number and percentage distribution of the information related to the assessment of the ART adherence level in both groups of HIV infected adolescents.

S. No.	Information of ART Adherence		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
1.	**Line of ART treatment**	I line treatment	169	86.7%	163	84.5%	χ^2=0.74 p=0.68 DF=2 **NS**
		Alternative treatment	20	10.3%	25	13.0%	
		II line treatment	6	3.1%	5	2.6%	
2.	**Responsible Person**	Self	53	27.2%	45	23.3%	χ^2=0.74 p=0.68 DF=2 **NS**
		Caregivers	142	72.8%	148	76.7%	
3.	**Exposure to Adherence tools**	No	195	100.0%	193	100.0%	χ^2=0.00p=1.00 DF=1 **NS**
4.	**Previous Hospitalization**	Yes	86	44.1%	92	47.7%	χ^2=0.49p=0.48 DF=1 **NS**
		No	109	55.9%	101	52.3%	
4.a	**If yes**	Typhoid	11	12.8%	19	20.7%	χ^2=0.62p=0.30 DF=3 **NS**
		Fever (PUO)	29	33.7%	21	22.7%	
		Diarrhea	24	27.9%	26	28.3%	
		Others	22	25.6%	26	28.3%	

Not significant P >0.05

Table 5.2.1(a) shows number and percentage distribution of the information related to assessment of the ART adherence level in both groups of HIV infected adolescents. In experimental group, regarding the line of treatment the majority (87%) of the participants are in I line treatment, 10% are in alternative I line treatment and 3% are in II line treatment. The majorities (73%) of the adolescents are taking the medications under the control of caregivers, and the remaining 27% are taking self medications. All the participants (100%) are not exposure to adherence tools. In considering with hospitalizations, 44% participants were hospitalized, in split of view 47% fever (includes typhoid), 28% diarrhea and 26% were admitted for injuries or

accidents. In control group, regarding the line of treatment, the majority (85%) of the participants are in I line treatment, 13 % are in alternative treatment and remaining 3% are in II line treatment. The majorities (77%) of the adolescents are taking the medications under the control of caregivers, and the remaining 23% were taking self medications. All the participants (100%) are not exposure to adherence tools. In considering with hospitalizations, 40% participants were hospitalized for fever and typhoid, equal percentage of 28% admitted for diarrhea and injuries or accidents. The chi square values for all the variables are shows that the distribution of the information related to the level of ART adherence of HIV infected adolescents in both groups are similar.

Table 5.2.1 (a-i): Line of treatment according to the name of drugs of HIV infected adolescents in both groups

Name of the drug	I line		Name of the drug	Alternative I line		Name of the drug	II line	
	Exp	Con		Exp	Con		Exp	Con
ZLN	129	129	**ALN**	14	21	**AL/LR**	6	5
ZLE	13	21	**ALE**	4	4			
SLN	19	7	**ZL/LR**	1				
SLE	0	1	**TL/LR**	1				
TLE	8	5						
Total	**169**	**163**		**20**	**25**		**6**	**5**
χ^2 **test**	χ^2=9.00 p=0.66**NS**		χ^2=3.99 p=0.21 **NS**			χ^2=0.00 p=1.00 **NS**		

Not significant P>0.05

Table 5.2.1 (a-i) shows the line of treatment of HIV infected adolescents in both groups. Regarding the I line of treatment among 169 and 163 participants in both groups, the majority (129) of the adolescents are taking ZLN, where as respectively 13 & 21 participants are taking ZLE and 19 and 7 participants are taking SLN. Considering with SLE, none of the participants in the experimental group and only one participant in control group. The newer drugs of one pill of TLE are consumed by 8 participants in experimental and 5 in control group. Among 20 and 25 participants in alternative I line treatment for both groups, 14 and 21 adolescents are in ALN and equal of 4 participants are in ALE. Regarding ZL/LR, and TL/LR only in one participant in experimental group. With regard to II line treatment 6 and 5 subjects are taking AL/LR. The above all chi square values reveal that the distributions of line of treatment are similar in both groups.

Table 5.2.1(b) : Number and percentage distribution in exact dose and frequency of pills in both groups of HIV infected adolescents

S. No.	Dose and frequency Questionnaire		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
5.	**Exact dose of medication**	Yes	135	69.2%	135	69.9%	χ^2=0.02 p=0.87
	'0' month	No	60	30.8%	58	30.1%	DF=1 **NS**
	3rd month	Yes	192	98.5%	144	74.6%	χ^2=47.5
		No	3	1.5%	49	25.4%	p=0.001*** DF=1 **S**
	6th month	Yes	195	100.0%	157	81.3%	χ^2=58.2
		No	0	0.0%	36	18.7%	p=0.001*** DF=1 **S**
6.	**Exact dosage frequency** '0' month	Yes	195	100.0%	193	100.0%	χ^2=0.00 p=1.00 DF=1**NS**
	3rd month	Yes	195	100.0%	193	100.0%	χ^2=0.00p=1.00 DF=1**NS**
	6th month	Yes	195	100.0%	193	100.0%	χ^2=0.00p=1.00 DF=1**NS**
7.	**Changes in ART**	No	195	100.0%	193	100.0%	χ^2=0.00p=1.00 DF=1**NS**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.1(b) shows number and percentage distribution in exact dose and frequency of pills in both groups of HIV infected adolescents. Regarding the exact dose of medications, in '0' month 69 % of participants only knew correctly but in 3rd & 6th month it was increased to 98% and 100 %. Whereas in control group, 70% were known correctly in '0' month but in 3rd & 6th month it was increased only up to 74% and 81% respectively. The chi square value is significant in 3rd and 6th month at p<0.001***. It shows that, there is a statistical improvement in exact dose of medication in experimental group of HIV infected adolescents. Regarding the exact dosage frequency, all the participants in both groups were known correctly. There are no changes in ART during study period in both groups.

Table 5.2.1(c) : Number and percentage distribution in medication burden, difficulty to take drugs and depression of HIV infected adolescents in both groups.

S. No.	Adherence Assessment Questionnaire		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
8.	**Medication burden**	Yes	188	96.4%	184	95.3%	χ^2=0.28p=0.59
	'0' month	No	7	3.6%	9	4.7%	DF=1 **NS**
	3rd month	Yes	99	50.8%	169	87.6%	χ^2=61.47 p=0.001***
		No	96	49.2%	24	12.4%	DF=1 **S**
	6th month	Yes	71	36.4%	148	76.7%	χ^2=63.04 p=0.001***
		No	124	63.6%	45	23.3%	DF=1 **S**
9.	**Difficulty to take** '0' month	Yes	138	70.8%	137	71.0%	χ^2=0.02 p=0.96
		No	57	29.2%	56	29.0%	DF=1 **NS**
	3rd month	Yes	89	45.6%	125	64.8%	χ^2=14.33 p=0.001***
		No	106	54.4%	68	35.2%	DF=1 **S**
	6th month	Yes	54	27.7%	121	62.7%	χ^2= 47.99p=0.001***
		No	141	24.6%	72	37.3%	DF=1 **S**
10.	**Depression**	Yes	147	75.4%	154	79.8%	χ^2= 1.08 p=0.29
	'0' month	No	48	24.6%	39	20.2%	DF=1 **NS**
	3rd month	Yes	103	52.8%	144	74.6%	χ^2= 19.90p=0.001***
		No	92	47.2%	49	25.4%	DF=1 **S**
	6th month	Yes	62	31.8%	139	72.0%	χ^2= 62.86p=0.001***
		No	133	68.2%	54	28.0%	DF=1 **S**

Not significant P >0.05, ***very high significant at P ≤ 0.001

Table 5.2.1(c) shows the number and percentage distribution in medication burden, difficulty to take drugs and depression of HIV infected adolescents in both groups. In baseline assessment, the majority of 95% & 96 % participants had medication burden respectively in both groups. At the 3rd and 6th month it was reduced to 51% and 36% respectively in experimental group whereas it reduced to 88% and 77% only in the control group. Consider with difficulty in taking the drugs, the majority (71%) of participants from both groups had difficulties in baseline assessment, but at the 3rd and 6th month it is reduced to 46% and 25% respectively in experimental group whereas in control group it only reduced to 64 % and 62%.

Regarding the subjective assessment of depression, the majority of 70% & 80% of participants was in '0' month assessment in both groups, but at the 3rd and 6th month it is reduced to 53% and 32 % gradually in experimental group whereas it reduced to 75 % and 72% only in control group. It shows that significant improvement in the experimental group than the control group of HIV infected adolescents. The chi-square value of all these variables at 3rd and 6th month is significant at p=0.001***. It depicts that significant improvement in reducing medication burden, feeling difficulty and depression of HIV infected adolescents in experimental group.

5.2.2 : Assess and evaluate the pre and post test level of ART adherence in both groups of HIV infected adolescents by '5' point response scale, visual analog scale, '3' day recall method and pill count methods

Table 5.2.2 (a): Number and percentage distribution in the level of ART adherence in both groups of HIV infected adolescents by '5'point response scale

S. No.	5 Point Response Scale		Group				Chi-square test
			Experimental		Control		
			No.	%	No.	%	
11.	**a. Forgot**	Never	102	52.3%	107	55.4%	χ^2=3.63
	'0'month	Rarely	61	31.3%	45	23.3%	p=0.16
		Sometimes	32	16.4%	41	21.2%	DF=2 **NS**
	'3'month	Never	149	76.4%	109	56.5%	χ^2=22.63
		Rarely	35	17.9%	46	23.8%	p=0.001***
		Sometimes	21	5.6%	38	19.7%	DF=2 **S**
	'6' month	Never	168	86.2%	112	58.0%	χ^2=39.67
		Rarely	19	9.7%	45	23.3%	p=0.001***
		Sometimes	8	4.1%	36	18.7%	DF=2 **S**
	b. Careless in time	Never	101	51.8%	107	55.4%	χ^2=1.34
	'0'month	Rarely	55	28.2%	56	29.0%	p=0.51
		Sometimes	39	20.0%	30	15.5%	DF=2 **NS**
	'3'month	Never	162	83.1%	108	56.0%	χ^2=5.99
		Rarely	22	11.3%	63	32.6%	p=0.05
		Sometimes	11	5.6%	22	11.4%	DF=2 **S**
	'6' month	Never	183	93.8%	110	57.0%	χ^2=34.23
		Rarely	12	6.2%	64	33.2%	p=0.001***
		Sometimes	0	0.0%	19	9.8%	DF=2 **S**
	c. Feel better	Never	112	57.4%	110	57.0%	χ^2=0.08
	'0'month	Rarely	76	39.0%	75	38.9%	p=0.96
		Sometimes	7	3.6%	8	4.1%	DF=2 **NS**
	'3'month	Never	172	88.2%	113	58.5%	χ^2=85.73
		Rarely	23	11.8%	71	37.3%	p=0.001***
		Sometimes	0	0.0%	9	4.1%	DF=2 **S**
	'6' month	Never	195	100%	119	61.7%	χ^2=92.38
		Rarely	0	0.0%	69	35.7%	p=0.001***
		Sometimes	0	0.0%	5	2.6%	DF=2 **S**
	d. Feel worse	Never	142	72.8%	144	74.6%	χ^2=4.13
	'0'month	Rarely	42	21.5%	30	15.5%	p=0.12
		Sometimes	11	5.6%	19	9.8%	DF=2 **NS**
	'3'month	Never	186	95.4%	149	77.2%	χ^2=29.83
		Rarely	9	4.6%	28	14.5%	p=0.001***
		Sometimes	0	0.0%	16	8.3%	DF=2 **S**
	'6' month	Never	195	100%	154	79.8%	χ^2=63.40
		Rarely	0	0.0%	28	14.5%	p=0.001***
		Sometimes	0	0.0%	11	5.7%	DF=2 **S**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2(a) shows the number and percentage distribution in the level of ART adherence in both groups of HIV infected adolescents by '5'point response scale. Regarding the response to forgot, 52-55% of participants are in never category but in subsequent evaluation it is increased to 76 % and 86 % in experimental group but it is increased 57-58 % only in the control group. The chi square value of 22.63 and 39.67 is significant at the level of 0.001***. It shows the marked improvement in the experimental group. In consideration of careless in time, 52-55 % of participants are in never category but in subsequent evaluation it is increased to 83% and 94% in experimental group but it is increased to 56 &57 % only in the control group. The chi square value of 5.99 is significant at the level of 0.05** at 3rd month and 34.23 significant at the level of 0.001*** at 6th month. It shows the significant improvement in the experimental group.

Regarding the response to feel better, 57% of participants are in never category in both groups. But in subsequent evaluation in experimental group it is increased to 88% in 3rd month and achieved 100% at 6th month but it is increased to 58% and 61% only in the control group. The chi square value of 85.73 and 92.38 is significant at the level of 0.001***. It shows the remarkable improvement in the experimental group. In regard to feel worse, 72-75% of participants are in never category but in subsequent evaluation in the experimental group it is increased to 95% in 3rd month and 100% in 6th month and subsequently it is increased to 77% and 79% in the control group. The chi square value of 29.83 and 63.40 is significant at the level of 0.001***. It shows the significant improvement in ART adherence level of HIV infected adolescents in experimental group than the control group.

Table 5.2.2(a-i): Number and Percentage distribution in overall level of ART adherence in both groups of HIV infected adolescents by '5' point response scale.

S. No.	Overall '5' Point Response Scale Adherence Level		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
10.a	**Baseline**	Poor adherence	30	15.4%	28	14.4%	χ^2=0.23
		Sub optimal	135	69.2%	132	67.7%	p=0.88
		Optimal adherence	30	15.4%	33	16.9%	DF=2 NS
	3rd month	Poor adherence	0	0.0%	28	14.4%	χ^2=207.87
		Sub optimal	18	9.2%	130	66.7%	p=0.001***
		Optimal adherence	177	90.8%	35	17.9%	DF=2 **S**
	6th month	Poor adherence	0	0.0%	26	13.5%	χ^2=269.39
		Sub optimal	0	0.0%	132	68.4%	p=0.001***
		Optimal adherence	195	100 %	35	18.1%	DF=2 **S**

Not significant P >0.05, * Very high significant at P≤0.001**

Table 5.2.4 (a-i) shows number and percentage distribution in overall level of ART adherence in both groups of HIV infected adolescents by '5' point response scale. In baseline assessment, the majority of participants from both groups had sub optimal level of adherence (69% & 67%). In experimental group, there is an equal percentage of participants (15%) are in optimal and as well as poor adherence. But in subsequent evaluation of 3rd and 6th month, optimal adherence is increased to 91% and 100 %. In subsequent evaluation of the control group, the optimal adherence level is increased from 16.9 %, 17.9% & 18.1% respectively The chi square value of 207.87 and 269.39 is significant at P ≤ 0.001***. It shows the significant improvement in experimental group than the control group.

Table 5.2.2(b) : Number and percentage distribution in the level of ART adherence in both groups of HIV infected adolescents by Visual analog method

S. No.	Visual analog method		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
12.	'**0'month**	60.0%	7	3.6%	3	1.6%	χ^2=13.85 p=0.09 DF=8 **NS**
		65.0%	4	2.1%	4	2.1%	
		70.0%	10	5.1%	17	8.8%	
		75.0%	11	5.6%	10	5.2%	
		80.0%	48	24.6%	33	17.1%	
		85.0%	24	12.3%	43	22.3%	
		90.0%	46	23.6%	35	18.1%	
		95.0%	16	8.2%	21	10.9%	
		100.0%	29	14.9%	27	14.0%	
	'3'month	65.0%			5	2.6%	χ^2=81.74 p=0.001*** DF=7 **S**
		70.0%			11	5.7%	
		75.0%			15	7.8%	
		80.0%	10	5.1%	32	16.6%	
		85.0%	14	7.2%	26	13.5%	
		90.0%	49	25.1%	51	26.4%	
		95.0%	23	11.8%	22	11.4%	
		100.0%	99	50.8%	31	16.1%	
	'6'month	75			12	6.2%	χ^2=177.23 p=0.001*** DF=5 **S**
		80			8	4.1%	
		85%			35	18.1%	
		90%	6	3.1%	65	33.7%	
		95%	37	19.0%	38	19.7%	
		100%	152	77.9%	35	18.1%	

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2 (b) shows number and percentage distribution in the level of ART adherence in both groups of HIV infected adolescents by visual analog method. In '0' month assessment, nearly 15% had optimal level adherence in both groups. But at 3rd and 6th month evaluation it is increased to 50% and 80% in experimental group but there is no marked improvement in control group. The chi square value of 81.74 and 177.23 is significant p=0.001*** in 3rd & 6th month evaluation. It shows the marked improvement in the experimental group of HIV infected adolescents.

Table 5.2.2 (b-i): Number and percentage distribution in overall level ART adherence in both groups of HIV infected adolescents by visual analog method

S. No.	Visual Analog Method		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
12.	**Baseline**	Poor adherence	32	16.4%	34	17.6%	χ^2=0.13
		Sub optimal	134	68.7%	132	68.4%	p=0.93
		Optimal adherence	29	14.9%	27	14.0%	DF=2 **NS**
	3rd month	Poor adherence	0	0.0%	31	16.1%	χ^2=71.9
		Sub optimal	96	49.2%	131	67.9%	p=0.001***
		Optimal adherence	99	50.8%	31	16.1%	DF=2 **S**
	6th month	Poor adherence	0	0.0%	12	6.2%	χ^2=141.3
		Sub optimal	43	22.1%	146	75.6%	p=0.001***
		Optimal adherence	152	77.9%	35	18.1%	DF=2 **S**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2 (b-i) shows the number and percentage distribution in overall level ART adherence in both groups of HIV infected adolescents by visual analog method. In experimental group, only 15 % of participants had optimal level of adherence, 69% in sub optimal level of adherence and 16% in poor adherence in the baseline assessment of HIV infected adolescents. Whereas the optimal level of adherence increased to 51% in 3rd month and 78% in 6th month and subsequently reduced the suboptimal level from 49% to 22%.While in control group, only 14% of participants had optimal level of adherence, 68 % in sub optimal level of adherence and 18% had poor adherence in the baseline assessment. There is slight improvement in the subsequent evaluation of 3rd and 6th month but it's not statistically improved. The chi square value in 3rd & 6th month evaluation of 71.9 and 142.3 is significant in the level of p=0.001***. It shows the marked improvement in the experimental group of HIV infected adolescents.

Fig5.2.2 (a-i) : Percentage wise distribution in level of ART adherence in both groups of HIV infected adolescents by '5' point response scale

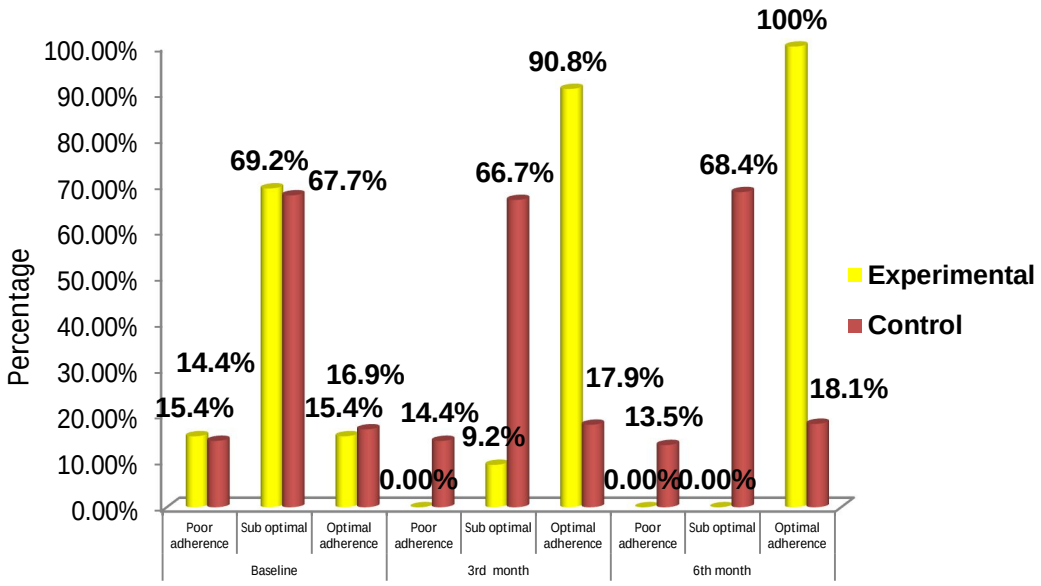


Fig 5.2.2 (b-i): Percentagewise distribution in level of ART adherence in both groups of HIV infected adolescents by visual analog method.

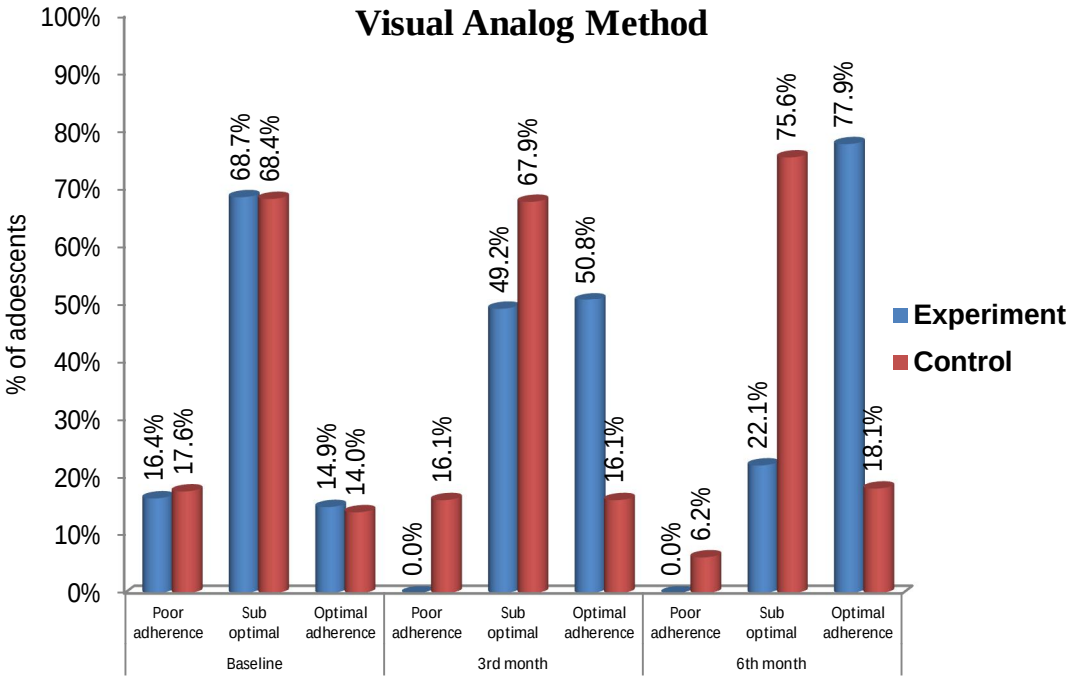


Table 5.2.2 (c): Number and percentage distribution in the level of ART adherence in both groups of HIV Infected Adolescents by '3' days recall method.

S. No.	'3' days Recall method		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
13.	**'0' month**	80%	12	6.2%	23	11.9%	χ^2=4.94 p=0.29 DF=4 **NS**
		85%	32	16.4%	24	12.4%	
		90%	13	6.7%	13	6.7%	
		95%	15	7.7%	12	6.2%	
		100%	123	63.1%	121	62.7%	
	3rd month	80%	0	0.0%	17	8.8%	χ^2=34.31 p=0.001*** DF=4 **S**
		85%	5	2.6%	24	12.4%	
		90%	14	7.2%	13	6.7%	
		95%	16	8.2%	16	8.3%	
		100%	160	82.1%	123	63.7%	
	6th month	80%	0	0.0%	15	7.8%	χ^2=62.20 p=0.001*** DF=4 **S**
		85%	0	0.0%	24	12.4%	
		90%	0	0.0%	13	6.7%	
		95%	11	5.6%	13	6.7%	
		100%	184	94.4%	128	66.3%	

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2(c) shows number and percentage distribution in the level of ART adherence in both groups of HIV infected adolescents by '3' days recall method. In '0' month assessment, nearly 63 % had optimal level adherence in both groups. But in 3rd and 6th month evaluation it increased to 82% and 94% in experimental group but there is no marked improvement in the control group i.e., it's increased to 64% and 66% respectively.

The chi square value of 34.31 and 62.20 is significant in the level of p=0.001*** at 3rd & 6th month evaluation. It shows the marked improvement in the experimental group of HIV infected adolescents than the control group.

Table 5.2.2 (c-i) : Number and percentage distribution in overall level of ART adherence in both groups of HIV infected adolescents by '3' days recall method

S. No.	'3' days recall method		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
13.a	**Baseline**	Poor adherence	0	0.0%	0	0.0%	χ^2=0.01
		Sub optimal	72	36.9%	72	37.3%	p=0.93
		Optimal adherence	123	63.1%	121	62.7%	DF=2 **NS**
	3rd month	Poor adherence	0	0.0%	0	0.0%	χ^2=16.5
		Sub optimal	35	17.9%	70	36.3%	p=0.001***
		Optimal adherence	160	82.1%	123	63.7%	DF=2 **S**
	6th month	Poor adherence	0	0.0%	0	0.0%	χ^2=48.4
		Sub optimal	11	5.6%	65	33.7%	p=0.001***
		Optimal adherence	184	94.4%	128	66.3%	DF=2 **S**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2 (c-i) shows number and percentage distribution in overall level of adherence in both groups of HIV infected adolescents by '3' days recall method. In '0' month assessment, only 63 % of participants had optimal level of adherence and remaining 37% in sub optimal level of adherence in both groups. Whereas the optimal level of adherence is increased to 82% in 3rd month and 94% in 6th month. Subsequently, reduced the suboptimal level of adherence from 18% to 6% in experimental group. But in the control group, there is a minimum improvement in the subsequent evaluation of 3rd and 6th month. The chi square value of 16.5 and 48.4 is significant at p=0.001*** in the subsequent evaluation. It shows the marked improvement in experimental group than the control group.

Table 5.2.2(d): Number and percentage distribution in level of ART adherence in both groups of HIV infected adolescents by pill count method.

S. No	Pill count Method		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
14.	**Base line**	80.00%	4	2.1%	7	3.6%	χ^2=3.66 p=0.45 DF=4 **NS**
		85.00%	8	4.1%	13	6.7%	
		90.00%	63	32.3%	70	36.3%	
		95.00%	35	17.9%	30	15.5%	
		100.00%	85	43.6%	73	37.8%	
	3rd month	80%	0	0.0%	5	2.6%	χ^2=90.15 p=0.001*** DF=4 **S**
		85%	3	1.5%	17	8.8%	
		90%	7	3.6%	50	25.9%	
		95%	15	7.7%	40	20.7%	
		100%	170	87.2%	81	42.0%	
	6th month	80%	0	0.0%	3	1.6%	χ^2=66.7 p=0.001*** DF=4 **S**
		85%	0	0.0%	21	10.9%	
		90%	5	2.6%	27	14.0%	
		95%	9	4.6%	30	15.5%	
		100%	181	92.8%	112	58.0%	

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2(d) shows number and percentage distribution in the level of ART adherence in both groups of HIV infected adolescents by pill count method. In '0' month assessment, nearly 44% in experimental group and 38 % in control group had optimal level adherence. But in 3rd month evaluation it is increased to 87% and in 6th month 92% in experimental group. But there is no marked improvement in control group it is increased to 42 % and 58% respectively. The chi square value of 27.8 and 45.1 is significant in the level of p= 0.001*** at 3rd & 6th month evaluation. It shows there is a marked improvement in the experimental group of HIV infected adolescents.

Table 5.2.2 (d-i): Number and percentage distribution in overall level of ART adherence in both groups of HIV infected adolescents by pill count method

S. No.	Overall level of Adherence		Group				Chi square Test
			Experimental		Control		
			No.	%	No.	%	
14.	**Baseline**	Poor adherence	0	0.0%	0	0.0%	χ^2=1.33
		Sub optimal	110	56.4%	120	62.2%	p=0.44
		Optimal adherence	85	43.6%	73	37.8%	DF=1 **NS**
	3rd month	Poor adherence	0	0.0%	0	0.0%	χ^2=91.95
		Sub optimal	25	12.8%	112	58.0%	p=0.001***
		Optimal adherence	170	87.2%	81	42.0%	DF=2 **S**
	6th month	Poor adherence	0	0.0%	0	0.0%	χ^2=93.13
		Sub optimal	14	7.2%	100	57.8%	p=0.001***
		Optimal adherence	181	92.8%	93	48.2%	DF=2 **S**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2 (d-i) shows number and percentage distribution in overall level of ART adherence in both groups of HIV infected adolescents by pill count method. In experimental group, only 44% of participants had optimal level of adherence, 56% in sub optimal level of adherence and no one in poor adherence in the baseline assessment. But in the optimal level is increased to 87% and 93% in 3rd and 6th month subsequently reduced the suboptimal level from 13% and 7% .While in control group, only 38% of participants had optimal level of adherence and remaining 68 % in sub optimal level of adherence in the baseline assessment and there is slight improvement in the subsequent evaluation but it is not statistically improved. The chi square value at 3rd & 6th evaluation of 91.95 and 93.13 is significant in the level of p=0.001***. It shows the significant improvement in the experimental group of HIV infected adolescents than the control group.

Fig 5.2.2(c-i): Percentage wise distribution in level of ART adherence in both groups of HIV infected adolescents by '3' days recall method

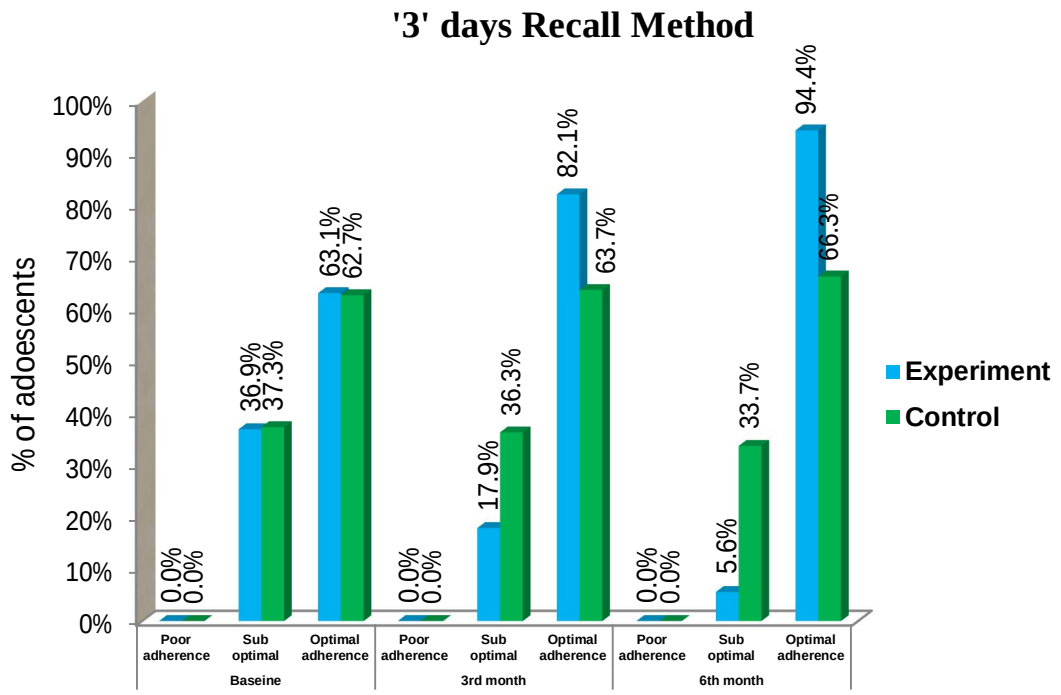


Fig 5.2.2(d-i) : Percentage wise distribution in level of ART adherencein both groups of HIV infected adolescents by pill count method.

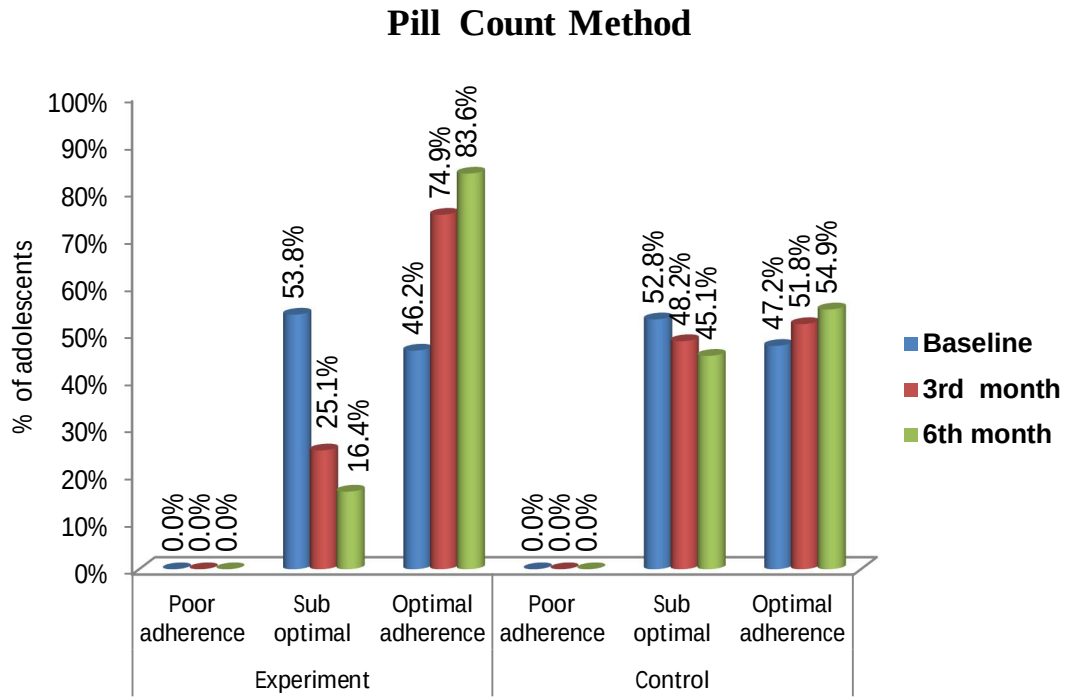


Table 5.2.2(e): Reasons for the non adherence to ART in both groups of HIV infected adolescents

S. No.	Reasons for non adherence		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
15.	**Baseline**	Not applicable	80	41.0%	70	36.3%	
		Forgot	65	33.3%	77	39.9%	
		Boring	12	6.2%	10	5.2%	χ^2=3.90
		Busy scheduled	20	10.3%	15	7.8%	p=0.68
		Travelling	13	6.7%	18	9.3%	DF=6
		Not having finance to come and collect the drug	3	1.5%	2	1.0%	**NS**
		Side effects of drugs	2	1.0%	1	.5%	
	3rd month	Not applicable	174	89.2%	88	45.6%	
		Forgot	21	10.8%	73	37.8%	χ^2=88.98
		Boring			11	5.7%	p=0.001***
		Busy scheduled			15	7.8%	DF=4
		Travelling			6	3.1%	**S**
	6th month	Not applicable	183	93.8%	119	61.7%	
		Forgot	12	6.2%	51	26.4%	χ^2=60.69
		Boring			6	3.1%	p=0.001***
		Busy scheduled			14	7.3%	DF=4
		Travelling			3	1.6%	**S**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2(e) shows the reasons for the non adherence to ART in both groups of HIV infected adolescents**.** In baseline assessment, respectively there were 41% and 36% of adolescents only in the not applicable category and remaining adolescent's had many reasons for the non adherence in both groups. But after HIP, in experimental group it is increased to 89 % and 94% respectively in subsequent evaluation but still 6% of adolescents were had non adherence problems because of forgot. Whereas in control group it's increased up to 46% and 62% only in further evaluation period. The chi square value of 88.98 and 60.69 is significant in p=0.001***. This table finding depicts the counseling and interventional diary has effectiveness to increase the adherence to ART among HIV infected adolescents in experimental group.

Table 5.2.2(f): Aids for improving adherence to ART in both groups of HIV infected adolescents

S. No.	Aids for improve adherence		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
16.	**Baseline**	Pill box	92	47.2%	97	50.3%	χ^2=4.50 p=0.21 DF=3 **NS**
		Reminders in mobile	9	4.6%	3	1.6%	
		Buddy system	8	4.1%	4	2.1%	
		Nothing	86	44.1%	89	46.1%	
	3rd month	Pill box			97	50.3%	χ^2=189.50 p=0.001 DF=3 **S**
		Reminders in mobile			3	1.5%	
		Buddy system			5	2.6%	
		Diary	86	44.1%			
		Nothing			88	45.6%	
		Pill box+ Diary	92	47.2%			
		Reminders in mobile+ Diary	9	4.6%			
		Buddy system+ Diary	8	4.1%			
	6th month	Pill box			97	50.3%	χ^2=182.45 p=0.001 DF=3 **S**
		Reminders in mobile			3	1.5%	
		Buddy system			7	3.6%	
		Diary	86	44.1%			
		Nothing			86	44.6%	
		Pill box+ Diary	94	48.2%			
		Reminders in mobile+ Diary	7	3.6%			
		Buddy system+ Diary	8	4.1%			

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.2.2 (f) shows the aids for improving adherence to ART in both groups of HIV infected adolescents. In baseline assessment, the half of percentage (47% and 50%) of adolescents was using pillboxes and nearly 44% and 46 % of adolescents were not using any aids to improve the adherence in both groups. Whereas, in 3rd and 6th month evaluation along with investigator counseling and the diary also used as a remainder cue along with previous aids in order to improve the adherence for experimental group. But in control group there is no special aids used to improve the adherence and also there is no marked changes in the aids from the baseline to 6th month evaluation. The chi square value of 189.50 and 182.45 is significant at p=0.001*** in subsequent evaluation. It depicts that, the interventional diary has effectiveness to improve the adherence among HIV infected adolescents in experimental group.

Fig 5.2.2 (e): Percentage wise distribution of reasons for the non adherence to ART in experimental group of HIV infected adolescents

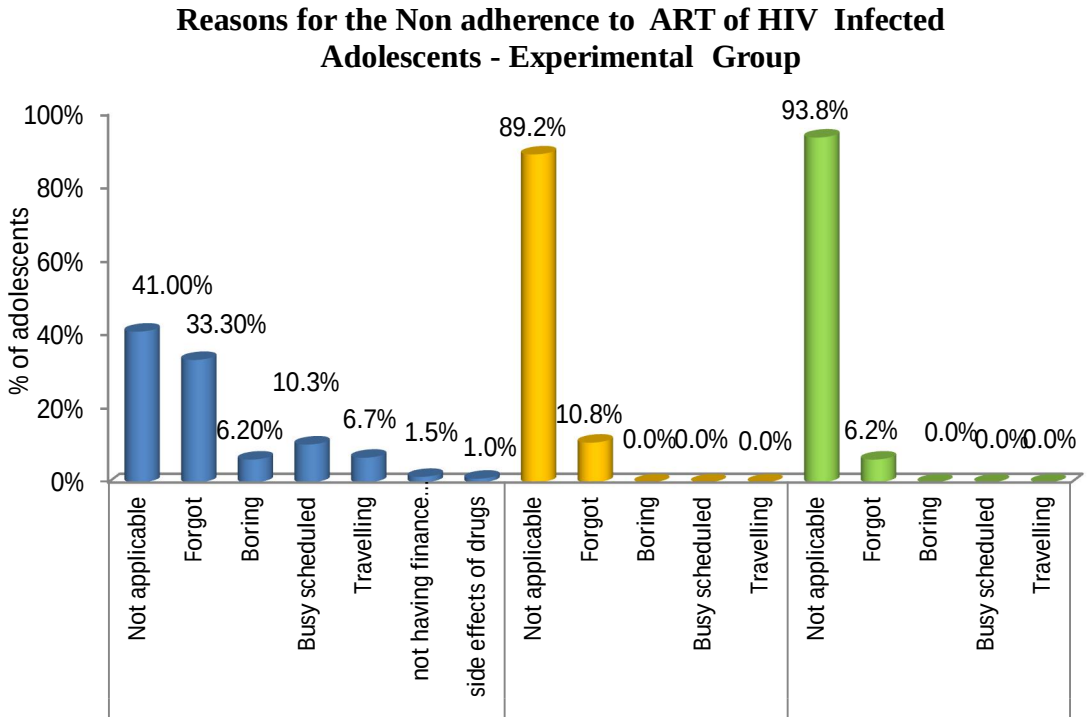
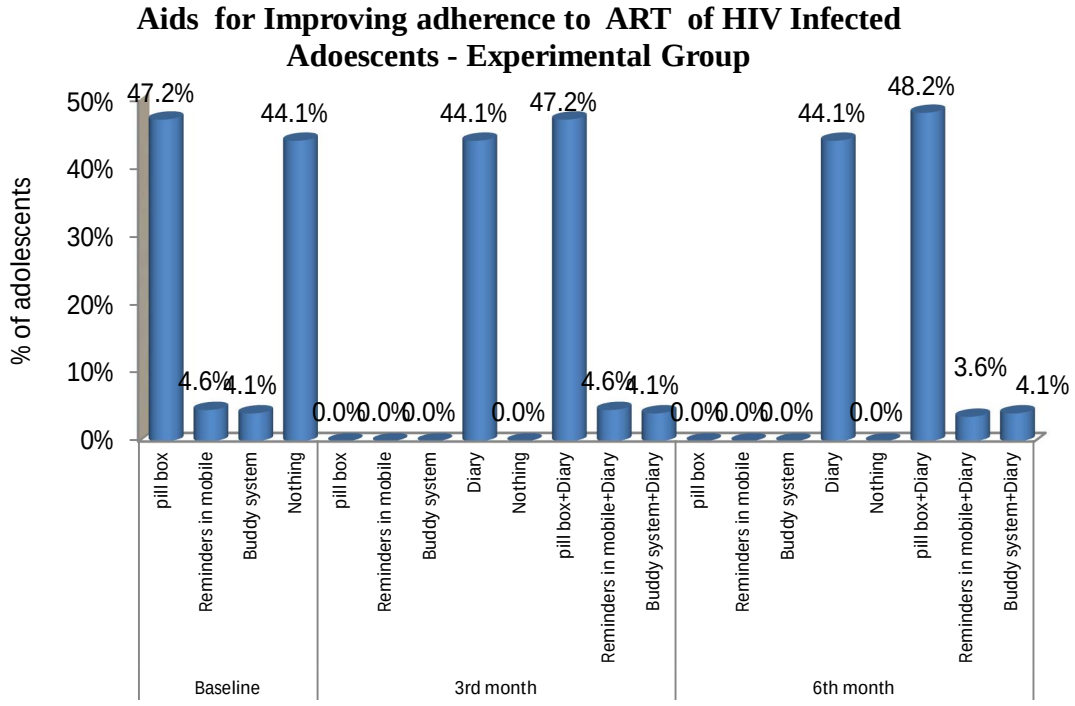


Fig 5.2.2 (f) :Percentage wise distribution of Aids for improving adherence to ART in experimental group of HIV infected adolescents.



5.2.3: Assess and evaluate the pre and post test level of nutritional status in both groups of HIV infected adolescents by anthropometric variables.

Table 5.2.3 (a): Mean and Standard deviation level of Height in both groups of HIV infected adolescents.

S. No.	Assessment of Height	Group	Mean	Std. Deviation	Student Independent t-test
1.	**Base line**	Experimental Control	141.36 139.84	12.648 11.816	t=1.21 P=0.22 **NS**
	3rd month	Experimental Control	142.26 139.92	14.625 11.797	t=1.73 P=0.08 **NS**
	6th month	Experimental Control	142.57 140.21	12.356 11.713	t=1.92 P=0.06 **NS**

Not significant P >0.05

Table 5.2.3 (a) shows mean and standard deviation level of height in both groups of HIV infected adolescents. There is no marked improvement in mean and standard deviation of both groups of adolescents from baseline to 6th month evaluation. The student independent t-test is also not significant at p >0.05. It shows that there is no marked change in the height during the study period in both groups.

Table 5.2.3 (b): **Mean and Standard deviation level of weight in both groups of HIV infected adolescents.**

S. No.	Assessment of Weight	Group	Mean	Std. Deviation		Student independent t-test
2.	**Base line**	Experimental Control	34.39 33.62	8.91 9.28	0.77	t=0.83 P=0.41 NS
	3rd month	Experimental Control	35.00 33.70	8.86 9.30	1.30	t=1.41 P=0.16 NS
	6th month	Experimental Control	37.01 34.16	17.47 9.20	2.85	t=2.01 P=0.05* **S**

Not significant P >0.05, * Significant at P≤0.05,

Table 5.2.3 (b) shows mean and standard deviation level of weight in both groups of HIV infected adolescents. In experimental group, the mean value is gradually increased from 34.39 to 37.01 during the study period. It depicts that there is gradual improvement in weight of HIV infected adolescents. But in control group, there is no gradual improvement in the mean value, denotes no improvement in weight during the study period. At 6th month 't' value of 2.01 is significant at p=0.05*. It reveals that there is significant improvement in weight of HIV infected adolescents in experimental group.

Table 5.2.3(c) : Mean and standard deviation level of BMI in both groups of HIV infected adolescents

S. No.	Assessment of BMI	Group	N	Mean	Std. Deviation		Student Independent t-test
3.	**Base line**	Experimental Control	195 193	16.82 16.80	2.314 2.368	0.02	t=0.07 P=0.94 **NS**
	3rd month	Experimental Control	195 193	17.08 16.83	2.292 2.369	0.25	t=1.06 P=0.28 **NS**
	6th month	Experimental Control	195 193	17.43 16.98	2.278 2.328	1.81	t=1.96 P=0.05* **S**

Not significant P >0.05, * Significant at P≤0.05

Table 5.2.3 (c) shows mean and standard deviation level of BMI in both groups of HIV infected adolescents. In experimental group, the mean value is gradually increased from 16.82 to 17.43 during the study period depicts that there is gradual improvement in BMI of HIV infected adolescents. But in control group, there is no gradual improvement in the mean value, which denotes that there is no improvement in BMI during the study period. At 6th month 't' value of 1.96 is significant at p=0.05*. It denotes that there is a significant improvement in BMI of HIV infected adolescents in experimental group than the control group.

Table 5.2.3(d): Mean and Standard deviation of waist circumference in both groups of HIV infected adolescents.

S. No.	Assessment of Waist circumference	Group	N	Mean	Std. Deviation		Student independent t-test
4.	**Base line**	Experimental Control	195 193	52.31 52.36	7.546 5.771	0.05	t=0.07 P=0.94 NS
	3rd month	Experimental Control	195 193	52.90 52.42	7.625 5.792	0.48	t=0.69 P=0.49 NS
	6th month	Experimental Control	195 193	54.02 52.68	7.572 5.753	1.34	**t=1.96** **P=0.05* S**

Not significant P >0.05, * significant at P≤0.05

Table 5.2.3 (d) shows mean and standard deviation of waist circumference in both groups of HIV infected adolescents. In experimental group, the mean value is gradually increased from 52.31, 52.90 and 54.02 respectively throughout the study period reveals that there is gradual improvement in waist circumference of HIV infected adolescents. But in control group, there is no gradual improvement in the mean value, which shows that there is no marked improvement in waist circumference of HIV infected adolescents. At 6th month 't' value of 1.96 is significant at p=0.05*.

Table 5.2.3 (e) :Mean and Standard deviation of Mid arm circumference in both groups of HIV infected adolescents.

S. No.	Assessment of mid arm circumference	Group	N	Mean	Std. Deviation		Student independent t-test
5.	Base line	Experimental Control	195 193	17.852 17.618	1.8263 1.1850	0.23	t=1.49 P=0.13 **NS**
	3rd month	Experimental Control	195 193	17.982 17.726	1.8692 1.1807	0.26	t=1.61 P=0.11 **NS**
	6th month	Experimental Control	195 193	18.148 17.745	1.8486 1.1822	0.40	**t=2.56 P=0.01** S**

Not significant P >0.05, highly significant at P≤ 0.01**

Table 5.2.3 (e) shows mean and standard deviation of mid arm circumference in both groups on HIV infected adolescents. In experimental group, the mean value is gradually increased from 17.85 to 18.14 and the mean difference is 0.23 to 0.40 during the study period depicts that there is gradual improvement in mid arm circumference of HIV infected adolescents. But in control group, there is no gradual improvement in the mean value or there is no improvement in mid arm circumference during the study period. At 6th month 't' value of 2.56 is significant at p=0.01*.

Table 5.2.3 (f) : Mean and Standard deviation of skin fold thickness (Triceps) in both groups of HIV infected adolescents.

S. No	Assessment of Skin fold thickness	Group	N	Mean	Std. Deviation		Student independent t-test
6.	Base line	Experimental Control	195 193	3.753 3.668	.8642 .6456	0.08	t=1.08 P=0.28 NS
	3rd month	Experimental Control	195 193	3.8841 3.7684	.86894 .64557	0.12	t=1.49 P=0.14 NS
	6th month	Experimental Control	195 193	4.199 3.867	.7566 .6436	0.33	**t=4.66 P=0.01** S**

Not significant P >0.05, ** highly significant at P≤ 0.01

Table 5.2.3 (f) shows mean and standard deviation of skin fold thickness in both groups of HIV infected adolescents. In experimental group, the mean value is gradually increased from 3.753, 3.8884 and 4.199 respectively throughout the study period reveals that there is gradual improvement in skin fold thickness (triceps) of HIV infected adolescents. But in control group, there is no gradual improvement in the mean value or there is no marked improvement in skin fold thickness of HIV infected adolescents. At 6th month 't' value of 4.66 is significant at p=0.01*.

Fig 5.2.3(g): Mean score distribution of anthropometric variables in experimental group of HIV infected adolescents

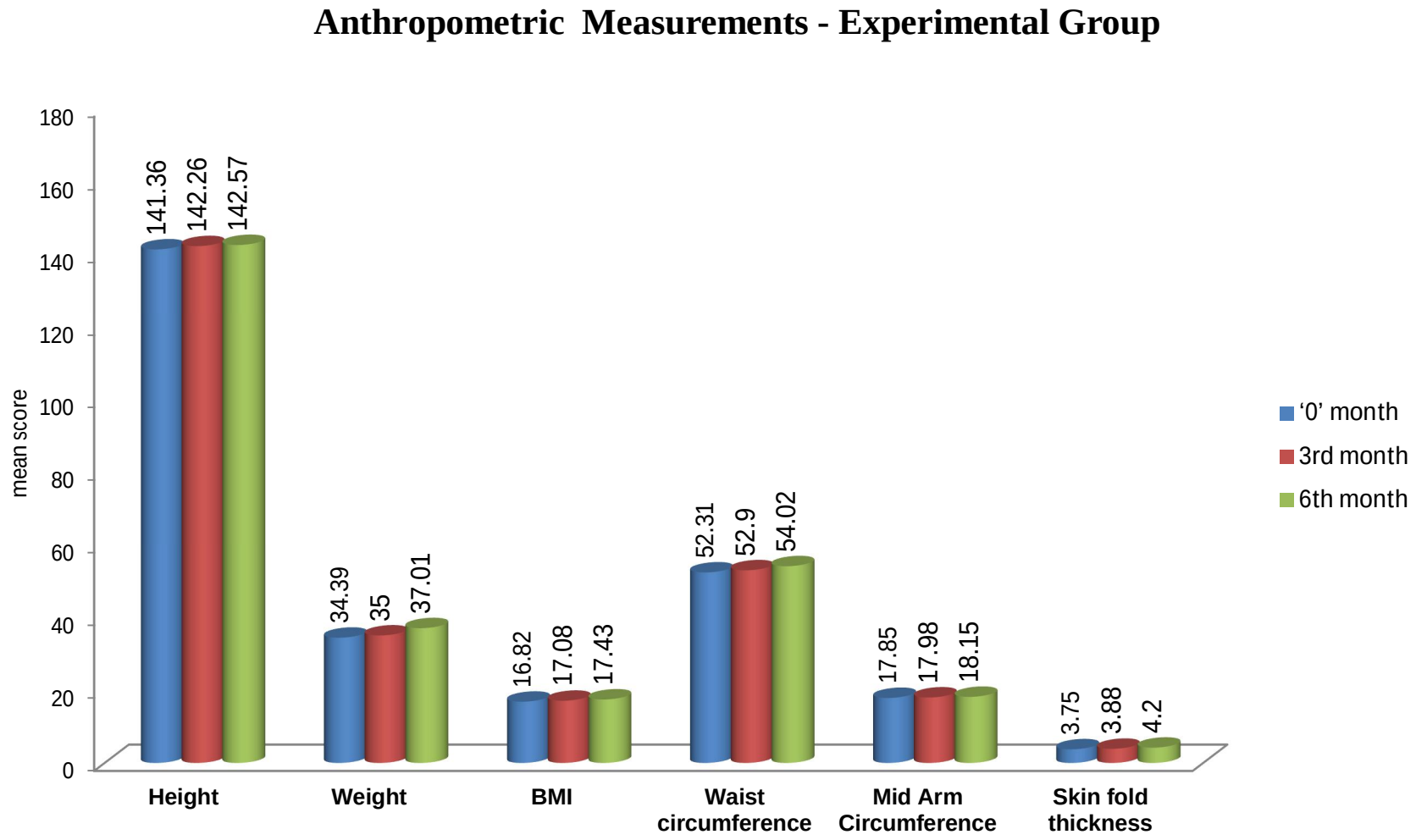


Table 5.2.3 (g): Mean and SD level of pre and post test score in nutritional variables of HIV infected adolescents in experimental group with ANOVA F- test and Bonferroni t–test

S. No.	Nutritional Variables	Experimental						Repeated Measure ANOVA F-test	Bonferrni t-test
		'0' month		3rd month		6th month			
		Mean	SD	Mean	SD	Mean	SD		
1.	**Height**	141.36	12.65	142.26	14.63	142.57	12.36	F=4.40 **P=0.04**	Base Vs 6thmonth **(p<0.01)**
2.	**Weight**	34.39	8.91	35.00	8.86	37.01	17.47	F=15.32 **P=0.001**	Base Vs 6thmonth **(p<0.01)** 3rd vs 6th month **(p<0.05)**
3.	**BMI**	16.82	2.31	17.08	2.29	17.43	2.28	F=28.22 **P=0.001**	Base Vs 6thmonth **(p<0.01)** 3rd vs 6th month **(p<0.05)**
4.	**Waist circumference**	52.31	7.55	52.90	7.62	54.02	7.57	F=63.88 **P=0.001**	Base Vs 6thmonth **(p<0.01)** 3rd vs 6th month **(p<0.05)**
5.	**Mid Arm circumference**	17.85	1.83	17.98	1.87	18.15	1.85	F=35.13 **P=0.001**	Base Vs 6thmonth **(p<0.01)** 3rd vs 6th month **(p<0.05)**
6.	**Skin fold thickness**	3.75	.86	3.88	.87	4.20	.76	F=33.44 **P=0.001**	Base Vs 6thmonth **(p<0.01)** 3rd vs 6th month **(p<0.05)**

***significant at P≤0.05, **highly significant at P≤0.01, ***very high significant at P≤0.001**

Table 5.2.3 (g) shows the ANOVA F-test and Bonferroni t–test values for nutritional variables of HIV infected adolescents in experimental group. All the variables except height had significance in repeated measure of ANOVA 'F' test at p=0.001***. It shows that except height there is a marked improvement in all other nutritional variables of HIV infected adolescents. But the Bonferroni t–test revealed that all the variables had significance from baseline to the 6th month evaluation at p<0.01** and 3rd to 6th month evaluation also had significance at P<0.05* except the height. It denotes that there is a significant improvement in all the variables of HIV infected adolescents, but only the height had minimal improvement of HIV infected adolescents.

Table 5.2.3 (h) : Mean and Standard deviation level of pre and post test score in nutritional variables of HIV infected adolescents in control group with ANOVA F- test and Bonferroni t–test

S. No.	Nutritional variables	Control group						Repeated Measure ANOVA F-test	Bonferroni t-test
		'0' month		3rd month		6th month			
		Mean	SD	Mean	SD	Mean	SD		
1	**Height**	139.84	11.82	139.92	11.80	140.21	11.71	F=0.95 P=0.33	-
2	**Weight**	33.62	9.28	33.70	9.30	34.16	9.20	F=1.02 P=0.30	-
3	**BMI**	16.80	2.37	16.83	2.37	16.98	2.33	F=1.11 P=0.27	-
4	**Waist Circumference**	52.36	5.77	52.42	5.79	52.68	5.75	F=0.88 P=0.34	-
5	**Mid Arm Circumference**	17.62	1.19	17.73	1.18	17.74	1.18	F=0.86 P=0.35	-
6	**Skin fold thickness**	3.67	.65	3.77	.65	3.87	.64	F=1.40 P=0.24	-

Not significant P >0.05

Table 5.2.3 (h) shows ANOVA F-test and Bonferroni t–test values for nutritional variables of HIV infected adolescents in control group. The all nutritional variables of HIV infected adolescents in control group did not have significance in ANOVA F-test and Bonferroni t–test. It reveals that there is no marked improvement in the all nutritional variables of HIV infected adolescents in control group.

Table 5.2.3 (i): Pre and post test 'Z' score of HIV infected adolescents in both groups

Z-score	Experimental						Control					
	Baseline		3rd month		6th month		Baseline		3rd month		6thmonth	
	No.	%	No.	%	No.	%	No.	%	No.	%	No	%
-4.00 to -3.00	13	6.7%	9	4.6%	2	1.0%	11	5.6%	10	5.1%	9	4.7%
-3.00 to -2.00	42	21.5%	38	19.5%	35	17.9%	45	23.1%	44	22.6%	44	22.8%
-2.00 to -1.00	37	19.0%	32	16.4%	29	14.9%	27	13.8%	24	12.3%	25	12.8%
-1.00 to 0.00	22	11.3%	25	12.8%	29	14.9%	30	15.4%	29	14.9%	29	14.9%
0.00 to 1.00	23	11.8%	25	12.8%	30	15.4%	28	14.4%	35	17.9%	32	16.4%
1.00 to 2.00	58	29.7%	58	29.7%	60	30.8%	52	26.7%	53	27.2%	54	27.7%
2.00 to 3.00	0	0.0%	8	4.1%	10	5.1%	0	0.0%	0	0.0%	0	0.0%
Total	195	100	195	100	195	100	193	100	193	100	193	100
Chi square test	**χ^2=20.74p=0.05 Significant**						**χ^2=1.22p=0.97 Not significant**					

Not significant P > 0.05, * significant at P ≤ 0.05

Table 5.2.3 (i) shows, pre and post test 'Z' score of HIV infected adolescents in experimental and control group. The chi square value of 20.7 is significant at the p= 0.05* in experimental group. But in control group, there won't be any progress in nutritional status and chi square value of 1.22 is not significant at p>0.05. It depicts that there is gradual increase in nutritional status of HIV infected adolescents in the experimental group than the control group.

5.2.4: Assessment of clinical histories and presence of clinical signs and symptoms related to nutrition in both groups of HIV infected adolescents

Table 5.2.4 (a): Information related to clinical histories in both groups of HIV infected adolescents.

S. No.	Clinical History Assessment		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
1.	**Previous history Nutritional Deficiency**	**Yes**	9	4.6%	11	5.7%	χ^2=0.23 P=0.63 **NS**
		No	186	95.4%	182	94.3%	
1.a	**If yes**	1 years	2	22.2%	3	27.2%	χ^2=0.84 P=0.84 **NS**
		2 years	3	33.3%	5	45.5%	
		3 years	2	22.2%	1	9.1%	
		4 years	2	22.2%	2	18.2%	
2	**De wormed of subject regularly**	**Yes**	105	53.8%	91	47.2%	χ^2=1.73 P=0.19 **NS**
		No	90	46.2%	102	52.8%	
3.	**Presence of Iron deficiency**	**Yes**	3	1.5%	2	1.0%	χ^2=0.20 P=0.90.**NS**
		No	192	98.5%	191	99.0%	
4.	**Weight loss**	**Yes**	13	6.7%	10	5.2%	χ^2=0.38 P=0.53 **NS**
		No	182	93.3%	183	94.8%	
	If yes, Present body weight	**(0-5%)**	13	100.0%	10	100.0%	χ^2=0.00 P=1.00 **NS**

Not significant P >0.05

Table 5.2.4 (a) shows the information related to clinical histories in both groups of HIV infected adolescents. Among this both groups, 5% and 6% had nutritional deficiency and nearly 46% in experimental and 53% in control group of adolescents had not followed de worming regularly. Nearly 3% in experimental group and 2% in control group of adolescents having iron deficiency anemia. In consideration with loss of weight, nearly 5-7% lost their present weight from 0-5 % within 3 months. In all the clinical variables shows the 'p' value is less than the calculated chi square value and it's not significant at P>0.05. It reveals that, the distribution variables in both the groups are similar.

Table 5.2.4 (b): Presence of Clinical signs and symptoms in both groups of HIV infected adolescents

Table 5.2.4 (b-i): Dry skin, Nail, Head and Eyes in both groups of HIV infected adolescents

S. No.	Clinical signs and symptoms		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
1.	**Dry Skin**	Yes	8	4.1%	12	6.2%	χ^2=0.88 P=0.34 **NS**
	'0' month	No	187	95.9%	181	93.8%	
	3rd month	Yes	5	2.6%	10	5.2%	χ^2=1.78 P=0.18 **NS**
		No	190	97.4%	183	94.8%	
	6th month	Yes	2	1.0%	13	6.7%	χ^2=8.50 P=0.01** **S**
		No	193	99.0%	180	93.3%	
2.	**Nails**	No	195	100.0%	193	100.0%	χ^2=0.00 P=1.00 **NS**
3.	**Head-** Color / texture	Yes	14	7.2%	11	5.6%	χ^2=0.36 P=0.54 **NS**
	'0' month	No	180	92.3%	182	93.3%	
	3rd month	Yes	11	5.6%	15	7.7%	χ^2=0.70 P=0.40 **NS**
		No	184	94.4%	178	92.3%	
	6th month	Yes	7	3.6%	13	6.7%	χ^2=1.96 P=0.14 **NS**
		No	188	96.4%	180	93.3%	
3.a	I**nfection** S.dermatitis	Yes	8	4.1%	10	5.1%	χ^2=0.25 P=0.61 **NS**
	'0' month	No	187	95.9%	183	93.8%	
	3rd month	Yes	6	3.1%	10	5.1%	χ^2=1.08 P=0.29 **NS**
		No	189	96.9%	183	93.8%	
	6th month	Yes	5	2.6%	10	5.1%	χ^2=1.78 P=0.18 **NS**
		No	190	97.4%	183	93.8%	
4.	**Eyes**	Yes	7	3.6%	7	3.6%	χ^2=0.0 P=0.99 **NS**
	'0' month	No	188	96.4%	186	95.4%	
	3rd month	Yes	5	2.6%	7	3.6%	χ^2=1.68 P=0.19 **NS**
		No	190	97.4%	186	95.4%	
	6th month	Yes	3	1.5%	6	3.1%	χ^2=0.36 P=0.54 **NS**
		No	192	98.5%	187	95.9%	

Not significant P >0.05, ** highly significant at P≤ 0.01

Table 5.2.4 (b-i) shows clinical signs and symptoms of dry skin, nail, head and eyes in both groups of HIV infected adolescents. In regard to presence of dry skin 4% and 6 % were respectively seen in both group adolescents in baseline assessment, but in subsequent evaluation it was reduced to 1% in experimental group and remaining same in control group. The chi square value of 8.50 was significant at p=0.01** denoted that, there is gradual decrease in dryness of skin among HIV infected adolescents in experimental group. In consideration of nails, there is no change noticed in nails in both groups of HIV infected adolescents throughout the assessment period. With regard to the head and eyes there is no significant changes are found throughout study period in both the groups.

Table 5.2.4 (b-ii) : Clinical signs and symptoms of mouth, Gastro intestinal system and extremities in both groups of HIV infected adolescents.

S. No.	Clinical signs and symptoms		Group				Chi square test
			Experimental		Control		
			No.	%	No.	%	
5.	**Oral**	Yes	17	8.7%	13	6.7%	χ^2=0.53 P=0.46 **NS**
	'0' month	No	178	91.3%	180	92.3%	
	3rd month	Yes	9	4.6%	11	5.6%	χ^2=0.23 P=0.62 **NS**
		No	186	95.4%	182	93.3%	
	6th month	Yes	0	100.0%	10	5.1%	χ^2=15.39 P=0.01** **S**
		No	195		183	94.9%	
6.	**G.I. System**	Yes	56	28.7%	49	25.3%	χ^2=0.54 P=0.46 **NS**
		No	139	71.3%	144	74.7%	
	If yes '0' month	Appetite	38	67.9%	32	65.3%	χ^2=1.58 P=0.66 **NS**
		Nausea	14	25.0%	10	20.4%	
		Vomiting	2	3.6%	4	8.2%	
		Diarrhea	2	3.5%	3	6.1%	
	3rd month	Appetite	21	72.4%	28	51.9%	χ^2=5.89 P=0.05* **S**
		Nausea	8	27.6%	18	33.3%	
		Vomiting	0	0.0%	8	14.8%	
		Diarrhea	0	0.0%	0	0.0%	
	6th month	Appetite	7	87.5%	25	55,5%	χ^2=6.00 P=0.05* **S**
		Nausea	1	12.5%	15	33.3%	
		Vomiting	0	0.0%	3	6.7%	
		Diarrhea	0	0.0%	2	4.5%	
7.	**Extremities**	Yes	25	2.8%	19	9.8%	χ^2=0.85 P=0.35 **NS**
	a. Muscle wasting	No	170	87.2%	174	90.2%	
	b. Edema	No	195	100.0%	193	100.0%	χ^2=0.00 P=1.00 **NS**
	c. Lipo dystrophy	Yes	22	11.2%	13	6.7%	χ^2=2.44 P=0.11 **NS**
		No	173	88.8%	180	93.3%	

Not significant P >0.05, * significant at P≤0.05, ** highly significant at P≤ 0.01

Table 5.2.4 (b-ii) shows the clinical signs and symptoms for oral, gastro intestinal system and extremities in both groups of HIV infected adolescents. In relevant to oral, 6-8 % had problems in the baseline assessment. At 6th month evaluation, there is marked improvement in experimental group and no one is found with dryness of lips, bleeding gums and apthus ulcers but still 5 % in control group. The chi square value of 15.39 is significant at p=0.01**. In regard to the gastro intestinal system, in baseline assessment shows that 25-28 % of adolescents had various GI problems in both the groups. But at the 6th month evaluation, it is reduced in the experimental group and it's proved with chi square values whereas in the control group there is no significant changes found at 6th month evaluation. In regard to extremities, the presence of muscle wasting and lipo dystrophy were seen in 13%

Fig 5.2.4 (b-i) - Percentage wise distribution in dry skin of HIV infected adolescents in both groups.

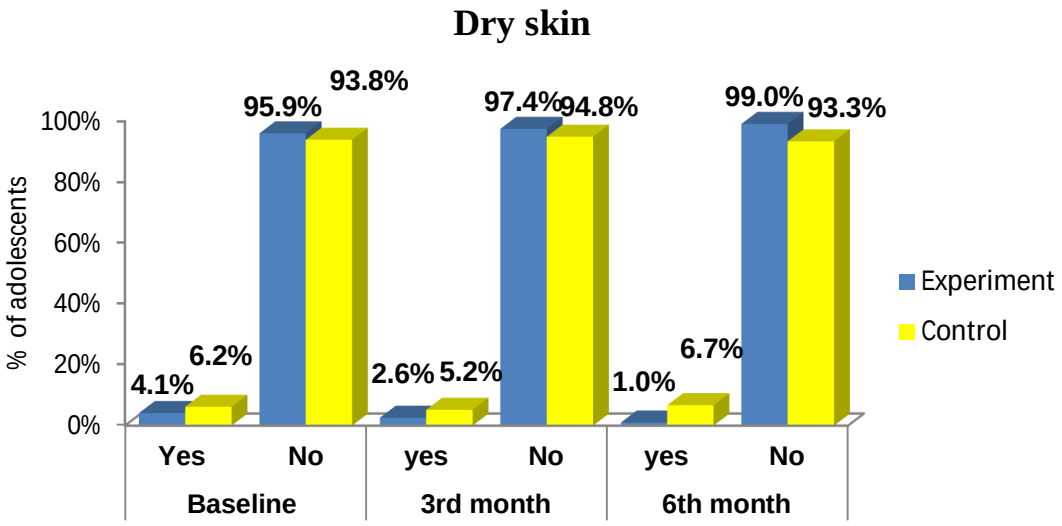
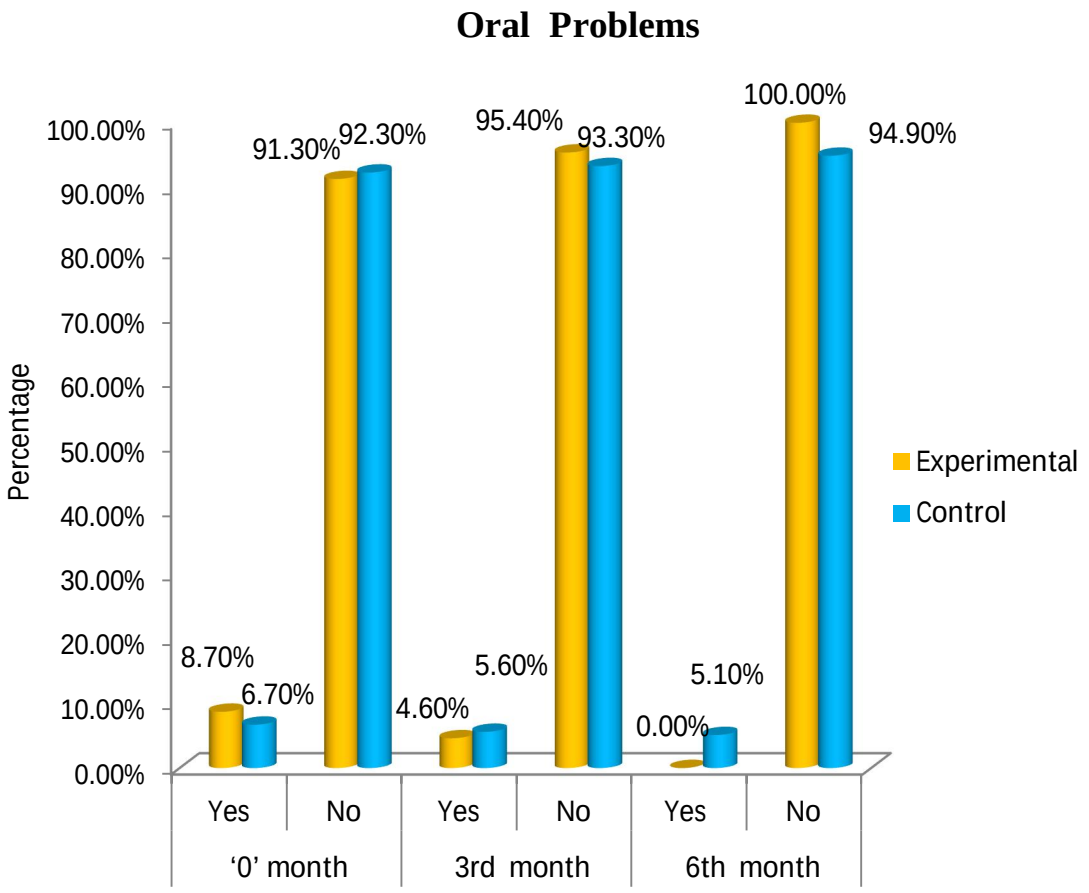


Fig 5.2.4 (b-ii): Percentage wise distribution in Oral Problems of HIV infected adolescents in both groups



and 11% in experimental group whereas in control group10% and 7% respectively in both the groups. There is no participants had edema during study period in both groups.

5.2.5: Assess and evaluate pre and post test level of QOL in both groups of HIV infected adolescents.

Table 5.2.5 (a): Pre and post test mean score of quality of life mean in experimental group of the HIV infected adolescents.

S. No.	QOL Domains	Assessment					
		Baseline	%	3rd month	%	6th month	%
1.	General Health Ratings	34.83	57.1%	39.11	64.1%	40.01	65.6%
2.	Physical Functioning	17.10	57.0%	19.43	64.8%	23.63	78.8%
3.	Psychological Wellbeing	54.82	65.3%	58.04	69.1%	60.97	72.6%
4.	Social Role Functioning	4.25	22.4%	6.30	33.2%	9.94	52.3%
5.	Health care Services	3.75	15.6%	6.86	28.6%	13.36	55.7%
6.	Symptoms	48.92	40.8%	58.02	48.4%	67.74	56.5%
	TOTAL	**163.66**	**48.4%**	**187.75**	**55.5%**	**215.64**	**63.8%**

Table 5.2.5 (a) shows pre and post test score of quality of life in baseline, the 3rd month and the 6th month evaluation in experimental group of the HIV infected adolescents. In general health ratings domains, 57% are in baseline assessment and it is increased to 64% in 3rd month and 66% in 6th month evaluation**.** With regard to physical functioning there is a marked improvement i.e., 57 % to 79 % respectively. In consideration with psychological well being it is increased from baseline value of 65 % to 73%. In regards to social role functioning and health care services its marked improvement from baseline value from 22% and 16 % to 52% and 58% respectively. Regarding symptoms of the HIV infected adolescents; it is increased from 41% to 57%. The overall percentage of baseline assessment is 48% but at 6th month evaluation it is increased to 64 %.

Table 5.2.5 (b) Pre and post test mean score of quality of life in control group of the HIV infected adolescents

S. No.	QOL Domains	Assessment and QOL score					
		Baseline	**%**	**3rd month**	**%**	**6th month**	**%**
1	General Health Ratings	34.32	56.3%	32.95	56.3%	34.47	56.5%
2	Physical Functioning	17.31	57.7%	18.15	57.9%	17.54	58.5%
3	Psychological Wellbeing	54.17	64.5%	53.25	64.8%	54.81	65.3%
4	Social Role Functioning	4.19	22.1%	4.25	22.5%	4.42	23.3%
5	Health care Services	3.66	15.3%	3.50	15.8%	3.97	16.5%
6	Symptoms	49.28	41.1%	43.30	41.8%	50.80	42.3%
	TOTAL	**162.93**	**48.2%**	**155.40**	**48.6%**	**166.02**	**49.1%**

Table 5.2.5 (b) shows pre and post test quality of life score in baseline, 3rd and 6th month evaluation in control group of the HIV infected adolescents. In all the domains, there is no marked improvement from baseline to 6th month evaluation in the control group of HIV infected adolescents. The total percentage is increased only from 48% to 49% respectively throughout the evaluation period.

Fig 5.2.5(a): Percentage wise distribution in domain wise QOL score in experimental group of HIV infected adolescents.

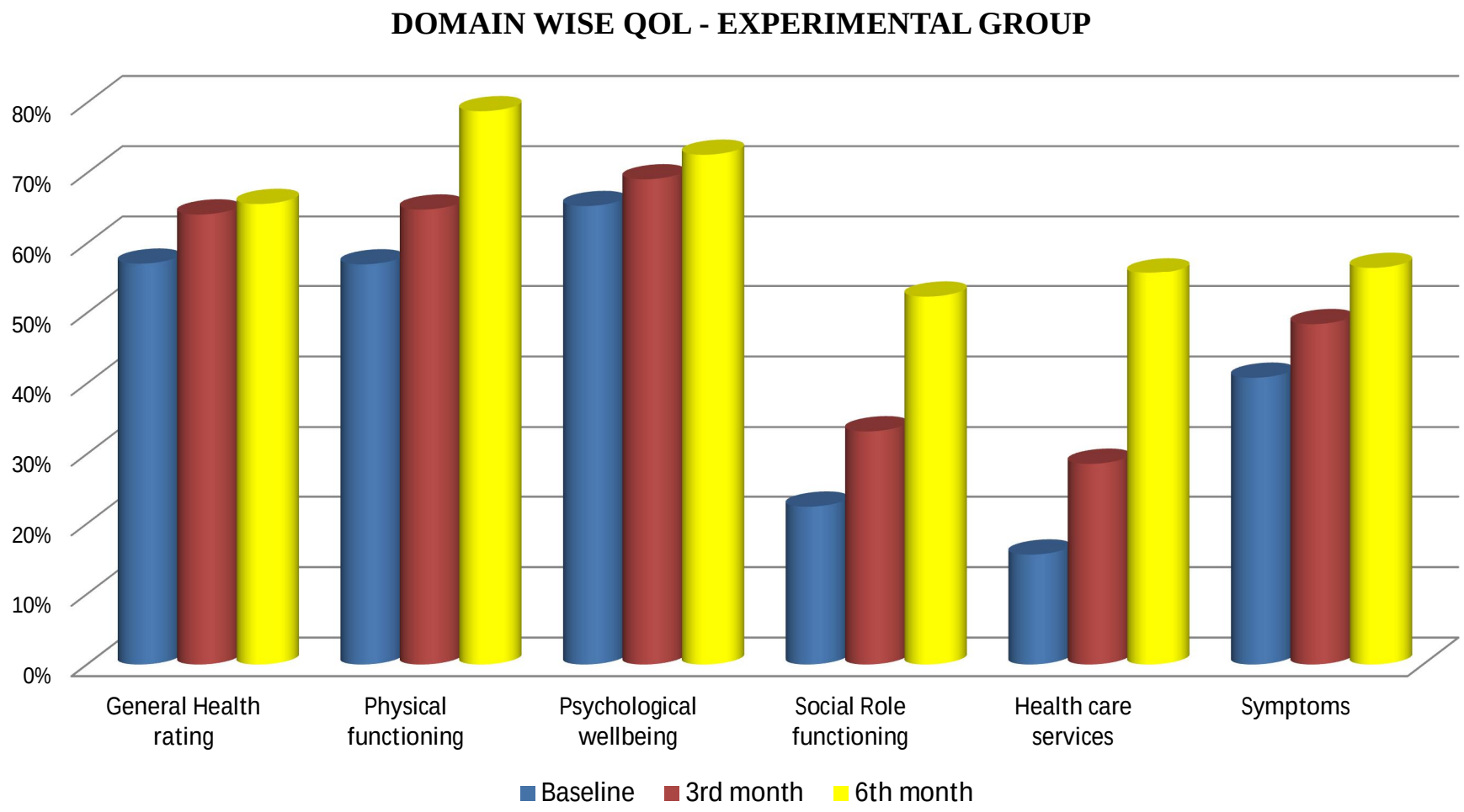


Table 5.2.5 (c): Number and percentage distribution in overall quality of life score in experimental group of the HIV infected adolescents

QOL Interpretation	Base line		3rd month		6th month		Chi square test
	No.	%	No.	%	No.	%	
Poor	157	80.5%	93	47.7%	45	23.1%	χ^2=174.19
Moderate	38	19.5%	102	52.3%	122	62.6%	P=0.001***
Good	0	0.0%	0	0.0%	28	14.3%	DF=4 **S**

***** very high significant at P≤0.001**

Table 5.2.5 (c) shows number and percentage distribution in overall quality of life score in experimental group of the HIV infected adolescents**.** In baseline assessment, the majority of 81% of the participants had poor QOL and 20% had moderate QOL. The next assessment of the 3rd month, 48 % of participants had poor QOL and 52% had moderate QOL and none of them had good QOL .At the 6th month evaluation, only 23% in poor QOL, 63 % had moderate QOL and 18 % of adolescents achieved good QOL. The chi square value of 174.19 is significant at p =0.001***. It depicts that there is significant improvement in quality of life of HIV infected adolescents in experimental group.

Table 5.2.5(d): Number and percentage distribution in overall quality of life score in control group of the HIV infected adolescents

QOL Interpretation	Base line		3rd month		6th month		Chi square test
	No.	%	No.	%	No.	%	
Poor	160	82.9%	155	80.3%	151	78.2%	χ^2=1.34
Moderate	33	17.1%	38	19.7%	42	21.8%	P=0.51
Good	0	0.0%	0	0.0%	0	0.0%	DF=2
	193	100.0%	193	100.0%	193	100.0%	**NS**

Not significant P >0.05

Table 5.2.5 (d) shows number and percentage distribution in overall quality of life score in control group of the HIV infected adolescents. In the baseline assessment, the majority 83% of the HIV infected adolescents had poor QOL and 17% had moderate QOL. In subsequent evaluation, it is increased to 19% and 23% respectively in moderate QOL. There is no participants had good QOL throughout study period. The chi square value of 1.34 is not significant at p>0.05.

Fig 5.2.5(c): Percentage wise distribution of overall QOL scores in experimental group of HIV infected adolescents

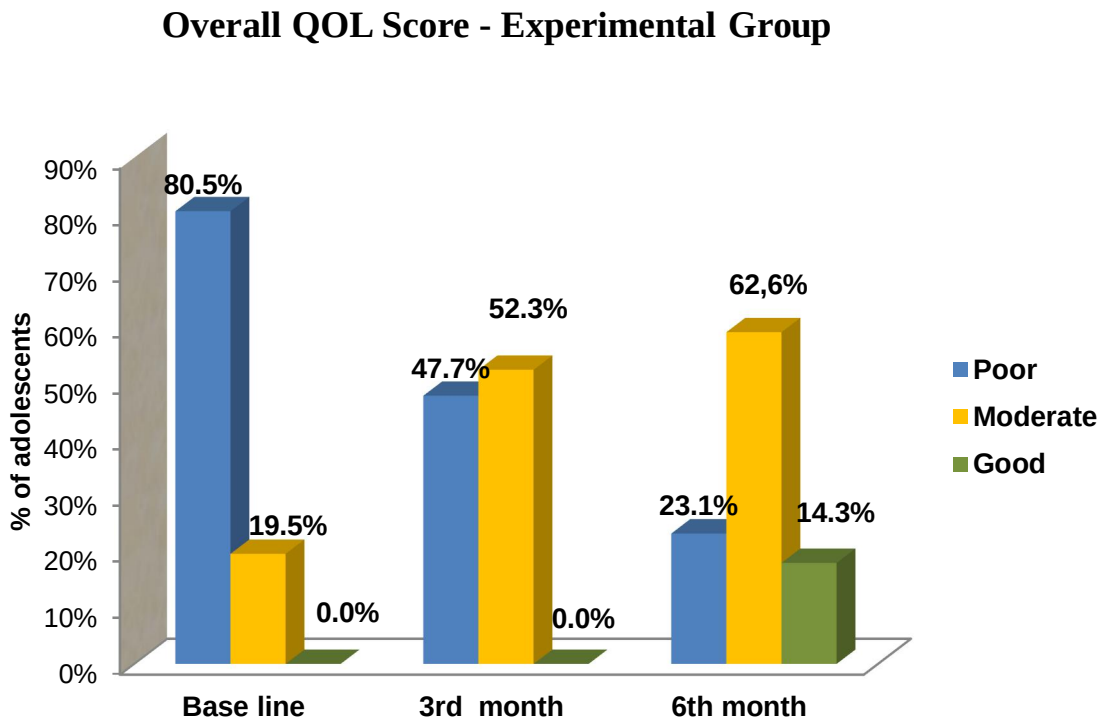
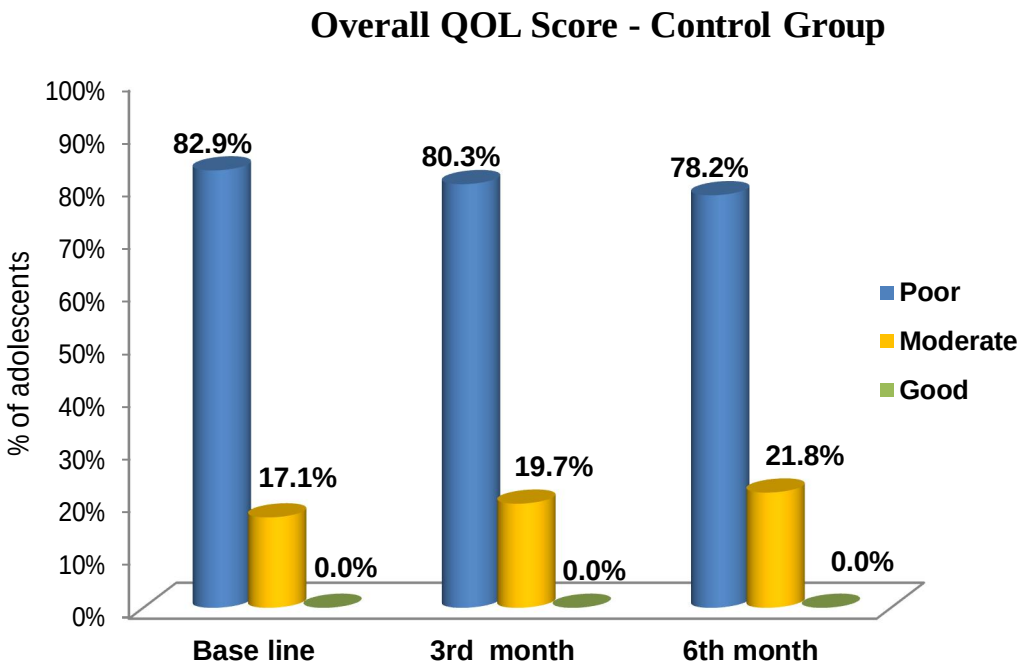


Fig 5.2.5(d) :Percentagewise distribution of overall QOL scores in control group of HIV infected adolescents.



SECTION III

5.3: Compares and determines the effectiveness of HIV interventional package in both groups of HIV infected adolescents.

5.3.1: Compares the overall level of CD4 count in both groups of HIV infected adolescents.

5.3.1(a): Compares the number and percentage distribution in overall level of CD4 count in both groups of HIV infected adolescents.

S. No.	CD4 Count	Experimental				Control			
		'0' month		6th month		'0' month		6th month	
		No.	%	No.	%	No.	%	No.	%
1	**301-600 Cells**	92	47.2%	18	9.2%	95	49.2%	58	30.1%
2	**601-900 Cells**	77	39.5%	119	61.0%	80	41.5%	109	56.5%
3	**901-1200 Cells**	19	9.7%	46	23.6%	13	6.7 %	23	11.9%
4	**>1200 Cells**	7	3.6%	12	6.2%	5	2.6%	3	1.5%
Chi square value		$\chi 2$=71.47 P=0.001*** DF=3 **S**				$\chi 2$=3.89 P=0.14 DF=2 **NS**			

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.3.1(a) shows the number and percentage distribution in overall level of CD4 count in both groups of HIV infected adolescents. In experimental group, 40% are in 601-900 cells/mm^3, 10% are in 901-1200 cells/mm^3 and only 4 % are >1200 cells/mm^3 of CD4 count in baseline assessment. But on 6th month evaluation it is increased to 61 % , 23 % and 6 % in respective of the CD4 counts and only 9% are in the CD4 count of 301-600 cells/mm^3. The chi square value of 71.47 is significant at P=0.001***. While in control group, there is no marked improvement in CD4 count from baseline to 6th month evaluation. The chi square value 3.89 is not significant at P=0.14. It reveals that there is significant improvement in the level of CD4 count in the experimental group than the control group of HIV infected adolescents.

Table 5.3.1(b): Effectiveness of HIP in mean and SD level of CD4 count in both groups of HIV infected adolescents.

Group	Baseline			6th month			Paired t-test
	Mean	SD	Mean difference	Mean	SD	Mean difference	
Experiment	664.86	221.688	4.86	840.30	231.671	136.96	t=7.21 P=0.001*** **S**
Control	669.72	174.703		703.35	165.724		t=1.62 p=0.12 **NS**

Not significant P >0.05, * very high significant at P≤0.001**

Table 5.3.1 (b) shows the effectiveness of HIP in mean and SD level of CD4 count in both groups of HIV infected adolescents. In baseline assessment, the mean score is 664.86 in experimental group and 669.72 in control group. The mean difference is 4.86. Whereas in the 6th month assessment of mean score in experimental and control group is 840.30 and 703.35 respectively. The mean difference is 136.96. The paired t-test value of 7.21 is significant at p=0.001*** in experimental group. It depicts that the CD4 count is increased in experimental group than the control group.

Fig 5.3.1: **Comparison of percentagewise of distribution in overall level of CD4 count of HIV infected adolescents in both groups.**

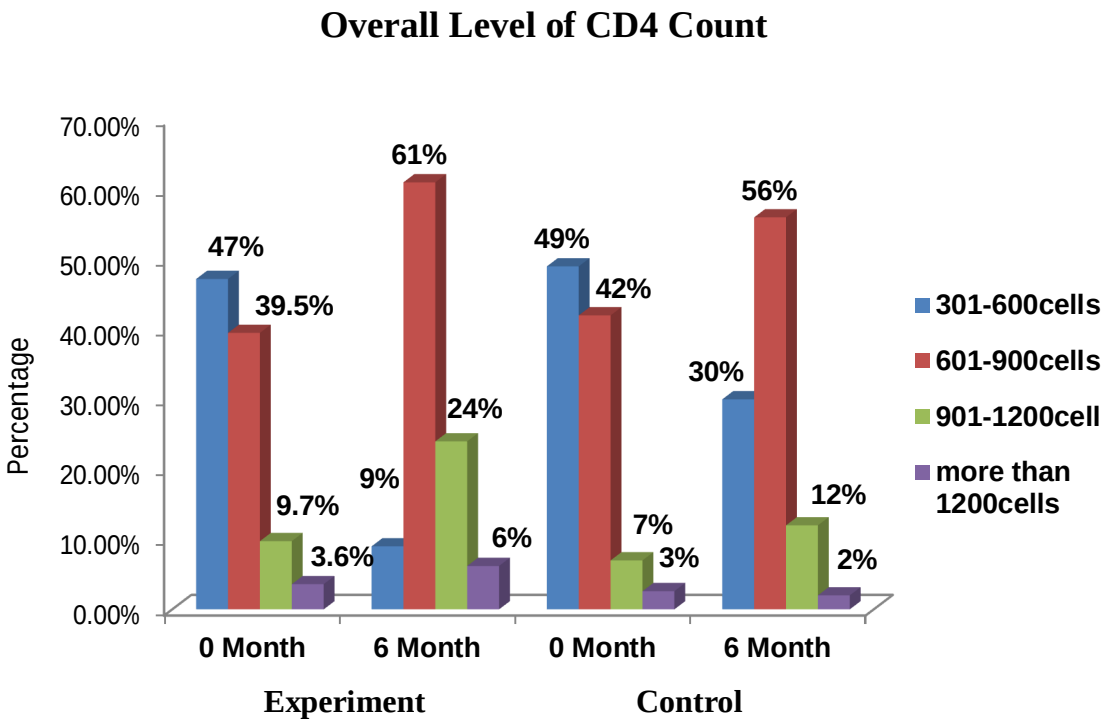


Fig 5.3.1(a): **Effectiveness of HIP in mean level of CD4 count of HIV infected adolescents in both groups**

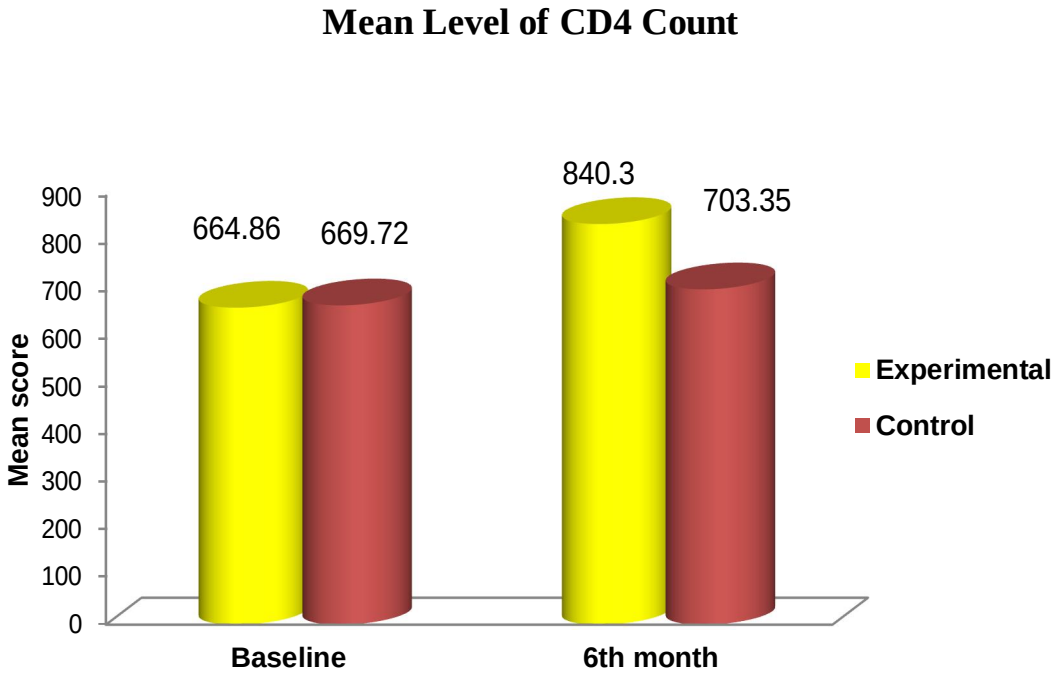


Table 5.3.2: Compares the overall level of ART adherence in both groups of HIV infected adolescents by various methods

Table 5.3.2(a): Compares the number and percentage distribution in overall level of ART adherence in experimental group of HIV infected adolescents by various methods

S. No.	Methods	Experimental Group						Chi Square value
		'0' Month		3rd Month		6th Month		
		No.	%	No.	%	No.	%	
1.	**'5'point response** Optimal	30	15.4%	177	90.8%	195	100.0%	χ^2=392.99 p=0.001** DF=2 **S**
	Sub optimal	135	69.2%	18	9.2%	0	0.0%	
	Poor	30	15.4%	0	0.0%	0	0.0%	
2.	**Visual analog** Optimal	29	14.9%	99	50.8%	152	77.9%	χ^2=191.4 p=0.001*** DF=4 **S**
	Sub optimal	134	68.7%	96	49.2%	43	22.1%	
	Poor	32	16.4%	0	0.0%	0	0.0%	
3.	**'3' days recall** Optimal	123	63.1%	160	82.1%	184	94.4%	χ^2=60.1 p=0.001*** DF=2 **S**
	Sub optimal	72	36.9%	35	17.9%	11	5.6%	
	Poor	0	0.0%	0	0.0%	0	0.0%	
4.	**Pill count method** Optimal	85	43.6%	170	87.2%	181	92.8%	χ^2=149.14 p=0.001*** DF=2 **S**
	Sub optimal	110	56.4%	25	12.8%	14	7.2%	
	Poor	0	0.0%	0	0.0%	0	0.0%	

***** very high significant at P≤0.001**

Table 5.3.2(a) compares the overall level of ART adherence in experimental group of HIV infected adolescents by various methods .With regard to '5' point response scale, only 15 % had optimal level adherence in baseline assessment but its reached 100% in 6th month evaluation. The chi square value of 392.99 is significant at the p=0.001***. Regarding the visual analog method, the baseline assessment only15% had optimal level adherence, whereas in the 6th month it's increased to 78%. The chi square value of 191.4 is significant at the p=0.001***. Consider with '3' days recall method, 63% had optimal level adherence in baseline method, but it's increased to 94%. The chi square value of 60.1 is significant at the p=0.001***. In consideration of pill count method, 44% had optimal level adherence in baseline method, but it's increased to 93%. The chi square value of 149.14 is significant at the p=0.001***. It denotes that there is significant improvement in the adherence level among HIV infected adolescents in the experimental group.

Table 5.3.2 (b) : Compares overall level of ART adherence in control group of HIV infected adolescents by various methods.

S. No.	Methods	Control Group						Chi Square value
		'0' Month		3rd Month		6th Month		
		No.	%	No.	%	No.	%	
1.	**'5'point response** Optimal	33	17.1%	35	18.1%	35	18.1%	χ^2=0.19 p=099 DF=2 **NS**
	Sub optimal	132	68.4%	130	67.4%	132	68.4%	
	Poor	28	14.5%	28	14.5%	26	13.5%	
2.	**Visual analog method** Optimal	27	14.0%	31	16.1%	35	18.1%	χ^2=13.1 p=0.01** DF=4 **S**
	Sub optimal	132	68.4%	131	67.9%	146	75.6%	
	Poor	34	17.6%	31	16.1%	12	6.2%	
3.	**'3' days recall method** Optimal	121	62.7%	123	63.7%	128	66.3%	χ^2=0.58 p=0.74 DF=2 **NS**
	Sub optimal	72	37.3%	70	36.3%	65	33.7%	
	Poor	0	0.0%	0	0.0%	0	0.0%	
4.	**Pill count method** Optimal	73	37.8%	81	42.0%	93	48.2%	χ^2=4.29 p=0.11 DF=2 **NS**
	Sub optimal	120	62.2%	112	58.0%	100	57.8%	
	Poor	0	0.0%	0	0.0%	0	0.0%	

**** highly significant at P≤ 0.01**

Table 5.3.2(b) compares overall level of ART adherence in control group of HIV infected adolescents by various methods. In regard to '5' point response scale, there is no marked improvement in adherence rate from baseline to 6th month evaluation. The chi square value of 0.19 is not significant at the p=0.99. In relevant to drug color method, the baseline assessment only14% had optimal level adherence, whereas in 6th month it's increased to 18%. The chi square value of 13.1 is significant at the p=0.01**. Consider with '3' days recall method, 63% had optimal level adherence in baseline method, but it's slightly increased to 66%. The chi square value of 0.58 is not significant at the p=0.74.

In consideration of pill count method, 38% had optimal level adherence in baseline method, but it's markedly increased to 48%. Still the chi square value of 4.29 is not significant at the p=0.11. It depicts that there is no significant changes in control group of HIV infected adolescents. Even though there were many different adherence rates were estimated in various methods, the missed dose history was correlated with pill count method only. So the investigator has taken the mean adherence score of pill count method in order to evaluate the effectiveness of adherence improvement in both groups.

Fig. 5.3.2: Compares overall level of ART adherence by pill count method in both groups of HIV infected adolescents.

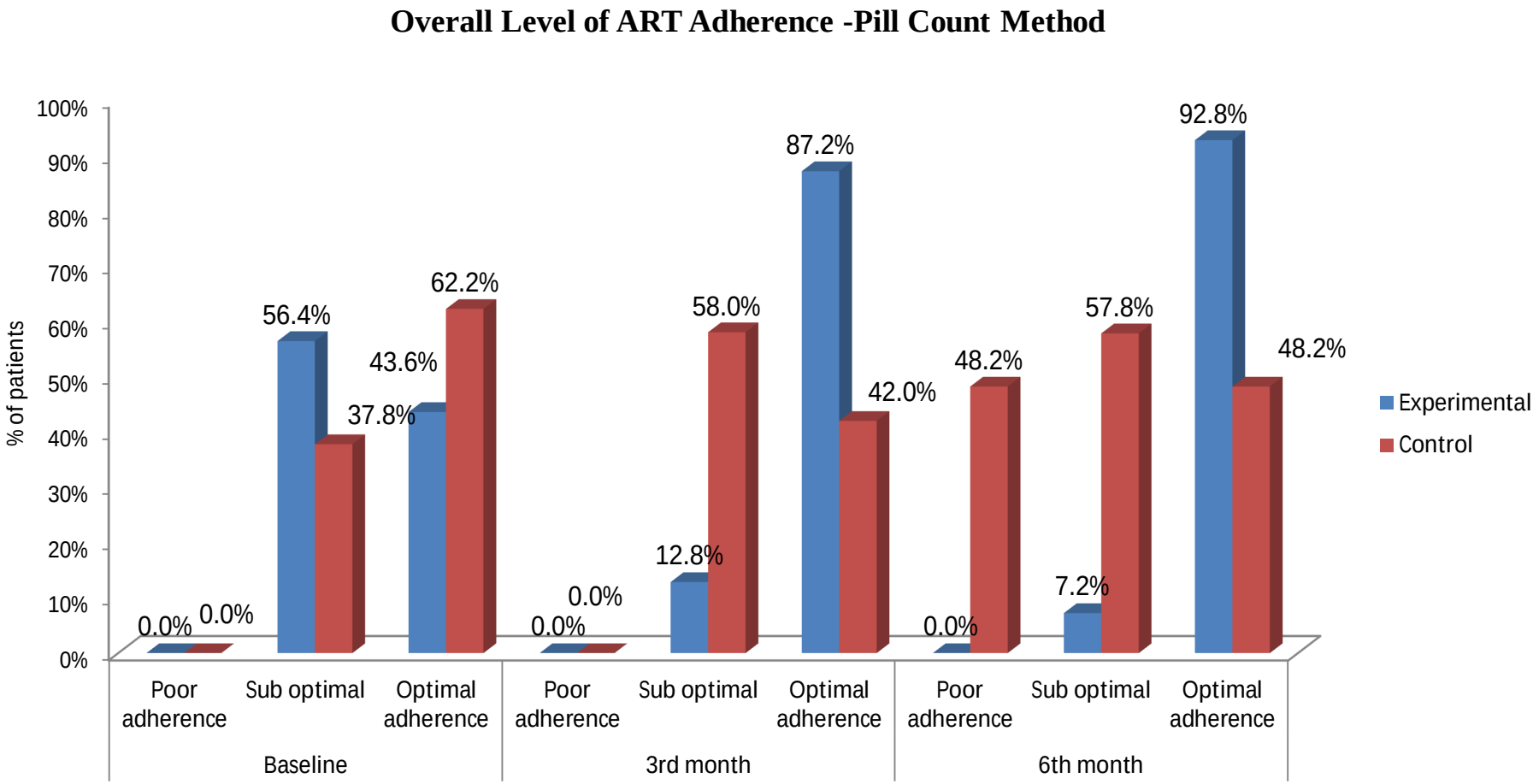


Table 5.3.2 (c): Effectiveness of HIP in mean level of ART adherence score in both groups of HIV infected adolescents.

Groups		Mean ART Adherence	Mean Difference in ART score with 95% Confidence interval	Percentage of ART adherence gain score with 95% Confidence interval
Experimental	Pretest	85.36	13.38 (11.91 – 14.84)	**13.4%** (11.9% –14.8%)
	Posttest	98.74		
Control	Pretest	85.60	4.94 (3.26 – 6.61)	**4.9%** (3.3% –6.6%)
	Posttest	90.54		

Table 5.3.2(c) shows effectiveness of HIP in mean level of ART adherence score in both groups of the HIV infected adolescents. In experimental group, the mean ART adherence score in pretest is 85.36 and post test score is 98.74. The mean difference in ART score with 95% confidence interval is 13.38 and percentage of adherence gain score is 13.4%. However, in control group, the mean ART adherence score in pretest is 85.60 and post test score is 90.54. The mean difference in ART score with 95% confidence interval is 4.94 and percentage of adherence gain score is only 4.9%. It denotes that there is marked improvement in adherence level of HIV infected adolescents in experimental group than the control group.

5.3.3: Comparison of overall level of nutritional score of HIV infected adolescents in both groups

Table 5.3.3(a) : Comparison on interpretation of 'Z' score of HIV infected adolescents in both groups

Z-score	Experimental						Control					
	Baseline		3rd month		6th month		Baseline		3rd month		6thmonth	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Severely malnourished	13	6.7	9	4.6%	2	1.0%	11	5.7%	10	5.2%	9	4.7%
Moderately malnourished	42	21.5	38	19.5%	35	17.9%	45	23.3%	44	22.8%	44	22.8%
Normal	140	71.8	148	75.9%	158	81.1%	137	71.0%	139	72.0%	140	72.5%
Chi square test	χ^2=9.48p=0.05* **Significant**						χ^2=0.10p=0.99 **Not significant**					

Not significant P >0.05, * significant at P≤0.05

Table 5.3.3(a) compares the interpretation of 'Z' score on HIV infected adolescents in experimental and control group. In experimental group of HIV infected

adolescents, 7% were severely mal nourished, 22 % were moderately malnourished and 72 % were normal in their nutritional status in baseline assessment. Whereas in subsequent evaluation, the severely and moderate malnourished adolescents were reduced to 4.6% &19.5% at 3rd month and 1% & 18% at 6th month respectively. The normal adolescent's percentage is increased to 76 % and 81 % for further respective evaluation periods. The chi square value of 9.48 is significant at level of p=0.05. Whereas in control group there is no marked improvement in throughout the study period. The chi square value of 0.10 is not significant at level of p=0.99.

Table 5.3.3 (b): Effectiveness of HIP on nutritional gain score in both groups of the HIV infected adolescents.

Groups		Nutritional status		
		Baseline	6th month	% of Nutritional Gain score
Experimental	Normal	140(71.8%)	158(81.1%)	↑9.3%
	Malnourished	55(28.2%)	37(18.9%)	
Control	Normal	137(71.0%	140(72.5%)	↑1.5%
	Malnourished	56(29.0%)	53(27.5%)	

Table 5.3.3 (b) shows effectiveness of HIP on nutritional gain score in both groups of the HIV infected adolescents. In experimental group, 72 % were only in normal level and 28% were malnourished. However in the 6th month the normal level is increased to 82% and malnourished adolescents are reduced to 19%. The percentage wise nutritional gain score is 9.3%. Whereas in control group, 71 % were only in normal level and 29% were malnourished. But in the 6th month the normal level is increased to only 72% and malnourished adolescents are reduced to 28%. The percentage wise nutritional gain score is only 1.5 %. It depicts that the experimental group has gained more score than the control group.

Fig 5.3.3: Comparison of 'Z' score distribution in both groups of HIV Infected adolescents.

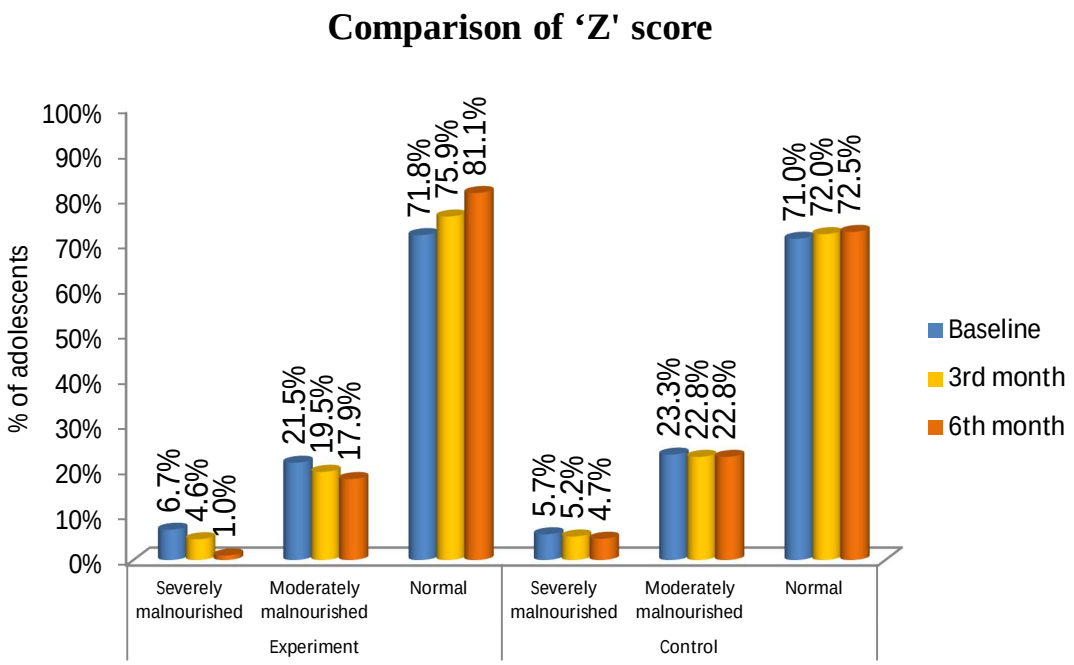


Fig 5.3.3(a): Effectiveness of HIP on Nutritional gain score in both groups of HIV infected adolescents

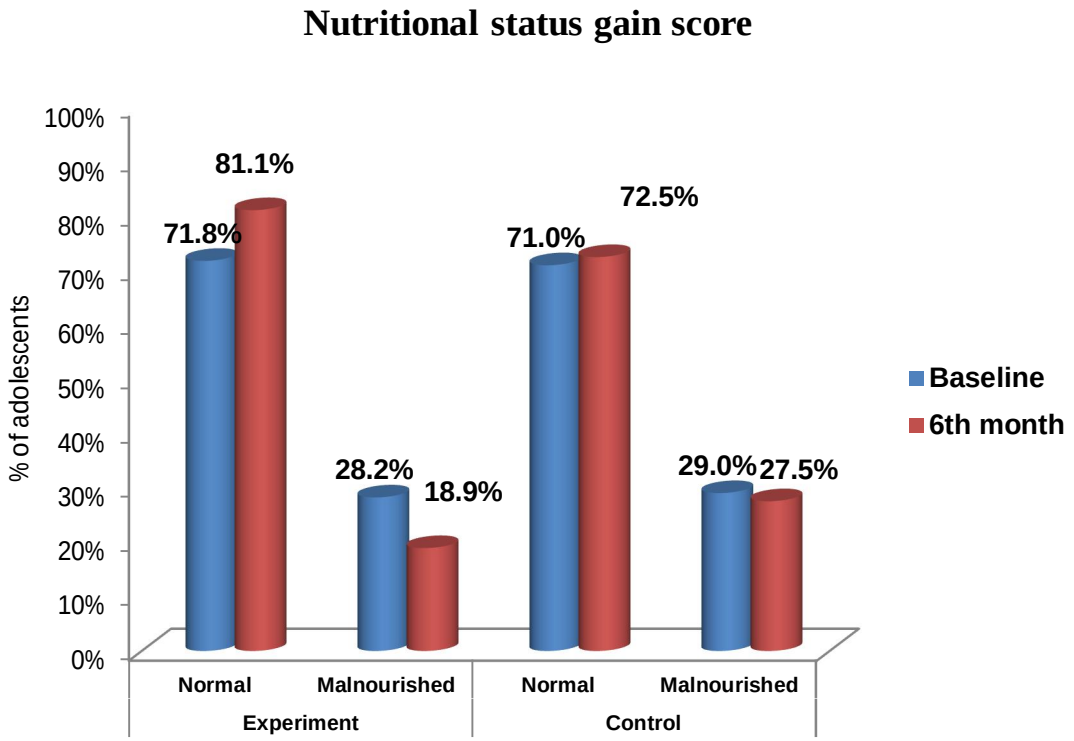


Table 5.3.4: Compares the mean and standard deviation in quality of life score in both groups of the HIV infected adolescents.

Table 5.3.4 (a) : Comparison of baseline level of the mean & S.D of quality of life score in both groups of the HIV infected adolescents.

S. No.	Quality of life Domains	Group				QOL mean difference	Student independent t-test
		Experimental		Control			
		Mean	SD	Mean	SD		
1	**General Health Ratings**	34.83	4.31	34.32	2.17	0.51	t=1.45 P=0.15 **NS**
2	**Physical Functioning**	17.10	1.35	17.31	1.42	0.20	t=1.44 P=0.15 **NS**
3	**Psychological Wellbeing**	54.82	4.24	54.17	3.30	0.64	t=1.67 P=0.10 **NS**
4	**Social Role Functioning**	4.25	.43	4.19	.39	0.06	t=1.42 P=0.16 **NS**
5	**Healthcare Services**	3.75	.54	3.66	.81	0.09	t=1.30 P=0.19 **NS**
6	**Symptoms**	48.92	2.48	49.28	5.17	0.36	t=0.88 P=0.37 **NS**
	Total	163.66	6.22	162.93	4.85	0.73	t =1.30 P=0.19 **NS**

Not significant P >0.05

Table 5.3.4(a) shows comparison of baseline level of the mean & S.D of quality of life score in both groups of the HIV infected adolescents. In all the QOL domain in both groups had more as less equal mean value. i.e., the total mean value is 163.7 and 162.9 respectively and the mean difference score is 0.73. It is tested with student independent t-test and proved that all variables are not significant. It denotes that there is no difference in the quality of life score of HIV infected adolescents in both groups.

Table 5.3.4 (b) : Comparison of 3rd month level of the mean & S.D of quality of life score in both groups of the HIV infected adolescents

S. No.	Quality of life Domains	Group				QOL mean difference	Student independent t-test
		Experimental		Control			
		Mean	SD	Mean	SD		
1	**General Health Ratings**	39.11	4.47	34.34	2.17	4.77	t=13.32 P=0.001*** **S**
2	**Physical Functioning**	19.43	1.40	17.37	1.49	2.06	t=13.99 P=0.001*** **S**
3	**Psychological wellbeing**	58.04	4.35	54.46	3.27	3.58	t= 9.16 P=0.001*** **S**
4	**Social Role functioning**	6.30	.56	4.27	.45	2.02	t=39.30 P=0.001*** **S**
5	**Health care services**	6.86	.73	3.78	.86	3.07	t=38.03 P=0.001*** **S**
6	**Symptoms**	58.02	2.72	50.10	5.16	7.92	t=18.94 P=0.001*** **S**
	Total	**187.75**	**6.84**	**164.32**	**5.22**	**23.43**	t=37.89 P=0.001*** **S**

***Very high significant at P≤0.001**

Table 5.3.4 (b) shows comparison of the 3rd month level of the mean & S.D of quality of life score in both groups of the HIV infected adolescents. In experimental group, there is slight improvement in all QOL domains i.e., the total mean value is increased from 163.6 to 187.8 Where as in control group, its increased from 162.9 to 164.3 only and the total mean difference score is 23.43. The t-test is used to prove the significance in all QOL domains at p≤0.001***.

Table 5.3.4(c): Comparison of 6th month level of the mean & S.D of quality of life score in both groups of the HIV infected adolescents

S. No	Quality of life Domains	Group				QOL mean difference	Student independent t-test
		Experimental		Control			
		Mean	SD	Mean	SD		
1	**General health ratings**	40.01	12.27	34.47	2.18	5.53	t=6.17 P=0.001*** **S**
2	**Physical functioning**	23.63	2.12	17.54	1.67	6.08	t=31.34 P=0.001*** **S**
3	**Psychological wellbeing**	60.97	5.15	54.81	3.28	6.16	t=14.05 P=0.001*** **S**
4	**Social Role functioning**	9.94	1.73	4.42	.60	5.51	t=41.89 P=0.001*** **S**
5	**Health care Services**	13.36	1.82	3.97	.98	9.38	t=63.19P=0.001*** **S**
6	**Symptoms**	67.74	6.16	50.80	4.79	16.94	t=30.22 P=0.001*** **S**
	Total	**215.64**	**16.10**	**166.02**	**5.33**	**49.61**	**t=40.66 P=0.001*** S**

***** very high significant at P≤0.001**

Table 5.3.4 (c) shows comparison of the 6th month level of the mean & S.D of quality of life score in both groups of the HIV infected adolescents. In experimental group, there is marked improvement in all QOL domains i.e., the total mean value is increased from 163.6 to 215.6 Whereas in control group, its increased from 162.9 to 166.02 only and the total mean difference score is 49.61. The t-test is used to prove the significance in all QOL domains at p≤0.001***.

Table 5.3.4 (d): Effectiveness of HIP on quality of life score in both groups of the HIV infected adolescents

Groups	Assessment	Mean QOL score	Mean Difference in QOL score with 95% Confidence interval	Percentage of QOL gain score with 95% Confidence interval
Experimental	Baseline	163.66	51.97 (49.97 – 53.97)	**15.1%** (14.8% –16.0%)
	6th month	215.64		
Control	Baseline	162.93	3.09 (2.48 – 3.70)	**0.9%** (0.7% –1.1%)
	6th month	166.02		

Table 5.3.4 (d) shows effectiveness of HIP on quality of life score in both groups of the HIV infected adolescents. In experimental group, the mean QOL score in pretest is 163.66 and post test score is 215.64. The mean difference in QOL score with 95% confidence interval is 51.97 and percentage of QOL gain score is 15.1%. However, in control group, the mean QOL score in pretest is 162.93 and post test score is 166.02. The mean difference in QOL score with 95% confidence interval is 3.09 and percentage of QOL gain score is only 0.9%. It denotes that there is marked improvement in QOL level of HIV infected adolescents in experimental group than the control group.

Table 5.3.5: Overall effectiveness of HIP components in both groups of the HIV infected adolescents

S.No.	HIP Components	Percentage wise gain score		
		Experimental	Control	Difference
1.	Adherence rate	13.4%	4.9%	8.5%
2.	Nutritional status	9.3%	1.5%	7.8%
3.	QOL score	15.1%	0.9%	14.2%

Table 5.3.5 shows overall effectiveness of HIP on various components in both groups of the HIV infected adolescents. In adherence rate, the experimental group has gained 13.4% and control group 4.9%.The difference is 8.5%.Considering with nutritional status, the gain score is 9.3% in experimental group and 1.5% in control group. The difference is 7.8%. In regard to QOL the gain score is 15.1% in experimental group and 0.9% in control group where the difference is 14.2%.It reveals that, the experimental group has gained more score than the control group.

Fig 5.3.4: Box plot diagram shows the pre and post test level of overall mean QOL score of HIV infected adolescents in both groups

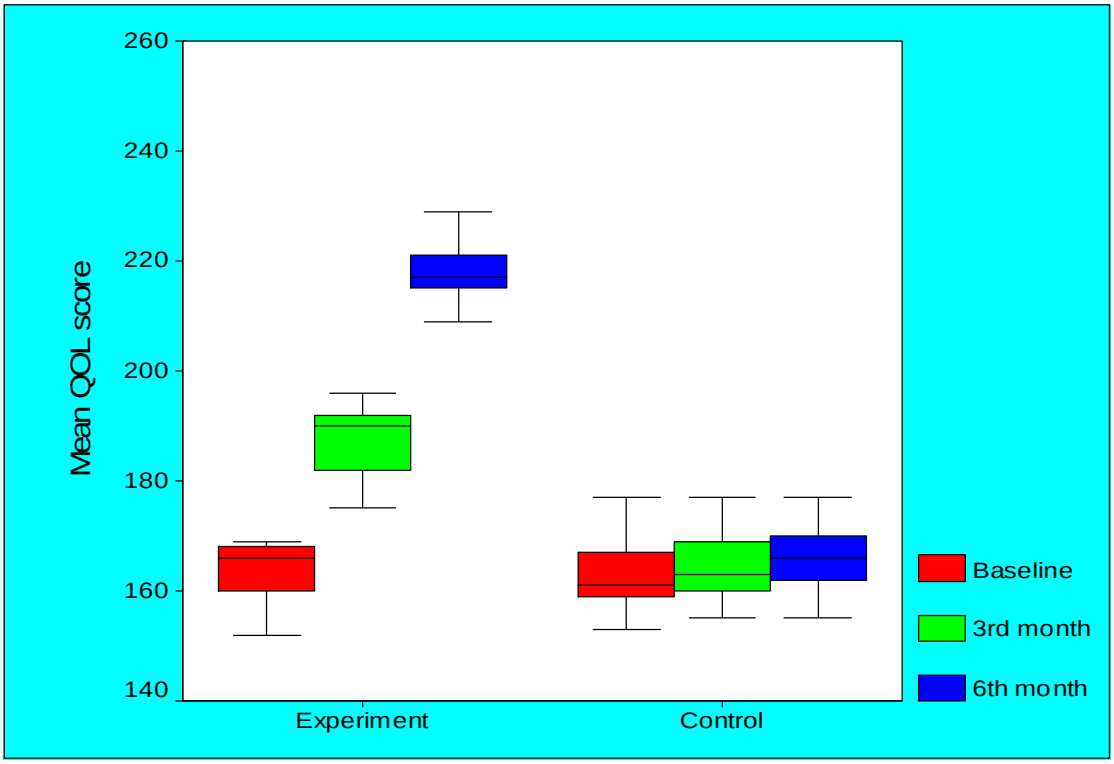
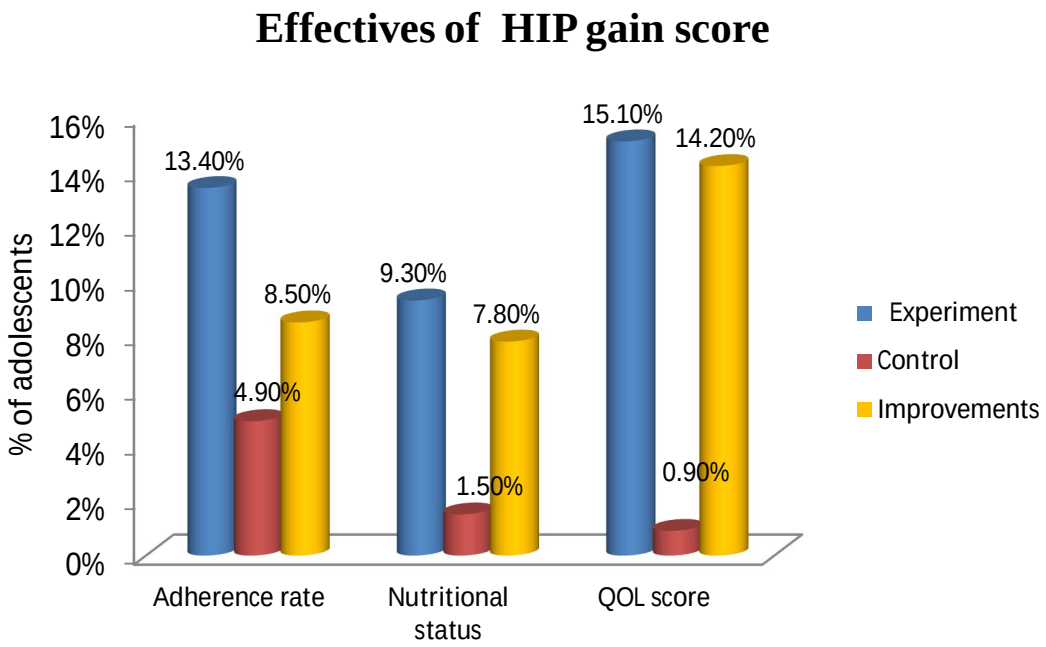


Fig 5.3.5: Overall effectiveness of HIP components in both groups of the HIV infected adolescents.



SECTION- IV

Section 5.4: This section correlates the HIP components of ART adherence, nutritional status and QOL of HIV infected adolescents in both groups

Table 5.4.1: Correlation between ART adherence and nutritional status of HIV infected adolescents in both groups

Groups	Assessment	Karl Pearson correlation coefficient	Interpretation
Experimental	**Baseline**	r = 0.17 p = 0.26	There is a poor correlation between ART and Nutritional score
	3rd month	r = 0.31 **p = 0.01****	There is a **Fair correlation** between ART and Nutritional score
	6th month	r = 0.42 **p = 0.001*****	There is a **Moderate correlation** between ART and Nutritional score
Control	**Baseline**	r = 0.16 p = 0.28	There is a poor correlation between ART and Nutritional score
	3rd month	r = 0.17 p = 0.25	There is a poor correlation between ART and Nutritional score
	6th month	r = 0.19 p = 0.22	There is a poor correlation between ART and Nutritional score

Table 5.4.1 shows correlation between the ART adherence and nutritional status of HIV infected adolescents in both groups by Karl Pearson correlation coefficient. In experimental group, the baseline assessment shows that there is a poor correlation between ART adherence and nutritional score. But in, the 3rd month there is fair correlation between ART adherence and nutritional score since r=0.31 significant at p=0.01** and in the 6th month there is moderate correlation between ART adherence and nutritional score since r=0.42 significant at p=0.001***. Whereas in control group, throughout the assessment period shows that there is a poor correlation between ART adherence and nutritional score because of 'r' value is lesser than 0.2. This table depicts that the adherence and nutrition are directly propositional it reveals that there is a positive correlation between the ART adherence and nutritional status of the HIV infected adolescents in experimental group.

Table 5.4.2: Correlation between ART adherence and QOL score of HIV infected adolescents in both groups

Groups	Assessment	Karl Pearson correlation coefficient	Interpretation
Experimental	Baseline	r = 0.17 p = 0.26	There is a Poor correlation between ART and QOL score
	3rd month	r = 0.31 **p = 0.05***	There is a **Fair correlation** between ART and QOL score
	6th month	r = 0.43 **p = 0.001*****	There is a **Moderate correlation** between ART and QOL score
Control	Baseline	r = 0.16 p = 0.28	There is a Poor correlation between ART and QOL score
	3rd month	r = 0.18 p = 0.25	There is a Poor correlation between ART and QOL score
	6th month	r = 0.20 p = 0.22	There is a Poor correlation between ART and QOL score

Table 5.4.2 shows correlation between ART adherence and QOL of HIV infected adolescents in both groups by Karl Pearson correlation coefficient. In experimental group, the baseline assessment shows that there is a poor correlation between ART and QOL score. But in, 3rd month there is fair correlation between ART and QOL score since r=0.31 significant at p=0.05** and in 6th month there is moderate correlation between ART and QOL score since r=0.43 significant at p=0.001***. Whereas in control group, throughout the assessment period shows that there is a poor correlation between ART and QOL score because of 'r' value is lesser than 0.2. This table denotes that the ART adherence and QOL are directly propositional and it reveals that there is a positive correlation between the ART adherence and QOL of the HIV infected adolescents in experimental group.

SECTION-V

5.5: This section associates the relationship between the HIP components of ART adherence; Nutritional status and QOL of HIV infected adolescents in both groups.

5.5.1: Associates the ART adherence gain score with demographic variables of HIV infected adolescents with their caregivers in both groups

5.5.1(a): Association between the ART adherence gain score with demographic variables of HIV infected adolescents/ caregivers in experimental group.

S. No.	Demographic variables		No.	ART Adherence Gain Score						One way ANOVA/ t-test
				Pretest		Posttest		Gain score Post - Pre test score		
				Mean	SD	Mean	SD	Mean	SD	
1.	**Age of adolescents**	10 -12 years	60	82.84	10.75	97.73	2.74	15.89	9.09	**F=3.02 P=0.05* S**
		13 -15 years	91	86.42	9.26	99.67	1.26	13.25	9.15	
		16 -18 years	44	85.88	10.21	98.63	2.80	11.45	9.95	
2.	**Sex**	Male	97	84.31	10.48	99.02	2.24	14.71	9.77	**t=2.13 P=0.03* S**
		Female	98	85.41	9.76	97.47	2.73	12.06	9.35	
3.	**Education**	Primary	44	86.93	9.95	99.55	1.81	12.61	8.99	F=0.24 P=0.87 **NS**
		Middle	77	84.94	10.24	98.83	2.68	13.90	9.75	
		Secondary	59	85.17	10.17	98.22	2.59	13.05	9.83	
		Higher secondary	15	83.67	9.90	98.00	2.54	14.33	9.61	
4.	**Religion**	Hindu	165	84.73	10.20	98.52	2.66	13.79	9.63	F=1.33 P=0.26 **NS**
		Muslim	26	89.42	8.29	100.00	.00	10.58	8.29	
		Christian	4	85.00	12.91	100.00	.00	15.00	12.91	
5.	**Age of caregivers**	20 -35 years	49	84.11	10.71	100.10	2.79	15.99	9.35	**F=3.06 P=0.05* S**
		36 -50 years	136	85.11	10.71	98.35	2.79	13.24	9.17	
		> 50 years	10	88.50	13.34	98.50	2.42	10.00	10.30	
6.	**Sex**	Male	59	85.11	10.28	97.15	2.73	12.04	9.84	**t=1.98 P=0.05* S**
		Female	136	85.93	9.71	100.76	1.57	14.83	8.89	
7.	**Relationship with adolescents**	Father	24	85.00	10.62	98.15	2.83	13.15	9.98	**F=2.04 P=0.04* S**
		Mother	52	82.75	8.88	100.23	2.04	17.48	7.89	
		Caregiver	119	86.92	9.35	98.01	1.18	11.09	9.20	
8.	**Education**	No formal education	38	87.37	10.95	99.47	1.94	12.11	10.11	F=0.81 P=0.44 **NS**
		School level	97	84.74	10.22	98.97	2.16	14.23	9.69	
		College level	60	85.08	9.32	97.92	3.09	12.83	8.94	
9	**Occupation**	Employed	85	87.24	9.90	99.65	1.50	12.41	9.37	F=1.09 P=0.33 **NS**
		Not Employed	28	82.14	10.67	97.50	3.47	15.36	10.80	
		Not applicable	82	84.51	9.83	98.23	2.65	13.72	9.26	
10.	**Annual income**	< Rs.12000	31	83.87	11.95	97.42	3.62	13.55	11.12	F=0.17 p=0.91 **NS**
		Rs.12000 - 24000	70	86.50	9.94	99.71	1.17	13.21	9.67	
		> Rs.24000	12	88.33	6.85	100.00	.00	11.67	6.85	
		Not applicable	82	84.51	9.83	98.23	2.65	13.72	9.26	
11.	**Residence**	Rural	88	86.14	9.67	101.06	1.56	14.92	9.05	**t=1.97 P=0.05* S**
		Urban	107	85.82	10.43	98.04	2.89	12.22	9.98	

Not significant P >0.05, * significant at P ≤ 0.05

5.5.1(b) Association between the ART adherence gain score with demographic variables of HIV infected adolescents/caregivers in control group

S. No.	Demographic variables		No.	ART adherence gain score						One way ANOVA /t-test
				Pretest		Posttest		Gain score Post test-Pre test score		
				Mean	SD	Mean	SD	Mean	SD	
1.	**Age of adolescent**	10 -12 years	68	86.03	9.87	89.56	7.21	3.53	11.94	F=0.70
		13 -15 years	78	84.62	9.07	90.26	6.97	5.64	11.99	P=0.49
		16 -18 years	47	86.60	10.53	92.45	5.30	5.85	13.20	**NS**
2.	**Sex**	Male	109	84.68	9.98	89.40	6.93	4.72	13.09	t=0.28
		Female	84	86.79	9.27	92.02	6.26	5.24	11.16	P=0.77 **NS**
3.	**Education**	Primary	43	86.86	9.20	88.84	6.71	1.98	11.24	F=1.43
		Middle	85	84.71	9.74	90.47	7.26	5.76	12.64	P=0.28
		Secondary	50	86.80	8.85	91.80	5.60	5.00	10.35	**NS**
		H.Secondary	15	83.00	13.20	91.67	6.99	8.67	17.37	
4.	**Religion**	Hindu	148	86.42	9.49	90.44	6.70	4.02	12.03	F=1.08
		Muslim	36	82.92	10.65	88.36	5.79	5.44	13.30	P=0.33
		Christian	9	82.78	7.55	85.00	8.66	2.22	9.55	**NS**
5.	**Age of caregiver**	20 -35 years	49	86.33	11.12	88.37	7.53	2.04	13.88	F=1.81
		36 -50 years	125	86.12	9.00	91.40	6.37	5.28	11.31	P=0.15
		> 50 years	19	84.26	9.20	90.53	6.21	6.26	12.41	**NS**
6.	**Sex**	Male	65	84.46	10.39	91.00	5.94	6.54	12.68	t=1.28
		Female	128	86.17	9.34	90.31	7.15	4.14	12.01	P=0.20 **NS**
7.	**Relationship with adolescents**	Father	22	87.27	9.73	92.05	6.48	4.77	10.96	F=0.96
		Mother	43	85.47	11.69	92.67	6.93	7.21	13.02	P=0.38
		Caregiver	128	85.35	9.01	89.57	6.58	4.22	12.21	**NS**
8.	**Education**	No formal education	53	86.79	10.15	89.81	6.86	3.02	13.10	F=1.10
		School level	94	85.53	9.05	91.17	7.20	5.64	11.48	P=0.33 **NS**
		College level	46	84.35	10.52	90.11	5.63	5.76	12.82	
9.	**Occupation**	Employed	94	86.91	9.01	89.31	7.17	2.39	11.59	F=0.90
		Not Employed	21	87.86	10.44	93.10	6.80	5.24	9.15	P=0.41 **NS**
		Not applicable	78	84.40	10.02	91.35	5.96	6.95	13.18	
10.	**Annual income**	< Rs.12000	25	87.20	8.67	87.20	5.02	.00	10.99	F=1.99
		Rs.12000 - 24000	83	85.54	9.78	90.18	7.55	4.64	12.68	P=0.11 **NS**
		> Rs.24000	7	90.00	11.55	97.14	3.93	7.14	10.75	
		Not applicable	78	84.74	9.80	91.41	5.97	6.67	12.05	
11.	**Residence**	Rural	90	86.89	8.20	90.44	6.16	3.56	10.97	t=1.48
		Urban	103	84.47	10.78	90.63	7.27	6.17	13.21	P=0.14 **NS**

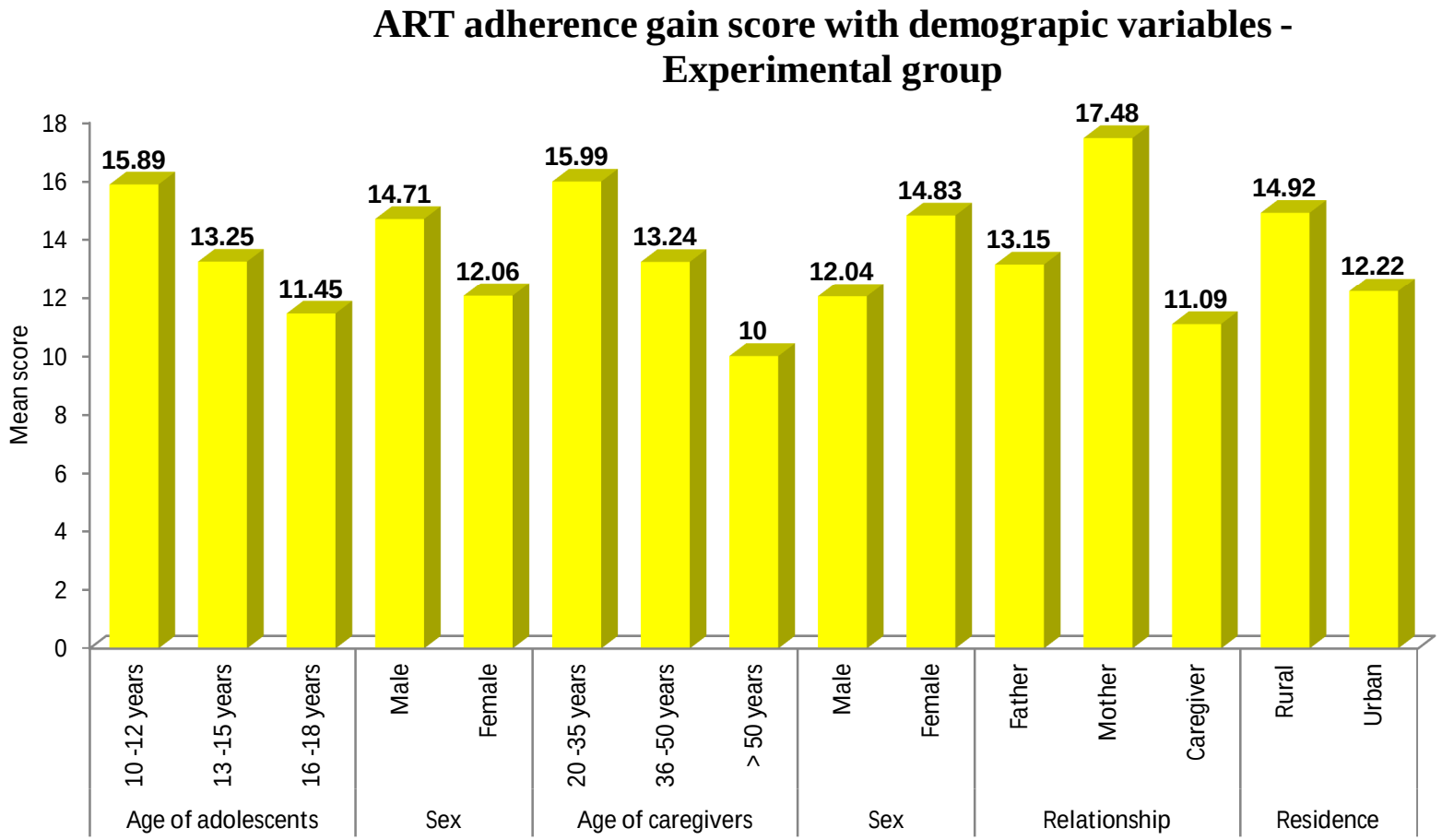
Not significant P > 0.05

Table 5.5.1(a) shows association between the ART adherence gain score with demographic variables of HIV infected adolescents / caregivers in experimental group. In that, the age and sex of adolescent, caregiver's age, sex, relationship with adolescents and residence variables are shows significant association with adherence gain score. Regarding age and sex of adolescents, the younger age of 10-12 years and males are gained high gain score of 15.89 and 14.71 and it is significant at the $p \leq 0.05^*$ and 0.03^*. In consideration with caregivers age and sex, the younger age of 20-35 years and females gained high gain score of 15.99 and 14.83 are significant at $p \leq 0.05^*$.

In regard to relationship with adolescents and residential area, the high gain score of 17.48 and 14.99 is seen with mothers and adolescents residing in rural areas. It is significant at $p \leq 0.04^*$ and 0.05^* respectively. The rest of other demographic variables are not associated with adherence gain score. This table reveals that, there is a significant association between the adherence levels of HIV infected adolescents with specific demographic variables of HIV infected adolescents/caregivers.

Table 5.5.1(b) shows association between the ART adherence gain score with demographic variables of HIV infected adolescent/ caregivers in control group. The gain score difference is not significant in one way analysis of variance F-test and student independent test. Here none of the variables are significant with adherence gain score.

Fig 5.5.1(a): Association of ART adherence gain score with demographic variables of HIV Infected adolescents/care givers in experimental group



5.5.2: Associates the nutritional status with demographic variables of HIV infected adolescents /caregivers in both groups

5.5.2(a): Association between the nutritional status with demographic variables of HIV infected adolescents/ caregivers in experimental group.

S. No.	Demographic variables		Normal		Malnourished		Total	Chi square test
			No.	%	No.	%		
1.	**Age of adolescents**	10 -12years	55	91.7%	5	8.3%	60	χ^2=15.85
		13 -15years	76	83.5%	15	16.5%	91	P=0.001***
		16 -18years	27	61.4%	17	38.6%	44	**S**
2.	**Sex**	Male	78	80.4%	19	19.6%	97	χ^2=0.05
		Female	80	81.6%	18	18.4%	98	P=0.82
								NS
3	**Education**	Primary	41	93.2%	3	6.8%	44	
		Middle	67	87.0%	10	13.0%	77	χ^2=15.44
		Secondary	41	69.5%	18	30.5%	59	P=0.001***
		H.secondary	9	60.0%	6	40.0%	15	**S**
4.	**Religion**	Hindu	129	78.2%	36	21.8%	165	χ^2=5.68
		Muslim	25	96.2%	1	3.8%	26	P=0.06
		Christian	4	100.0%			4	**NS**
5.	**Age of caregivers**	20 -35years	46	93.9%	3	6.1%	49	χ^2=7.10
		36 -50years	105	77.2%	32	22.8%	136	P=0.03*
		> 50 years	8	80.0%	2	20.0%	10	**S**
6.	**Sex**	Male	41	69.4%	18	30.6%	59	χ^2=7. 32
		Female	117	86.0%	19	14.0%	136	P=0.01**
								S
7.	**Relationship with adolescents**	Father	20	83.3%	4	16.7%	24	χ^2=6.64
		Mother	48	92.3%	4	7.7%	52	P=0.04*
		Caregivers	90	75.6%	29	24.4%	119	**S**
8.	**Education**	No formal education	30	78.9%	8	21.1%	38	χ^2=0.33
		Scholl level	78	80.4%	19	19.6%	97	P=0.84
		college level	50	83.3%	10	16.7%	60	**NS**
9.	**Occupation**	Employed	70	82.4%	15	17.6%	85	
		Not Employed	20	71.4%	8	28.6%	28	χ^2=3.43
		Not applicable	72	87.8%	11	12.2%	82	P=0.17
								NS
10.	**Annual income**	< Rs.12000	24	77.4%	7	22.6%	31	
		Rs.12000 - 24000	56	80.0%	14	20.0%	70	χ^2=0.54
		> Rs.24000	10	83.3%	2	16.7%	12	P=0.90
		Not applicable	68	82.9%	14	17.1%	82	**NS**
11.	**Residence**	Rural	77	87.5%	11	12.5%	88	**χ^2=4.37**
		Urban	81	75.7%	26	24.3%	107	**P=0.05***
								S

Not significant P >0.05, * significant at P≤0.05, * very high significant at P≤0.001**

5.5.2(b) : Association between the nutritional status with demographic variables of HIV infected adolescents / caregivers in control group

S. No.	Demographic variables		Normal		Malnourished		Total	Chisquare test
			No.	%	No.	%		
1.	**Age of adolescents**	10 -12 years	54	79.4%	14	20.6%	68	χ^2=3.42
		13 -15 years	56	71.8%	22	28.2%	78	P=0.18
		16 -18 years	30	63.8%	17	36.2%	47	**NS**
2.	**Sex**	Male	85	78.0%	24	22.0%	109	χ^2=3.72
		Female	55	65.5%	29	34.5%	84	P=0.6 **NS**
3.	**Education**	Primary	35	81.4%	8	18.6%	43	χ^2=6.55 P=0.08 **NS**
		Middle	65	76.5%	20	23.5%	85	
		Secondary	30	60.0%	20	40.0%	50	
		H.secondary	10	66.7%	5	33.3%	15	
4.	**Religion**	Hindu	108	73.0%	40	27.0%	148	χ^2=4.77
		Muslim	23	63.9%	13	36.1%	36	P=0.09
		Christian	9	100.0%			9	**NS**
5.	**Age of caregivers**	20 -35 years	39	79.6%	10	20.4%	49	χ^2=3.81
		36 -50 years	85	68.0%	40	32.0%	125	P=0.15
		> 50 years	16	84.2%	3	15.8%	19	**NS**
6.	**Sex**	Male	45	69.2%	20	30.8%	65	χ^2=0. 53 P=0.46 **NS**
		Female	95	74.2%	33	25.8%	128	
7.	**Relationship with adolescents**	Father	18	81.8%	4	18.2%	22	χ^2=3.98
		Mother	35	81.4%	8	18.6%	43	P=0.13
		Caregivers	87	67.9%	41	32.1%	128	**NS**
8.	**Education**	No formal education	45	84.9%	8	15.1%	53	χ^2=0.33 P=0.84 **NS**
		School level	69	73.4%	25	26.6%	94	
		College level	26	56.5%	20	43.5%	46	
9.	**Occupation**	Employed	69	73.4%	25	26.6%	94	χ^2=5.07 P=0.08 **NS**
		Not Employed	11	52.4%	10	47.6%	21	
		Not applicable	60	76.9%	18	23.1%	78	
10.	**Annual income**	< Rs.12000	19	76.0%	6	24.0%	25	χ^2=7.36 P=0.06 **NS**
		Rs.12000 - 24000	67	80.7%	16	19.3%	83	
		> Rs.24000	4	57.1%	3	42.9%	7	
		Not applicable	49	62.8%	29	37.2%	78	
11.	**Residence**	Rural	68	75.6%	22	24.4%	90	χ^2=0.77
		Urban	72	69.9%	31	30.1%	103	P=0.38 **NS**

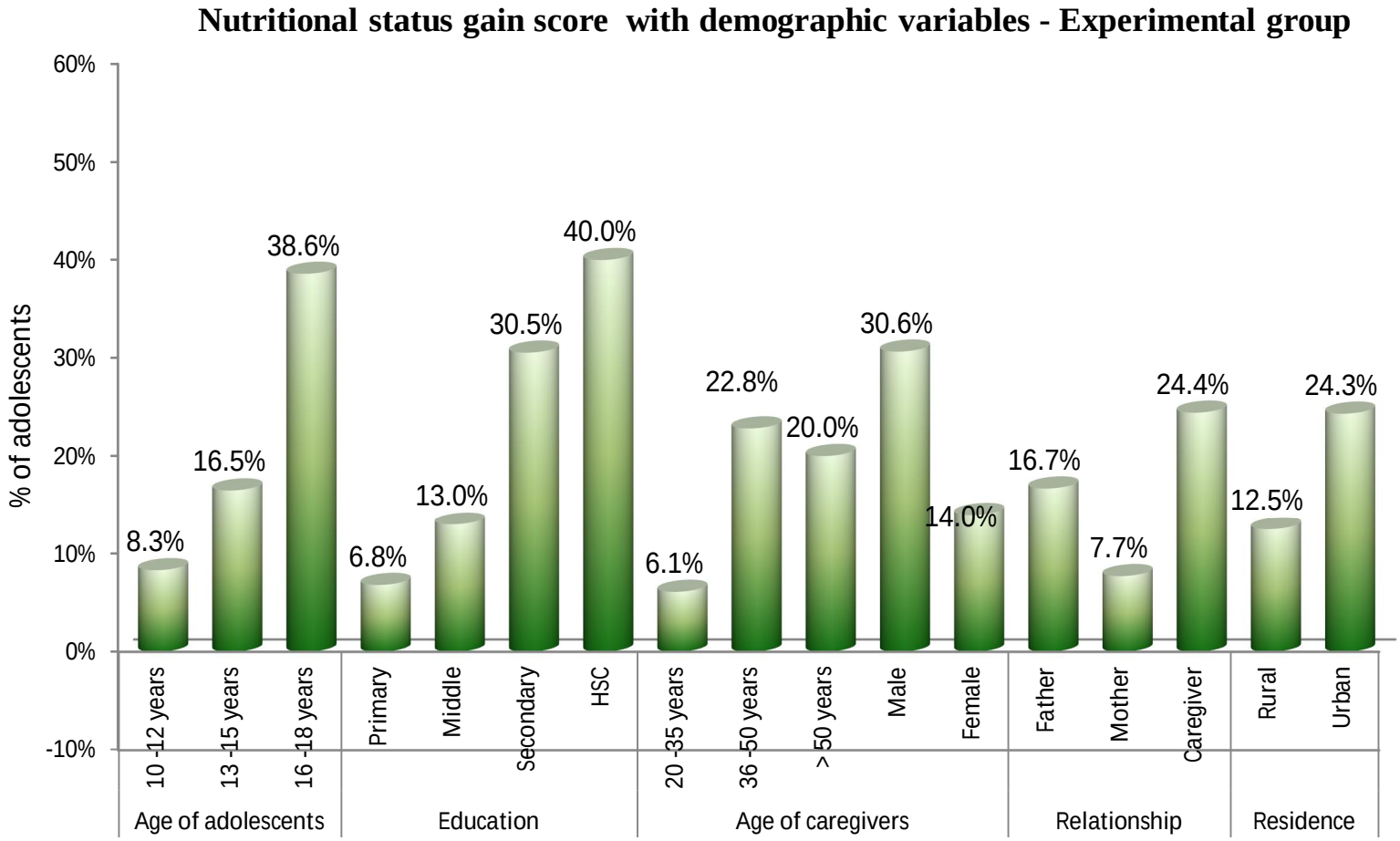
Not significant P >0.05

Table 5.5.2(a) shows association between the nutritional status with demographic variables of HIV infected adolescents/ caregivers in experimental group. In that, the age and education of adolescent, caregiver's age, sex, relationship with adolescents and residence variables are shows significant association with improvement in nutritional status. Regarding adolescents age, the majority of 92% are normal in the younger age of 10-12 years and only 8 % are in malnourished when compare to other age categories and it is significant at p=0.001***. In consideration with education, the highest percentage of 93% and 87 % are normal in primary and middle level educated adolescents and it is significant at p=0.001***.

In regard to caregiver's age, the majority of 94 % are normal in younger age of 20-35 years and it is significant at p=0.03*. In relationship with adolescents, the highest percentage of 92 % were associated with mothers when compare to the other categories and it is significant at 0.04*. In regard to residence, the majority of 88% are associated with rural and it is significant at p=0.05*. The remaining other demographic variables are not associated with nutritional status of HIV infected adolescents. This table finding depicts that there is a significant association between the nutritional status of HIV infected adolescents with specific demographic variables.

Table 5.5.2(b) shows association between the nutritional status with demographic variables of HIV infected adolescents/caregivers in control group. Here none of the variables are significant with nutritional status and it is proved by chi square test.

Fig 5.5.2 (a): Association of nutritional gain score with demographic variables of HIV Infected adolescents/care givers in experimental group.



5.5.3 : Associates the QOL gain score with demographic variables of HIV infected adolescents in both groups.

5.5.3(a): Association between the QOL gain score with specific demographic variables of HIV infected adolescents in experimental group.

S. No.	Demographic variables		No.	QOL gain score						One way ANOVA/ t-test
				Pretest		Posttest		Gain score: Post-pre test score		
				Mean	SD	Mean	SD	Mean	SD	
1.	**Age of adolescents**	10 -12 years	60	163.84	6.25	218.80	19.13	54.96	15.90	F=3.27 P=0.04* **S**
		13 -15 years	91	164.02	5.95	216.51	14.15	52.49	12.06	
		16 -18 years	44	163.00	6.63	211.00	16.07	48.00	13.78	
2.	**Sex**	Male	97	164.03	5.89	218.38	11.99	54.35	10.37	t=2.35 P=0.02* **S**
		Female	98	163.30	6.53	212.92	19.01	49.62	16.87	
3.	**Education**	Primary	44	164.20	6.34	221.80	14.06	57.60	13.13	F=1.51 P=0.21 **NS**
		Middle	77	164.62	5.64	215.70	14.47	51.08	12.85	
		Secondary	59	163.34	6.52	216.80	19.48	53.46	17.26	
		H. secondary	15	162.23	6.61	211.86	13.91	49.64	11.69	
4.	**Religion**	Hindu	165	164.07	5.99	216.30	15.56	52.23	13.98	F=0.20 P=0.81 **NS**
		Muslim	26	160.92	6.94	211.23	19.77	50.31	16.57	
		Christian	4	164.50	7.68	216.75	8.18	52.25	1.89	
5.	**Age of caregiver**	20 -35 years	49	163.31	6.41	221.11	19.12	57.80	15.20	F=3.50 P=0.03* **S**
		36 -50 years	136	163.66	6.21	215.38	15.22	51.72	14.14	
		> 50 years	10	165.40	5.64	216.10	8.80	50.70	4.94	
6.	**Sex**	Male	59	163.25	6.33	213.30	20.03	50.05	11.89	t=1.97 P=0.05***** **S**
		Female	136	163.84	6.18	217.82	14.14	53.98	13.41	
7.	**Relationship with adolescents**	Father	24	163.81	6.18	215.79	15.59	51.98	14.87	F=3.53 P=0.05 ***S**
		Mother	52	164.00	5.99	222.25	18.65	58.25	15.42	
		Caregiver	119	163.17	6.49	212.23	15.31	49.06	10.91	
8.	**Education**	No formal education	38	164.08	5.80	215.00	10.32	50.92	6.68	F=0.27 P=0.76 **NS**
		School level	97	164.03	6.19	216.73	12.98	52.70	10.00	
		College level	60	162.80	6.53	214.27	22.52	51.47	21.65	
9.	**Occupation**	Employed	85	164.47	5.83	215.11	11.40	50.64	7.58	F=2.02 P=0.13 **NS**
		N.Employed	28	162.25	6.81	219.04	10.19	56.79	9.35	
		N.applicable	82	163.30	6.36	215.02	21.14	51.72	19.57	
10.	**Annual income**	< Rs.12000	31	162.65	6.64	218.71	9.64	56.06	9.08	F=1.12 P=0.33 **NS**
		Rs.12000 - 24000	70	164.66	5.67	215.14	12.22	50.49	8.36	
		> Rs.24000	12	162.92	7.17	214.75	7.78	51.83	1.40	
		N.applicable	82	163.30	6.36	215.02	21.14	51.72	19.57	
11.	**Residence**	Rural	88	163.32	6.45	219.51	19.01	56.19	14.75	t=1.99 P=0.05* **S**
		Urban	107	164.08	5.93	216.11	11.70	52.03	14.41	

Not significant P >0.05, * significant at P≤0.05

5.5.3(b) Association between the QOL gain score with specific demographic variables of HIV infected adolescents in control group.

S. No.	Demographic variables		No.	QOL gain score						One way ANOVA/ t-test
				Pretest		Post test		Gain score: Post test-Pre test score		
				Mean	SD	Mean	SD	Mean	SD	
1.	**Age of adolescents**	10 -12 years	68	163.34	4.87	167.03	5.40	3.69	4.86	F=1.35 P=0.26 **NS**
		13 -15 years	78	163.00	5.15	166.01	5.49	3.01	4.22	
		16 -18 years	47	162.21	4.30	164.57	4.68	2.36	3.44	
2.	**Sex**	Male	109	162.44	4.36	165.57	5.01	3.13	4.32	t=0.12 P=0.89**NS**
		Female	84	163.56	5.39	166.61	5.69	3.05	4.30	
3.	**Education**	Primary	43	162.51	4.32	166.09	5.49	3.58	4.67	F=1.11 P=0.34 **NS**
		Middle	85	163.45	5.13	166.88	5.42	3.44	4.69	
		Secondary	50	162.60	4.77	164.82	4.90	2.22	3.26	
		H.Secondary	15	162.27	5.18	164.93	5.24	2.67	3.85	
4.	**Religion**	Hindu	148	163.01	4.80	166.34	5.33	3.33	4.43	F=0.98 P=0.37 **NS**
		Muslim	36	162.42	5.28	164.67	5.44	2.25	3.45	
		Christian	9	163.56	4.36	166.11	4.48	2.56	5.13	
5.	**Age of caregivers**	20 -35 years	49	161.37	3.23	165.06	5.01	3.69	5.01	F=1.79 P=0.16 **NS**
		36 -50 years	125	163.49	5.34	166.11	5.54	2.62	3.93	
		> 50 years	19	163.26	4.24	165.32	4.88	2.05	3.75	
6.	**Sex**	Male	65	162.08	4.61	164.98	5.14	2.91	4.25	t=0.42 P=0.67 **NS**
		Female	128	163.36	4.93	166.55	5.36	3.19	4.34	
7.	**Relationship with adolescents**	Father	22	161.36	4.40	165.36	5.09	4.00	3.77	F=0.63 P=0.53 **NS**
		Mother	43	162.28	4.60	165.49	5.62	3.21	3.17	
		Caregiver	128	163.41	4.96	166.31	5.29	2.90	4.70	
8	**Education**	No formal education	53	162.96	4.64	165.75	5.06	2.79	4.10	F=1.10 P=0.33 **NS**
		School level	94	163.81	5.37	166.67	5.31	2.86	4.08	
		College level	46	161.09	3.31	165.00	5.58	3.91	4.92	
9.	**Occupation**	Employed	94	162.20	4.26	165.87	5.41	3.67	4.52	F=1.68 P=0.18 **NS**
		N.Employed	21	165.62	4.59	168.00	4.66	2.38	3.29	
		N.Applicable	78	163.08	5.35	165.67	5.34	2.59	4.22	
10.	**Annual Income**	Rs.12000	25	161.96	2.99	166.80	5.37	4.84	5.47	F=1.17 P=0.32 **NS**
		Rs.12000 - 24000	83	162.45	4.47	165.45	5.09	3.00	4.09	
		> Rs.24000	7	159.86	3.39	163.00	4.16	3.14	4.49	
		N. applicable	78	164.03	5.58	166.33	5.53	2.31	3.78	
11.	**Residence**	Rural	90	164.24	5.32	167.18	5.35	2.93	4.80	t=0.48 P=0.63 **NS**
		Urban	103	161.78	4.09	165.01	5.12	3.23	3.83	

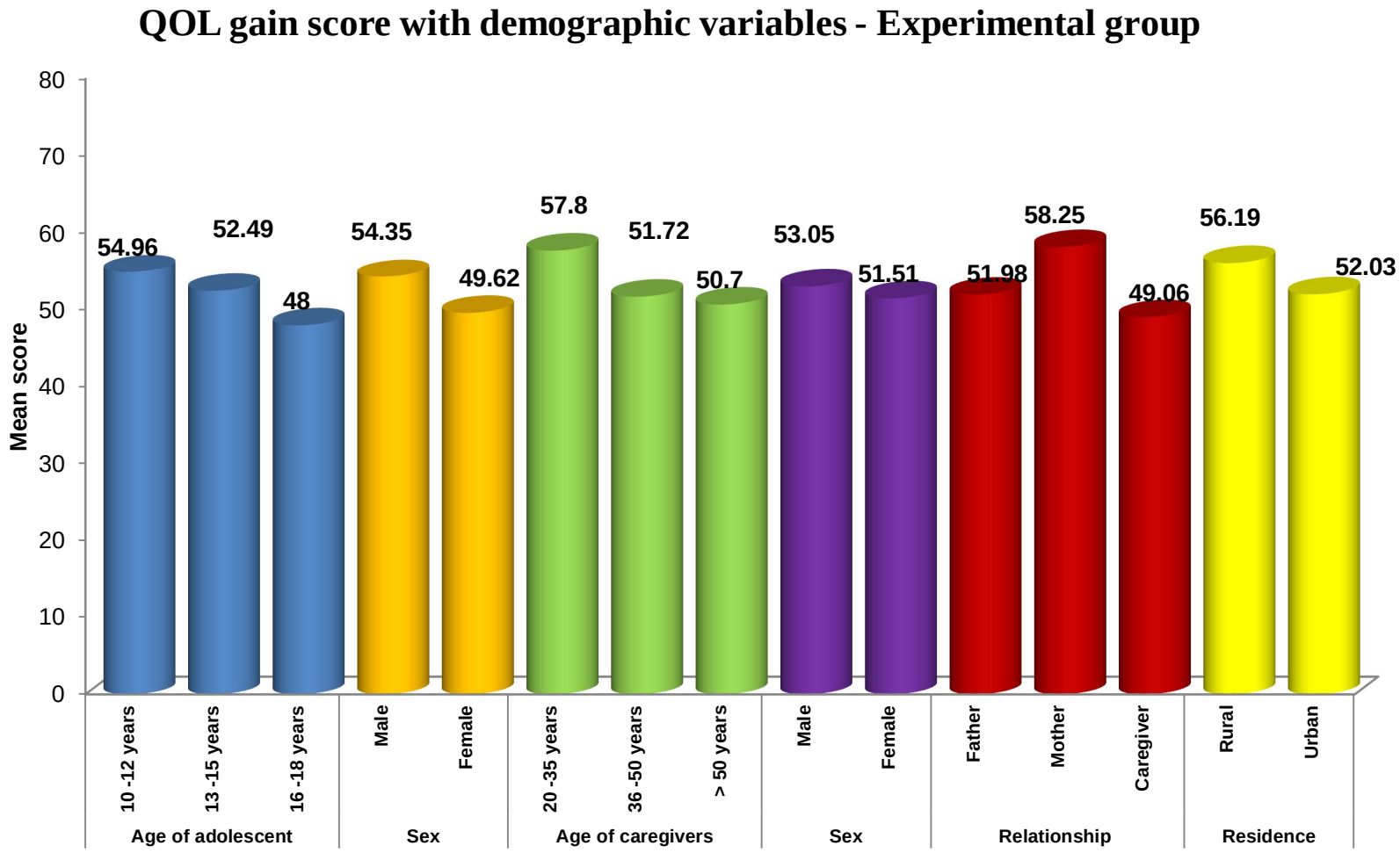
Not significant P >0.05

Table 5.5.3(a) shows association between the QOL gain score with demographic variables of HIV infected adolescents/ caregivers in experimental group. In that, the age and sex of adolescent, caregiver's age, sex, relationship with adolescents and residence variables shows significant association with QOL gain score. Regarding age and sex of adolescents, the younger age of 10-12 years and males are gained high gain score of 54.96 and 54.35 when compare to the other categories and it is significant at the p value of 0.04 * and 0.02*.

In consideration with caregivers age and sex , the younger age of 20-35 years are gained high gain score of 57.80 and it is significant at p=0.03* and in caregivers sex females are gained little more than males i.e., 53.98 and it is significant at p=0.05*. In regard to relationship with adolescents and residential area, the high gain score of 58.25 and 56.19 are seen with mothers and rural areas and it is significant at p=0.05*. The rest of the other demographic variables are not associated with QOL gain score. This table reveals that there is a significant association between the QOL of HIV infected adolescents with specific demographic variables of HIV infected adolescents /caregivers.

Table 5.5.3(b) shows association between the QOL gain score with demographic variables of HIV infected adolescents/ caregivers in control group. The gain score difference is not significant in one way analysis of variance F-test and student independent test. Here none of the variables are significant with QOL gain score.

Fig 5.5.3 (a): Association of QOL gain score with demographic variables of HIV Infected adolescents/care givers in experimental group.



SECTION VI

5.6: This section identifies the influencing factors for HIP components by using Uni and multivariate logistic regression in experimental group of HIV infected adolescents/caregivers

5.6.1: Identification the influencing factors for ART adherence by using Uni and multivariate analysis in experimental group of HIV infected adolescents/caregivers

5.6.1(a): Influencing factors for ART adherence gain score by using univariate analysis in experimental group of HIV infected adolescents/caregivers

S. No.	Influencing variables		ART Adherence Gain Score				Total	Chi square test	Odds Ratio (95%CI)
			Below average (≤13.38)		Above average (>13.38)				
			No.	%	No.	%			
1.	**Age**	< 15years	68	45.0%	83	55.0%	151	χ^2=5.94	**2.4**
		>15 years	29	65.9%	15	34.1%	44	**p=0.01****	**(1.1 -5.1)**
2.	**Sex**	Male	40	15.5%	57	84.5%	97	χ^2=5.59	**2.0**
		Female	57	56.2%	41	43.8%	98	**p=0.02***	**(1.1 -3.6)**
3.	**Age of caregivers**	< 35years	20	15.5%	39	84.5%	49	χ^2=9.58	**2.9**
		> 35years	77	56.2%	59	43.8%	146	**p=0.01****	**(1.4 -6.2)**
4.	**Sex of caregivers**	Female	20	33.8%	39	66.2%	59	χ^2=8.50	**2.5**
		Male	77	56.7%	59	43.3%	136	**p=0.01****	**(1.3 -5.1)**
5.	**Relationship with adolescents**	Parents	29	38.2%	47	61.8%	76	χ^2=6.69	**2.2**
		Caregivers	68	57.1%	51	42.9%	119	**p=0.01****	**(1.2- 4.1)**
6.	**Residence**	Rural	31	35.2%	57	64.8%	88	χ^2=14.49	**3.1**
		Urban	67	62.6%	40	37.4%	107	**p=0.001*****	**(1.6 -5.8)**

**** significant at P≤0.01, *** very high significant at P≤0.001**

Table 5.6.1(a) shows the influencing factors for ART adherence gain score by using Uni variate analysis in experimental group. In regard to the adolescents age with gain score, the majority of 83 participants (55%) of below 15 years are gained the above the average and majority of 66 % of above 15 years are gained below the average of gain score. It is significant at p=0.01** with OR 2.4 with 95% CI. In relevant to adolescents gender with gain score, the majority 85 % of males gained above the average and 56 % of females are gained the below level and it is significant at p=0.02* with OR 2.0 with 95% CI. Considering with caregivers age & sex with gain score, the majority 85 % and 66% adolescents who were taken care by below 35 years with females are gained above the average of gain score and it is significant at p=0.01* with OR 2.9 & 2.5 respectively with 95 % CI. In concern of relationship with adolescents, 62% adolescents who are residing with parents are gained the above

the average gain score and it is significant at p=0.01** with OR 2.2 with 95% CI. In pertain to residence, the majority 65 % of adolescents from rural areas is gained above the average of gain score and it is highly significant at p=0.001*** with OR 3.1 (1.6-5.8).

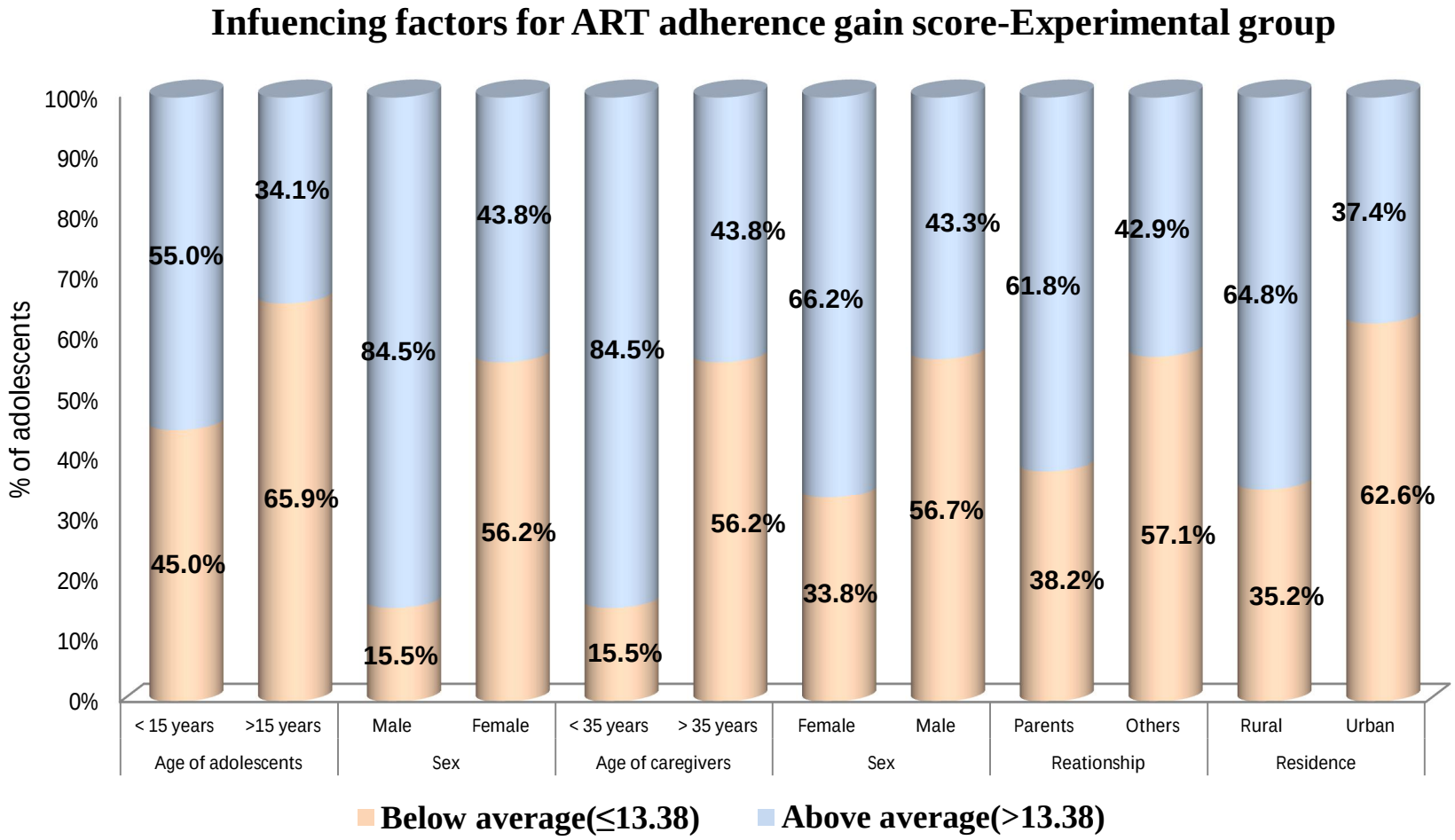
5.6.1(b): Influencing factors for ART adherence gain score by using Uni and Multi variate logistic regression analysis in experimental group of HIV infected adolescents/caregivers

S. No.	Influencing variables	Uni-variate analysis		Multivariate analysis	
		p-value	Unadjusted OR (95%CI)	p-value	Adjusted OR (95%CI)
1.	**Age** (<15 years Vs > 15 years)	0.01**	2.4 (1.1 -5.1)	0.02*	2.2 (1.1 - 4.6)
2.	**Sex** (Male Vs Female)	0.02*	2.0 (1.1 -3.6)	0.01**	1.7 (1.1 - 5.9)
3.	**Age of caregiver** (<35 years Vs > 35years)	0.01**	2.9 (1.4 -6.2)	0.03*	2.2 (1.3 - 4.8)
4.	**Sex of caregiver** (Female Vs Male)	0.01*	2.5 (1.3 -5.1)	0.60	1.3 (0.4 - 8.2)
5.	**Relationship with adolescents** (Parents Vs caregivers)	0.01**	2.2 (1.2- 4.1)	0.02*	1.8 (1.3 - 5.2)
6.	**Residence** (Rural Vs Urban)	0.001***	3.1 (1.6 -5.8)	0.18	1.5 (0.3 - 5.7)

**** significant at P≤0.05, *** very high significant at P≤0.001**

Table 5.6.1(b) shows the influencing factors for ART adherence gain score by using uni and multivariate logistic regression analysis in experimental group. In univariate analysis, the influencing factors of adolescents age & sex, age & sex of caregivers, relationship with adolescents and residence are significant with unadjusted OR with 95 % CI. Whereas in multivariate analysis, the sex of caregivers and residence are not significant at p= 0.60 and 0.18 with adjusted OR 1.3 & 1.5 respectively. The rest of other variables are more significant with adjusted OR with 95 % CI.

Fig5.6.1 (a): Influencing factors for ART adherence gain score by Uni and Multi variate analysis of HIV infected adolescents/care givers in experimental group.



5.6.2: Identification of the influencing factors for nutritional gain score by using Uni and multivariate analysis in experimental group of HIV infected adolescents/caregivers.

5.6.2(a) : Influencing factors for nutritional gain score by using Univariate analysis in experimental group of HIV infected adolescents/caregivers.

S. No.	Influencing variables		Nutrition gain score				Total	Chi square test	Odds Ratio (95%CI)
			Normal		Malnutrition				
			No.	%	No.	%			
1.	**Age**	< 15 years	131	65.0%	20	35.0%	151	χ^2=14.29 **p=0.001*** **	**4.1 (1.8-9.5)**
		>15 years	27	47.1%	17	52.9%	34		
2.	**Education**	Up to middle	108	56.8%	13	43.2%	121	χ^2=14.05 **p=0.001*** **	**3.9 (1.8-9.1)**
		Above middle	50	41.4%	24	58.6%	74		
3.	**Age of caregivers**	< 35 years	46	57.0%	3	43.0%	49	χ^2=6.94 **p=0.01****	**4.6 (1.3-19.8)**
		> 35 years	113	39.6%	34	60.4%	147		
4.	**Sex of caregivers**	Female	117	60.7%	19	39.3%	136	χ^2=7.32 **p=0.01****	**2.7 (1.1-6.0)**
		Male	41	43.0%	18	57.0%	59		
5.	**Relationship with adolescent**	Parents	68	56.9%	8	43.1%	76	χ^2=5.78 **p=0.02***	**2.7 (1.1-6.9)**
		Others	90	42.5%	29	57.5%	119		
6.	**Residence**	Rural	77	52.1%	11	47.9%	88	χ^2=4.37 **p=0.04***	**2.2 (1.0-5.2)**
		Urban	81	22.2%	26	77.8%	107		

**** significant at P≤0.01, *** very high significant at P≤0.001**

Table 5.6.2(a) shows the influencing factors for nutrition gain score by using uni variate analysis in experimental group. In regard to the adolescent's age with gain score, the majority of 131 participants (65%) of below 15 years are in normal and 53% of above 15 years are in malnourished level. It is highly significant at p=0.001*** with OR 4.1 with 95% CI. In relevant to adolescents education with gain score, the majority of 108 participants (56.8 %) are normal in middle level of education and it is highly significant at p=0.001*** with OR 3.9 with 95% CI.

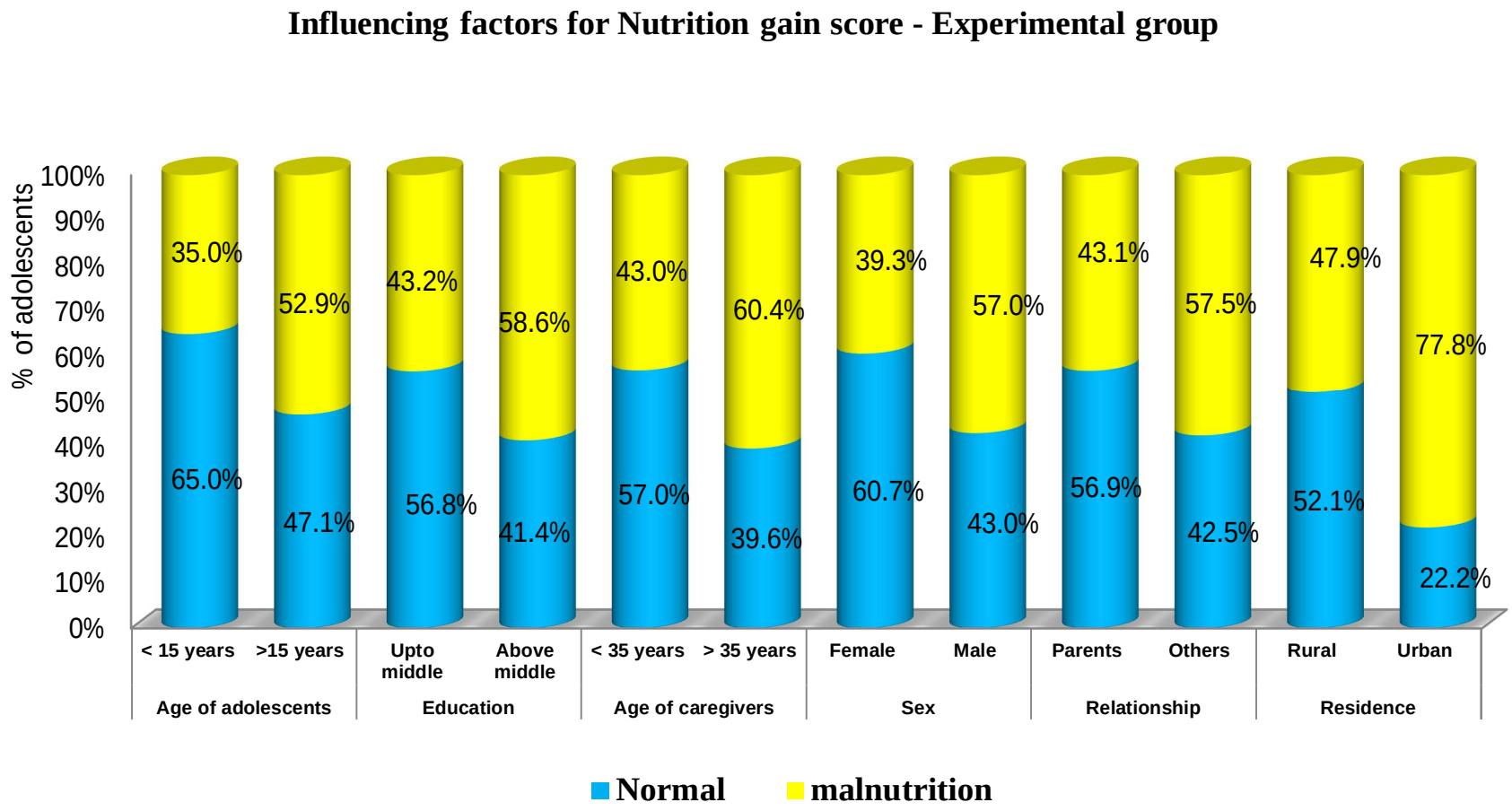
Considering with caregivers age & sex with gain score, the 57% adolescents who were taken care by below 35 years of females are in normal state and it is significant at p=0.01* with OR 2.9 & 2.5 respectively with 95 % CI. In concern of relationship with adolescents, 60 % adolescents residing with parents are in normal state and it is significant at p=0.02* with OR 2.7 with 95% CI. In pertain to residence, the majority 52% of adolescents from rural areas are in normal status and 78% of adolescents from urban areas are malnourished and it is significant at p=0.04*** with OR 2.2 (1.6- 5.8).

5.6.2(b) : Influencing factors for nutrition gain score by using Uni and Multivariate logistic regression analysis in experimental group of HIV infected adolescents/caregivers

S. No.	Influencing variables	Uni variate analysis		Multivariate analysis	
		p-value	Unadjusted OR (95%CI)	p-value	Adjusted OR (95%CI)
1.	**Age** (<15 years Vs > 15 years)	0.001***	4.1 (1.8 - 9.5)	0.01**	2.2 (1.1 – 6.2)
2.	**Education** (Up to middle Vs Above middle)	0.001***	3.9 (1.8 - 9.1)	0.01**	2.1 (1.1 - 5.9)
3.	**Age of caregiver** (<35 years Vs > 35years)	0.01**	4.6 (1.3 -19.8)	0.05*	1.3 (1.2 -3.8)
4.	**Sex of caregiver** (Female Vs Male)	0.01**	2.7 (1.1 - 6.0)	0.14	1.5 (0.7 – 8.2)
5.	**Relationship with adolescent** (Parents Vs others)	0.02*	2.7 (1.1- 6.9)	0.05*	1.2 (1.1– 3.2)
6.	**Residence** (Rural Vs Urban)	0.04*	2.2 (1.0 - 5.2)	0.33	0.5 (0.9-6.2)

Table 5.6.2 (b) shows the influencing factors for nutrition gain score by using uni and multivariate logistic regression analysis in experimental group. In univariate analysis, the influencing factors of adolescents age & sex, age & sex of caregivers, relationship with adolescents and residence are significant with unadjusted OR with 95 % CI. Whereas in multivariate analysis, the sex of caregiver and residence are not significant at p= 0.14 and 0.33 with adjusted OR 1.5 & 0.5 respectively. The rest of other variables are more significant with adjusted OR with 95 % CI.

Fig5.6.2 (a) : Influencing factors for Nutritional gain score by Uni and Multi variate analysis of HIV infected adolescents/care givers in experimental group.



5.6.3 : Identification of the influencing factors for QOL gain score by using Uni and Multivariate analysis in experimental group of HIV infected adolescents/caregivers.

5.6.3(a): Identification of the influencing factors for QOL gain score by using Uni variate analysis in experimental group of HIV infected adolescents/caregivers.

S. No.	Influencing variables		QOL gain score				Total	Chi square test	Odds Ratio (95%CI)
			Below average (≤51.97)		Above average (>51.97)				
			No.	%	No.	%			
1.	**Age**	< 15 years	67	44.4%	84	55.6%	151	χ^2=7.73	2.7
		>15 years	30	68.2%	14	31.8%	44	**p=0.01****	(1.3 -5.8)
2.	**Sex**	Male	37	38.2%	60	61.8%	97	χ^2=10.39	2.6
		Female	60	61.2%	38	38.8%	98	**p=0.001*****	(1.4 -5.0)
3.	**Age of caregivers**	< 35 years	16	32.7%	33	67.3%	49	χ^2=7.65	2.6
		> 35 years	81	55.4%	65	44.2%	146	**p=0.01****	(1.2 -5.4)
4.	**Sex of caregiver**	Female	22	37.3%	37	52.7%	59	χ^2=5.25	2.1
		Male	75	55.1%	61	44.9%	136	**p=0.02***	(1.1 -4.1)
5.	**Relationship with adolescents**	Parents	29	38.2%	47	61.8%	76	χ^2=6.69	2.2
		Others	68	58.0%	51	42.0%	119	**p=0.01****	(1.2- 4.1)
6.	**Residence**	Rural	34	38.6%	54	61.4%	88	χ^2=7.91	2.3
		Urban	63	58.9%	44	51.1%	107	**p=0.01****	(1.1 -4.2)

Table 5.6.3 (a) shows the influencing factors for QOL gain score by using univariate analysis in experimental group. In regard to the QOL gain score, the majority 84 participants (56%) of below 15 years are gained the above the average and majority 68 % of above 15 years are gained below the average of gain score. It is significant at p=0.01** with OR 2.7 with 95% CI. In relevant to adolescents gender with gain score, the majority 62 % of males are gained above the average and 61% of females are gained the below level and it is significant at p=0.001* with OR 2.6 with 95% CI.

Considering with caregivers age & sex with gain score, the majority 67% and 45% of adolescents who are taken care by below 35 years with females are gained above the average of gain score. It is significant at p=0.01* and 0.02* with OR 2.9 & 2.5 respectively with 95% CI. In concern of relationship with adolescents, 62% of adolescents who are residing with parents are gained the above the average gain score and it is significant at p=0.01** with OR 2.2 with 95% CI. In pertain to residence, the

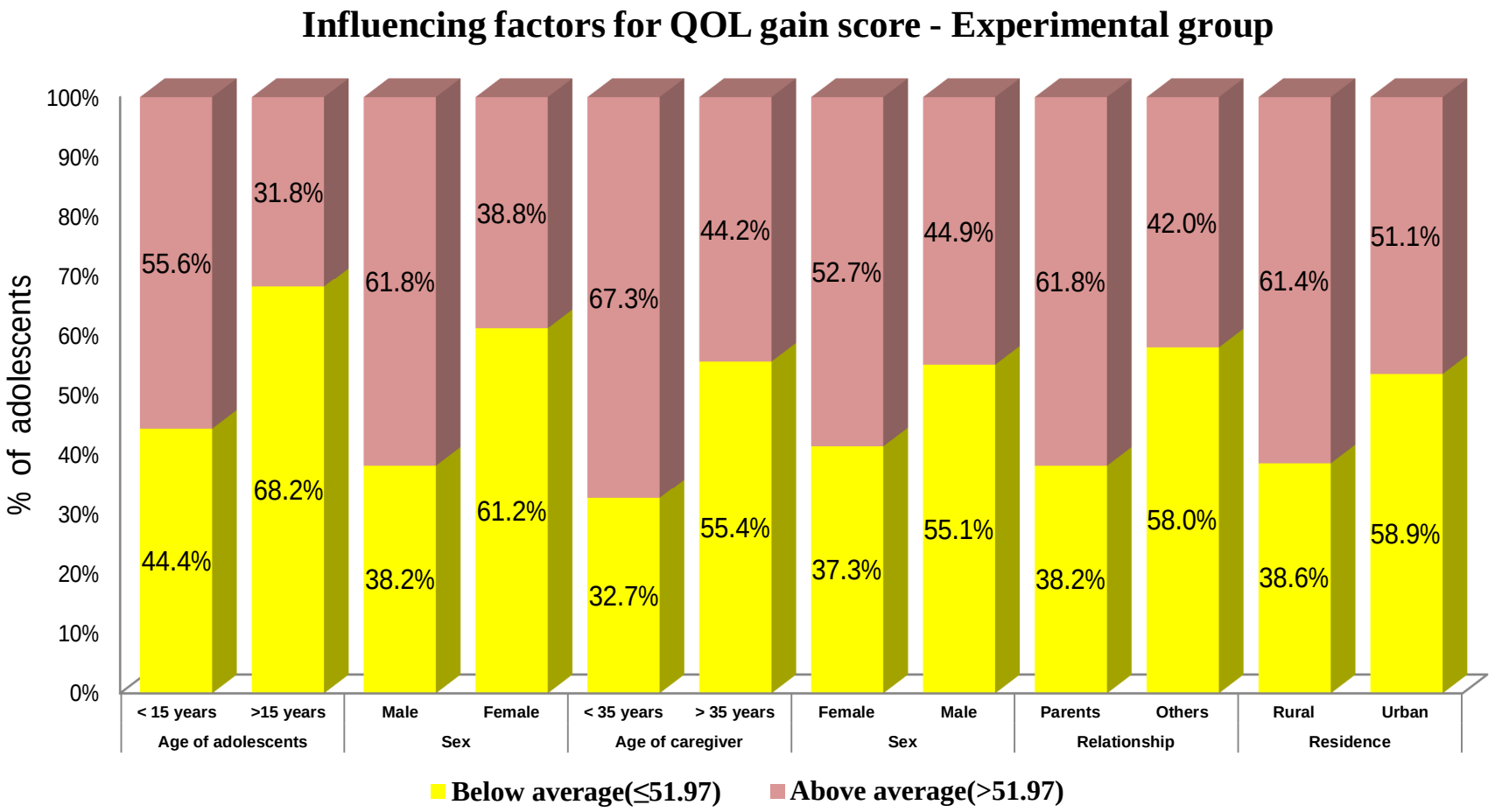
majority 62% of adolescents from rural areas is gained above the average of gain score and it is highly significant at p=0.01** with OR 2.3 (1.6-5.8).

5.6.3(b): Identification of the influencing factors for QOL gain score by using Uni and Multi variate logistic regression analysis in study group

S. No.	Influencing variables	Uni variate analysis		Multivariate analysis	
		p-value	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)
1.	**Age** (<15 years Vs > 15 years)	0.01**	2.7 (1.3 - 5.8)	0.03*	2.2 (1.2 - 4.9)
2.	**Sex** (Male Vs Female)	0.001***	2.6 (1.4 - 5.0)	0.01**	2.0 (1.1 - 4.9)
3.	**Age of caregiver** (<35 years Vs > 35years)	0.01**	2.6 (1.2 - 5.4)	0.02*	2.1 (1.2 - 5.1)
4.	**Sex of caregiver** (Female Vs Male)	0.02*	2.1 (1.1 - 4.1)	0.60	1.3 (0.7 - 6.9)
5.	**Relationship with adolescent** (Parents Vs others)	0.01**	2.2 (1.2 - 4.1)	0.02*	1.8 (1.2 - 5.9)
6.	**Residence** (Rural Vs Urban)	0.01**	2.3 (1.1 - 4.2)	0.14	1.5 (0.4 - 5.2)

5.6.3 (b) table shows the influencing factors for QOL gain score by using uni and multivariate logistic regression analysis in experimental group. In uni variate analysis, the influencing factors of adolescents age & sex, age & sex of caregivers, relationship with adolescent and residence are significant with unadjusted OR with 95% CI. Whereas in multivariate analysis, the sex of caregivers and residence are not significant at p=0.60 and 0.3 with adjusted OR 1.3 & 1.5 respectively. The rest of other variables are more significant with adjusted OR with 95 % CI.

Fig 5.6.3 (a): Influencing factors for QOL gain score by Uni and Multi variate analysis of HIV infected adolescents/care givers in experimental group.



Chapter - VI

Discussion

CHAPTER – VI

DISCUSSION

The aim of argument or discussion should not be victory, but progress.

Joseph Joubert

As the global HIV epidemic cross the threshold of its fourth decade, in the developing world have been made a major advances in HIV prevention and management. One remarkable challenge involves, the increased proportion of HIV infected children who live through school age into adolescence owed to increase with the access of life saving HARRT therapies. But still physical health and activity are very low in HIV infected children/adolescents when compared with non-infected children/adolescents due to non adherence to ART therapy, low immunity, growth stunting and poor QOL.

In this study, the investigator planned to implement the HIV interventional package of counseling related to significance of optimal adherence, importance of nutrition, strategies to enhance their QOL and along with yoga practice in order to improve their physical health and activity of the HIV infected adolescents. However, it has been proved with comparison of groups, the investigator conducted a experimental study to, evaluate the effectiveness of nurse initiated HIV interventional package (HIP) on HIV infected adolescents attending ART clinic in Chennai. The study was conducted in the four ART centres namely, Institute of Child Health and Hospital For Children (ICH) Egmore, Rajiv Gandhi Government General Hospital (RGGGH), Kilpauk Medical College and Hospital, (KMCH) and Government Hospital of Thoracic Medicine (GHTM).

The total of 388 participants was selected by using simple random technique and the samples were divided into experimental (195) and control (193) group. The data was collected from both groups of caregivers / adolescents through in depth interview, observation of hospital records, structured questionnaires and assessments of nutritional status by means of anthropometric measurements. The HIV interventional package (HIP) was given only to experimental group and the selected asana were demonstrated by the researcher whereas in control group received only

conservative care. The data was collected from both groups at '0'month, the 3rd month and the 6th month intervals. At the end of the 6th month the cursory instructions regarding HIP and practice of asana were also given to control group. The investigator adopted the King's goal attainment theory and it was more suitable to interpret the study findings phenomenon in the conceptual framework. The collected data was analyzed by SPSS version 16 by using the descriptive and inferential statistics methods.

The demographic variables of HIV infected adolescents in experimental and control group,

Table 5.1.1(a) showed that, the majority of 91 and 78 (47% and 40%) were in the age group of 13-15years. The mean age of the study group adolescents was 13.6 $\pm$ 2.2 years and the mean age of the control group was 13.8 $\pm$ 2.4 years. In gender wise the majority 97 and 109 (50% and 57%) were males. Regarding the educational status, the majority of 77 and 85 (40% & 44%) were in middle level of education and considering the religion aspect, the majority of 85% and 77% belonged to Hindu respectively in both the groups. The chi square value showed that, all demographic variables distribution of HIV infected adolescents was similar in both groups.

The demographic variables of caregiver's in experimental and control group,

Table 5.1.1 (b) showed that, the majority 136 and 125 (70% and 69%) were in the age group of 36-50 years. The mean age of the caregivers was 44.3 $\pm$ 13.5 years and the control group was 45.5 $\pm$ 12.2 years. In gender wise, the majority 136 and 128 (70% and 66%) were females. In regard to, the relationship of adolescents 61% and 66% of children were taken care by the caregivers and 27% and 22% by the mothers and nearly 12% by fathers in both the groups. Regarding the educational status, nearly 50% of their completed the school level of education and 30% and 24% were completed college level education respectively in both the groups. In consider with occupational status, the majority of 44% and 49% respectively in both groups were employed. The most of the participants i.e., 42% and 40% were living in nongovernmental organization since the annual income was not applicable category. In regard to Residence, nearly half of the participants of and 55% & 53% resided in

urban areas corresponding to both groups. The chi square test proved that, the caregiver's demographic variables distribution of both the groups were similar.

The clinical information of HIV infected adolescents in experimental and control groups includes,

Table 5.1.2(a) showed that, the majority of 55% and 58% were diagnosed as HIV status before 5-10 years and 97% and 98% got the HIV infection through the mother to child transmission respectively in both groups. **Cardoso C.A. (2012)** found the majority (80%) of adolescents had HIV through vertically than behaviorally infected adolescents aged 0-19 years old. This study also observed that significant improvement in patients survival times and a reduction in the number of deaths among patients using HAART.[186] In another Brazilian study, a reduction of 87.8% in the death rate of vertically HIV-infected children was observed from 1994-2002 after the arrival of HARRT.[187] Considering with stage of adolescents, most of the participants (71% & 65%) were in stage I and majority of 67% and 72% were on ART in between 1-5 years. In regard to the history of tuberculosis, nearly half of the participants (55%) had tuberculosis and completed their treatment successfully. This finding was similar in other study, found that TB is being the most common OI for HIV/AIDS and only prompt and appropriate care is essential to treat and cure the infections.[106]

Regarding the disclosure of the status, the majority of the 68 % and 64% of participants respectively didn't know their status in both groups and table 5.1.2 (a-i) showed that, more than 50% of in the age group 10-12 years didn't know their status in both groups. **Rick Lorenz et al (2016)** stated that study, majority (65%) of children were informed of their disclosure status with the mean age of 7 and between the ages of 5 to 9 years. Once known of their disclosure status, guiding principles recommended that the child and caregivers continue to discuss the child's HIV status and its effect on their life in growing complexity till the child matures intellectually.[188]

The South African study reported that, the higher adherence was associated with the early age (<12 years) of disclosure (OR -2.65; 95% CI). The finding suggested that, early and full disclosure was significantly associated with improved

adherence among adolescents on ART, and also it was an essential tool for reducing mortality and transmission.[34] The other review article stated that, 13 to 60% of children between 5 to 17 years from Asia and Southern-Eastern Africa known their disclosure status and the prevalence of disclosure vary in all countries.[189]

Butler AM et al (2009) in their prospective study evaluated the effects of HIV disclosure on HRQOL among children and adolescents (5-21 yrs). In analysis, the mean QOL scores were not significantly different at the last undisclosed visit contrast with the first disclosed visit, with the exception of general health domain. It depicted that, age at disclosure was reducing QOL significantly over time; therefore, disclosure should be encouraged at an appropriate time.[190]

In regard to CD4 count before start of ART, the majority of the adolescents in both groups were in below 300cells/mm^3 of all the age groups due to prognosis of diseases for HIV to AIDS as shown in the table 5.1.2(b). Once they started the ART it was increased but sustained up to 900 cells/mm^3 for majority (81-86%) of adolescents and only 10 % in above 900 cells/mm^3 even after 5 years of ART in both groups i.e., showed in the table 5.1.2 (c). The similar finding was seen in retrospective analysis of young adolescents in Kenya, i.e., the median CD4 count was 332 cells/mm^3 and majority were in WHO stage of I/II.[93] The other study also reported with similar results i.e., the median CD4 count was 385 cells/mm^3 (247-555) and the high rate of sub optimal adherence was observed in all the prenatally infected adolescents.[109] But the present study, after HIP there was marked improvement in experimental group i.e., nearly 15% was increased above 900 cells/mm^3 and majority (61%) were in 600-900 cells/mm^3 where as in control group there was no significant improvement as shown in table 5.1.2(d).

In the present study, the increased CD4 count mean difference was 4.86 in baseline assessment as shown in table 5.1.3 (c-i), it increased to 136.96 in 6^{th} month as shown in table 5.3.1(d-i) and proved with student independent test score of 6.67 was significant at p=0.001***. The review article of **Botros D et al (2012)** also stated that, the reinforcement counseling regarding adherence improvement, nutritional intervention trial and exercise program can be successful in promoting the health outcomes of PLHIV especially to increase CD4 count, improve the body compositions and reduce the risk of cardiovascular diseases and diabetes.[191]

The RCT on HIV infected participants, one hour of three times weekly aerobic exercises with monthly nutritional counseling compared with workshop on discuss the importance of physical activity and nutrition. The exercise group had significant improvements in CD4 count (P=0.002), resting heart rate (P=0.001), metabolic equivalents (P=0.014) and QOL than the control group. The domains of QOL, general health, vitality and mental health improved in the exercise group (P<0.05) compared with the control group. The study findings suggested that the practice of regular exercises, coupled with nutritional guidance, for the individuals with HIV/AIDS significantly improves the QOL.[192]

The background information of experimental and control group,

Table 5.1.3(a) showed the living status of family members, among this mothers (50-60 %) were alive more when compare to fathers (40-49%) in respective of both groups because fathers had the additional behaviors of alcohol, smoking and continue to acquiring repeated infection of HIV makes to decline their life span . Regarding of family members HIV status, table 5.1.3 (b) showed that the majority of parents nearly 97- 98 % were positive and only 2-3 % were negative. Only 39% and 38 % participants living with their biological parents and majority of 69% & 64% respectively in both groups were living in NGOs.

In relevant to health, financial and social support as shown in table 5.1.3 (c). The majority of 98% and 96% of corresponding group of adolescents were receiving helps from nearer health care facilities. The half of (52% & 55%) participants only had adequate financial support and remaining 47% & 45% of respective group subject's are in need of financial supports still to meet their daily requirements. In regard to social support, nearly (53% & 56 %) half of participants were receiving helps from relatives & neighbor, NGOs and government support. Among these 85% & 79% of the participants from both groups were satisfied. But nearly 37% & 44% of participants respectively in both groups were discriminated by relatives, friends in their schools and communities.

It was similar to findings conducted in India by **Bharathi (2014)** 86% ALHIV (mean 83.16 , SD 9.717) had low social support and all the participants had low level of (mean 92.84, SD 2.510) stigma and discrimination score. The study

reports suggested that need of counseling regarding available social support from government and non government organization in order to improve their QOL.[193] The other study also found, the perceived social support was highly correlated with (r= 0.527) structural measures (family /relatives, teachers& friends) and psychosocial well being of adolescents among AIDS orphans.[160] According to **Gupta AK et al (2013)** portrayed in their study, the NACO and DSACS planned a special financial assistance scheme for PLHIV in order to retain children affected by AIDS (CABA) in home based care, recently started to focus on orphan and vulnerable children (OVC) affected by AIDS in order to strengthen social service providers.[194]

The background and basic information of HIV/ART,

Table 5.1.3 (d) showed that, the majority of 77% and 71% of respective participants received the information from health care professionals. Among this majority of 63% and 62% from respective groups received the information's were disseminated through counselors and nearly 25% and 26% from nurses. Regarding the adolescents and their caregiver's knowledge of HIV/AIDS were shown in 5.1.3 (e & f). In that, the majority (80%) of participants had good knowledge and remaining 20% in moderate knowledge and zero percent in poor knowledge. But nearly 25% of the both group participants had confusion in the diagnosis part of view and 8-9% had dilemma regarding AIDS is a curable/manageable disease.

The findings was supported by another study, revealed that 14% of the children only know the mode of transmission of HIV/ AIDS and still they need knowledge in all the aspects especially prevention and management for HIV/AIDS.[195] The **UNICEF** (2003–2008) also stated that, only 36% of adolescent males in India have comprehensive knowledge of HIV.[20] The another US based study depicted that, adolescents (18% at mean age 16.6 years) and young adults (28% at 18.3 years) had low knowledge in HIV transmission, safer sex suggested that formal education needed in preventive aspects of HIV/AIDS among adolescents groups.[196]

Based on the objectives of present study the results were discussed below They are,

The pre (base level) and the post test (3rd and 6th month) level of ART adherence, nutritional status and QOL of HIV infected adolescents in experimental and control group are discussed in section 5.2,

Regarding the adherence assessment questionnaire dealt with section 5.2.1 showed that, the majority (85 & 86 %) of participants were in I line treatment, 10% and 13 % were in alternative I line treatment and only 3 % in II line treatment in respective of both groups. **Barenness et al (2014)** found in their study that many of the children/ adolescents (75.4%) were in first line regimen than second line ART (24.6%).[197] In this present study, majority of 129 participants from both groups were receiving ZLN regimen as shown in table 5.2.1(a-i). No changes were made in ART during the study period. The chi square value showed that, there was no significant changes were found among this variable. Hence further evaluation was not progressed. The majority of participants (73% and 77%) were taking the medications under the supervision of caregivers and the remaining 27 % and 23 % of adolescents from both groups were taking self medications. Considering with hospitalizations in both group participants, 47% and 43 % were hospitalized for fever, 28 % for diarrhea and 25-28% were admitted for injuries or accidents, management for anemia and stomach pain for evaluation respectively in both groups.

Considering with exact dose and dosage of medications as shown table 5.2.1(b), stated that all the participants in both groups had good knowledge about the dosage frequency but in exact dose part, 69% of participants only knew in both groups, but at the 6th month assessment all the participants in experimental group knew their exact dose whereas in control group, 18% in confused state. **Biressaw S et al (2013)** also stated in their study that all the caregivers of the HIV/AIDS children knew the right dose and frequency of pills.[198]

The table 5.2.1(c) showed that, 95 % of the participants had medications burden in both groups, whereas in the 6th month it was reduced to 36% in experimental group but there was no changes in control group as a subjective assessment. Regarding difficulty in taking drugs in both groups, the majority of (71%)

adolescents refused to take drugs due to swallowing, oral problems and also boring to take drugs. However in the 6th month it was reduced to 28% in experimental group but there was no changes in control group. It was supported by the review article stated that, there are many reasons for the non adherence i.e., ranged from 16% to 99% not interest to take the medications, refused to take medications, felt medication has burden, not aware of the benefits of ART and adverse effects of drugs.[108]

In this present study baseline assessment revealed that, the majority (75% & 80%) of adolescents had depression in both the groups due to parental death, financial problems, physical health and known their status. But it reduced to 31% in the 6th month evaluation in experimental group whereas no marked changes in the control group. It was supported by the following review articles **Lata S** and **Verma S (2013)** stated that, the majority of HIV/AIDS orphan children/adolescents were in depression state. This findings recommended the need of psychosocial counseling and relaxation therapy in order to reduce the depression and improve their psychosocial health of adolescents.[199]

The other RCT study from **Cade PT (2010)** found that; yoga is effective in reducing systolic and diastolic blood pressure. The participation of one hour yoga session 2-3 times per week aimed to encourage adherence, reduce depression, and promote mental focus, self control, self awareness and physical resilience.[180] **Jong E and Colleagues (2010)** identified that, granted exercise therapy is an effective way to reduce HIV related fatigue, depression, anxiety and improve the QOL.[200]

The evolution of ART has altered the perception of HIV/AIDS from a fatal to a chronic and potentially manageable disease. The ART is hope to increase survival, reducing the episode of HIV-related OIs, and humanizing patients QOL. The clinical development of HIV-infected clients under ART has been measured in every visit of pharmacy refill. Among many approaches, to assessing medication adherence is the subjective measures of patient self-report and it's remained the most common method when compare to the objective measures. In the present study the investigator assessed the adherence by subjective measures of five point response, visual analog, '3' days recall method and pill count methods in section 5.2.2.

Table 5.2.2 (a-i) showed number and percentage distribution of overall level of ART adherence in both groups of HIV infected adolescents by '5' point response scale. In baseline assessment, the majority of participants from both groups had sub optimal level of adherence (69% & 67%). In experimental group, the equal percentage of participants (15%) had optimal and as well as poor adherence. But in subsequent evaluation of the 3rd and the 6th month, optimal adherence increased to 91% and 100%. While in control group, it increased from 16.9% to 17.9% & 18.1% in subsequent evaluation. The chi square value of 207.87 and 269.39 was significant at $P \leq 0.001$***. It showed that, there was a significant improvement in study group than the control group.

Table 5.2.2 (b-i) showed the overall level ART adherence in both groups of HIV infected adolescents by visual analog method. In experimental group of HIV infected adolescents, only 15% of participants had optimal level of adherence, 69% in sub optimal and 16% in poor adherence in the baseline assessment. Whereas it was increased to 51% in the 3rd month and 78% the in 6th month of optimal level and subsequently reduced the sub optimal level from 49% to 22%.While in control group, only 14% of participants had optimal level of adherence, 68% in sub optimal and 18% in poor adherence in the baseline assessment and there was slight improvement in the subsequent evaluation of the 3rd and 6th month but it was not in statistically improved. The chi square value in 3rd & 6th month evaluation of 71.9 and 142.3 was significant in the level of p=0.001***. It showed that, there was a marked improvement in the experimental group of HIV infected adolescents.

Table 5.2.2 (c-i) showed overall level of adherence in both groups of HIV infected adolescents by '3' days recall method. In '0' month assessment, only 63% of participants had optimal level of adherence and remaining 37% in sub optimal level of adherence in both groups. Whereas it was increased to 82% in the 3rd month and 94% in the 6th month of optimal level and subsequently reduced the suboptimal level from 18% to 6% in experimental group. But in control group, there was only slight improvement in the subsequent evaluation of the 3rd and 6th month. The chi square value of 16.5 and 48.4 was significant at the p = 0.001*** in subsequent evaluation. It showed that there was a marked improvement in study group than the control group.

Table 5.2.2 (d-i) shows overall level of ART adherence in both groups of HIV infected adolescents by pill count method. In experimental group, only 44% of participants had optimal level of adherence, 56% in sub optimal level and no one in poor adherence in the baseline assessment. Whereas in subsequent evaluation it was increased to 87% in the 3rd month and 93% in the 6th month of optimal level and subsequently reduced the suboptimal level from 13% to 7% .While in control group, only 38% had optimal level of adherence and remaining 68 % in sub optimal level of adherence in the baseline assessment and there was slight improvement in the subsequent evaluation of 3rd and 6th month but it was not in statistically significant. The chisquare value in the 3rd & 6th month evaluation of 91.95 and 93.13 was significant in the level of p=0.001***. It showed that, there was a significant improvement in the experimental group of HIV infected adolescents than the control group.

The above findings were supported by **Tran BX et al (2013)** identified the prevalence of optimal ART adherence using visual analog method. The mean difference range was 40 to 100% and the rate of suboptimal adherence was 25.9% and the missed doses were 25.2%. [201] The other cross sectional survey on caregiver's reported adherence to ART in HIV infected children at Mekelle. Among 193 participants, caregivers reported '7' days recall adherence was 83.4%.The major cause of missed dose by caregiver's report includes: depression (24.4%), side effects of the drug (16.3%), pill burden (15.5%) and difficulty in swallowing pills (13.3%).Its depicted that the prevalence of sub optimal adherence to ART among children was found to be high and impart the knowledge to caregivers on essential of optimal adherence and their fundamental role in maintaining adherence.[202] This findings was supported by the other similar studies reports.[115,123,149]

Ernesto AS et al (2012) evaluated the prevalence of non-adherence to HAART among the HIV infected children / adolescents aged 7 to 19 years in Brazil. The overall prevalence of non-adherence was 11.1%, in split of view 15.8% in 24 hour self-report, 27.8% in seven-day self report and 45.4% in pharmacy dispensing record (PDR). When compared to PDR, 24 hour and seven-day self-reports, showed low sensitivity (29% & 43% respectively) but high specificity (95% & 85% respectively).[203] The other cross sectional study identified that among 262 adolescents

only 101 adolescents (39%) reported "excellent" adherence and the remaining 161(61%) reported suboptimal adherence.[204]

In the present study, the investigator used subjective assessments of four methods along with caregiver's report, still the adolescent's poses unique and formidable challenges in measuring antiretroviral adherence suggests that need to correlate with biological markers. The numeral articles are pointing out the different rates and predictors of pediatric adherence to ART. The review of the pediatric HIV literature portrayed 13 studies found that, the mean adherence rates as compared with adults are suboptimal typically ranging from <50% to >95% depending on the method of assessment[205]. In the other view, objective measure of adherence such as MEMS caps or pharmacy refill data was included in the adherence assessment, mean adherence range was only from <50% to 75% in adolescents.[206]

To improve adherence in these age groups requires, identifying the causes for the non adherence and an intervention strategies to address the needs. In regard to reasons for the non adherence of HIV infected adolescents as shown in table 5.2.2 (e). In the baseline assessment showed that, only 41% and 36 % were in not applicable categories for both groups. The remaining adolescents had the following reasons, i.e., the most of the participants had forgot (33% & 40%), boring (6% & 5%) busy scheduled (10% & 8%), travelling (7 % & 9%) and not having finance to come and collect the drug (2% & 1%) and less than 1% had non adherence because of side effects of drug respectively in both groups. In 3rd and 6th month assessment, the non applicable categories were gradually increased to 89% and 93% in experimental group whereas in control group, there was no significant improvement.

In both groups the foremost reason of forgot is major reason for the non adherence, even in 6th month evaluation the experimental group had 6% in forgot showed the computer assisted interventions are needed in this age groups. The study from **Koole O et al** found that 29% reported at least one reason for missed ART (1278/4425) The most frequent reason was simply forgetting (681/1278 or 53%), followed by food insecurity (30%) travelling and migration (18%) and lack of money to come and collect the drugs (12%).[207] The other study also found that the primary cause for non-adherence was, forgot to take the pills, financial constraints, side effects & lack of access to drug and low knowledge in the benefit of the drugs.[208] In African

study also noted that, forgetting to take the medication and not having finance to visit the ART centre were the major reasons for non-adherence.[209]

The study from **Hansana V et al (2013)** also reported that, nearly 40% of the participants had non adherence. The major reasons were being busy (97.0%), forgot (62.2%) side effects (52.3%) and lack of money to travel to the health centre (32.6%). The common side effects of the drugs were skin rash (42%), headache or dizziness (34.3%) and numbness (32.6%).[210] These similar findings were reported in another study the caregivers' forgetfulness (36.4%) and child refusal to take medication (27.3%) were reported as the main causes for missing doses. The above findings suggested that longitudinal study evaluating adherence combined with objective assessments (viral load, CD4 count and drug level in plasma) are essential to recognize the reliable measure of adherence.[198]

To address the needs of this adolescents the investigator assessed, aids for improving adherence for ART to HIV infected adolescents in both groups as shown in table 5.2.2(f). In baseline assessment nearly 47% & 50% of participants were using pill boxes, 44% & 46% were not using any thing and remaining only 2-4% were only using remainders in mobile and buddy system in both groups. In this study, the investigator has given a diary as remainder device in order to improve their adherence and maintenance of diary after the yoga practice for the experimental group alone. In 3rd and 6th month assessment, along with remainder cues the diary also used for adolescents and also in non applicable categories used dairy alone in the experimental group. The chi square value of 189.50 and 182.45 was significant at p=0.001***.

It was supported by Randomized trial involved with 170 Spanish participants on stable ART found a positive effect. The interventions focused to the participants were individual education and supportive counseling session at baseline with follow-up telephone sessions regarding on medication scheduling to the patient's lifestyle. After 24 weeks, 76% of intervention group vs. 52.5% in the control group had >90% of self-reported adherence (RR=1.45; 95% CI: 1.35-2.62). [211] **Lyon M.E. et al (2004)** found multiple alarm watch as the best aid for improving adherence to medication and family/treatment buddies rated as highly helpful to progress adherence.[212] The other view of study suggested that apart from device, the motivational counseling and

educational strategies may bestow the sustained ART adherence among this risk groups.[110]

Regarding the nutritional variables of HIV infected adolescents; table 5.2.3 (g) showed the ANOVA F- test and Bonferroni t–test values in experimental group. The all variables except height had significance in repeated measure of ANOVA 'F' test at p=0.001***. It showed that, except height there was a marked improvement in all other nutritional variables of HIV infected adolescents. But the Bonferroni t–test revealed that, all the variables had significance from baseline to 6th month evaluation at p<0.01 and 3rd to 6th evaluation also had significance at P<0.05* except the height. It denoted that there was a marked improvement in all the nutritional variables, but only the height had minimum improvement of HIV infected adolescents in experimental group. Whereas in table 5.2.3 (h) showed the all nutritional variables in control group did not have significance in ANOVA F-test and Bonferroni t-test. It revealed that there was no marked improvement in the all nutritional variables of HIV infected adolescents in control group.

The similar findings were seen in **Jeanine U et al (2015)** in longitudinal study at Rwanda depicted that the mean (SD) Z-score of stunting, wasting and underweight was -2.01 (1.59), 0.15 (1.46),-1.19 (1.29) for boys; for girls they were -1.46 (1.56), 0.22 (1.29), -0.63 (1.19); all sex differences in all three indicators were statistically significant (P < 0.001).[213] **Tang AM et al (2015)** done systematic review on 21 studies suggested that nutritional assessment and counseling are needed to improve good clinical outcomes.[214] The similar findings also supported by other studies included in review of literatures.[131,132]

Table 5.2.3 (i) showed that comparison of pre and post test 'Z' score of HIV infected adolescents in both groups. The chi square value of 20.74 was significant at the p>0.05* in experimental group. It depicts that there was gradual increase in nutritional status of HIV infected adolescents. But in control group, there was no be any progress in nutritional status and chi square value of 1.22 proved that not significant at p=0.97. This findings also supported by retrospective aspects includes the burden of anemia and nutritional status of HIV-positive children (1-1 years) in Ethiopa. The results revealed that around 54.4% of the children had anemia at baseline level, among this 7.8% had severely anemic and 44.7% had moderately

anemic. At baseline, 51.6% of the study subjects were underweight (weight-for-age Z score less than -2 SD); 49.1% were stunted (height-for-age Z score less than -2 SD); and 31.5% were wasted (BMI less than -2 SD), but after a year on ART declined to 8.9%, 15.9%, and 9.8%, respectively. The study finding suggests that, after initiation of ART there was decline in high prevalence of anemia and growth failure. Therefore, adherence and nutritional counseling are needed to strengthen overall health status of PLHA.[215]

The clinical histories related to nutrition were dealt with section 5.2.4. The table 5.2.4 (a) showed the previous history of nutritional deficiency nearly 95 & 94% of HIV infected adolescents were in normal state and only 5-6% had nutritional deficiency states namely, iron deficiency anemia (< 8-10 gm /dL) and vitamin D deficiency for past 2-4 years. In the present study, nearly 46% and 53% did not deworm their adolescents regularly in respective of both groups. At present, 2% in experimental and 1 % in control group participants having iron deficiency anemia and 7% and 5% from participants in both groups loosed their weight in 0-5 %.

It's supported by review article findings stated the overall prevalence of anemia (defined as hemoglobin < 11 gm/dL) was 66%, and 8% had severe anemia (Hb < 7 gm/dL) with the proportion of underweight and stunted children in the population was 55% and 46% respectively.[144] The similar findings were reported that, 25 % of 12-20 years perinatally infected adolescents were also had vitamin D and iron deficiency.[216] The other study from **Souza et al (2011)** found that the anthropometric variables of weight, height, waist circumference, triceps and sub scapular skin fold thickness was very low in participant aged of 6-19 yrs in sao Paulo city.[142]

Table 5.2.4 (b-i) showed the clinical signs and symptoms of dry skin nail, head and eyes of HIV infected adolescents in experimental and control groups. In regard to presence of dry skin 4% and 6 % were seen in both group adolescents in baseline assessment, but in subsequent evaluation it was reduced to 1% in experimental group and remaining same percentage in control group. The chi square value of 8.50 was significant at p=0.01**. It denoted that, there was gradual decrease in dryness of skin of HIV infected adolescents in experimental group. In consideration of nails, there are no changes noticed in nails in both groups of HIV infected adolescents throughout

the assessment period. But the controversial view on **Cribier B et al (1998)** stated that, discoloration and brittle nails reflect various conditions observed in HIV [217] and other study of **Sehgal VN et al (2011)** noted that decreased rate of nail growth has been observed in patients treated with Zidovudine [218]. With regard to the head and eyes there was no significant changes were found throughout study period in both groups. The other study also suggested that paleness in conjunctiva helps to rule out the anemia [219].

Table 5.2.4 (b-ii) shows the clinical signs and symptoms for oral, gastro intestinal system and extremities of HIV infected adolescents in both groups. In relevant to oral 8% and 6% were had problems respectively in the baseline assessment. At 6th month evaluation, there was marked improvement in experimental group and no one was found with dryness of lips, bleeding gums and apthus ulcers but still 5% present in control group. The chi square value of 15.39 was significant at p=0.01**. In regard to the gastro intestinal system, in baseline assessment 25-28% of adolescents had various GI problems of loss of appetite, nausea, vomiting and diarrhea in both groups. But at 6th month evaluation, the signs and symptoms was reduced in the experimental group and it's proved with chi square value of 5.89 and 6.00 was significant at p=0.05* In the control group there was no significant changes found at 6th month evaluation. In regard to extremities, the presence of muscle wasting and lipo dystrophy were seen in 13% and 11% in experimental group whereas in control group10% and 7% respectively. There was no participants had edema during study period in both groups.

It was supported by **Tukei VJ et al (2012)** determined the frequency and outcomes of ART related adverse events among 6 weeks to 18 years of 378 HIV infected children/adolescents with Zidovudine and stavudine plus lamivudine and Efavirenz or nevirapine. Among these participants 126 adverse events reported among 107 (28.3%) patients, dizziness (17.5%), diarrhea (13.5 %) and nausea and vomiting (14.3%) were most frequent. Anxiety/night mares, skin rashes, nail discoloration, and lipo dystrophy each contributed between 5% and 10%; whereas anorexia, abdominal pain, hepatitis, and somnolence contributed to 1 -5%.[220]

The other studies from review articles also reported that, fatigue or loss of energy was the most cited symptom (37%), followed by headache (34%) feeling sad

or depressed was reported by 30% of participants. Other symptoms that were not as common but more frequently attributed to ART by at least 30% of participants with the symptoms included trouble in remembering (37%), hair loss or changes in hair (35%), loss of appetite, (34%) nausea or vomiting (32%) and skin problems (30%).[132,207]

The results of the present study and other supportive studies have shown that PLHIV face various psychosocial problems such as poverty, depression, substance abuse, stigma and discrimination, which can influence their QOL not only from the view of physical but also from psychological and social health, which may interrupt in essential activities and managements of ART. In this view, the present study was assessed QOL among adolescents through the Modified AIDS Clinical Trial Group (ACTG) questionnaire.

Table 5.2.5 (a) shows pre and post test score of QOL in the experimental group of the HIV infected adolescents. In general health ratings domains, 57% were in baseline assessment and it was increased to 64% in the 3rd month and 66% in the 6th month evaluation**.** With regard to physical functioning there was a marked improvement i.e., from 57% to 65% and 79% respectively. In consideration with psychological wellbeing it increased from baseline value of 65% to 73%. With regards to social role functioning and health care services had marked improvement from baseline value from 22% and 16% to 52% and 56% respectively. Regarding symptoms distress of the HIV infected adolescents, it was increased from 41% to 57%. The overall percentage of baseline assessment was 48% but at the 6th month evaluation it was increased to 64 %.

Whereas in control group, there was no marked improvement from baseline to the 6th month evaluation i.e., total percentage increased only from 48% to 49% respectively throughout the evaluation period as shown in table 5.2.5(b). **Oberdorfer P et al (2008)** stated in their study, general health, physical functioning, symptoms, psychological well being and social role functioning domains score was similar to the present study. The poor physical functioning, more symptoms and low social functioning were significantly related to higher use of health care services($p<0.05$).[65]

Bunupuradah et al (2013) found the early group had higher QOL score changes in five domains, including health perception (p = 0.04), physical resilience (p = 0.02), psychosocial well-being (p = 0.04), social and role functioning (p < 0.01), and symptoms (p = 0.01) compared to the deferred group.[60] The study from **Gupta R et al (2015)** also revealed the need to provide appropriate counseling, education and creative ways to decrease the psychological impact of HIV/AIDS with a view to improve their quality of life.[195]

Table 5.2.5 (c & d) showed that, the overall interpretation of quality of life score in experimental and control group of the HIV infected adolescents**.** In experimental group, 81% had poor QOL, none of them in good QOL at baseline assessment whereas in 6th month evaluation it reduced to 23% had poor QOL and 14% in good QOL. The chi square value of 174.19 was significant at p=0.001*. However in control group, there was no significant improvement from baseline to the 6th month evaluation. The chi square value of 0.10 was not significant at p=0.99. The above findings proved that, the overall QOL was increased in experimental group than the control group. It's supported by **Swindells et al (1999)** findings revealed that the association between HIV infection and the QOL of PLHIV showed that QOL was influenced by social support and coping style strategies.[221]

The above findings suggested that, there is significant difference in post test score on adherence rate, nutritional status and QOL of HIV infected adolescents in experimental group alone. Since the first hypothesis H_o is rejected here.

The effectiveness of HIV interventional package on HIV infected adolescents in experimental and control group are discussed in section 5.3.

Table 5.3.1(a) showed the comparison of overall level of CD4 count of HIV infected adolescents in both groups. In experimental group, 40% were in 601-900 cells/mm^3, 10% were in 901-1200 cells/mm^3 and only 4% were in >1200 cells/mm^3 of CD4 count in baseline assessment. At the 6th month evaluation it increased to 61%, 23% and 6% in respective of the CD4 counts and only 9% had the CD4 count of 301-600 cells/mm^3. The chi square value of 71.47 was significant at P=0.001***. While in control group, there was no marked improvement in CD4 count from baseline to 6th month evaluation. The chi square value of 3.89 was not significant at P=0.14. Its revealed that, there was significant improvement in the level of CD4 count in the experimental group of HIV infected adolescents. **Diniz LO and Pinto JA (2009)**

revealed that increased CD4 cell percentage, low viral load was associated with increased QOL especially in social and role functioning.[222]

Table 5.3.2 (b) showed the effectiveness of HIP in mean and SD in the level of CD4 count of HIV infected adolescents in both groups. In baseline assessment, the mean score was 664.86 in experimental group and 669.72 in control group. The mean difference was 4.86. Where as in the 6th month assessment of mean score in experimental and control group was 840.30 and 703.35 respectively. The mean difference was 136.96. The paired t-test value was 7.21 was significant at p=0.001*** in experimental group. It's depicted that the CD4 count was increased in experimental group than the control group.

The findings was supported from **Caroline F et al (2014)** conducted pilot trial on adherence intervention combining with Financial Incentives (FI) with motivational counseling (MI) among adolescents in 16-25 yrs. The total of eleven young people outcomes values were compared with CD4 gain with post test. The results showed that, baseline to 1 year 9 out of 11 were achieved VL < 50, median CD4 140; mean CD4 gain 90cells/μL. Whereas after twelve months post cessation of MI/FI; six adolescents achieved VL < 50, median CD4 175, mean CD4 gain 122 cells/μL. The finding concludes that to prevent death and improve the adherence of adolescents, require novel interventions like FI/MI in order to improve virological and immunological outcomes with minimal expenditure.[223] The other review articles also supported the present study results.[191, 192]

Table 5.3.2 (a) compared the overall level of ART adherence in experimental group of HIV infected adolescents by various methods. With regard to '5' point response scale, only 15 % had optimal level adherence in baseline assessment but it was reached 100% in 6th month evaluation. The chi square value of 392.99 was significant at the p=0.001***. Regarding the visual analog method, the baseline assessment only15% had optimal level adherence, whereas in the 6th month it was increased to 78%. The chi square value of 191.4 was significant at the p=0.001***. With '3' days recall method, 63% had optimal level adherence in baseline method, but it was increased to 94%. The chi square value of 60.1 was significant at the p=0.001***. In consideration of pill count method, 44% had optimal level adherence in baseline method, but it was increased to 93%. The chi square value of 149.14 was

significant at the p=0.001***. It's denoted that there was significant improvement in the adherence rate among HIV infected adolescents in the experimental group.

Table 5.3.2(b) compared the overall level of ART adherence in control group of HIV infected adolescents by various methods used. In regard to '5' point response scale, there was no marked improvement in adherence rate from baseline to the 6th month evaluation. The chi square value of 0.19 was not significant at the p=0.99. In relevant to visual analog method, the baseline assessment only14% had optimal level adherence, whereas in the 6th month it increased to 18%. The chi square value of 13.1 was significant at the p=0.01**.

With '3' days recall method, 63% had optimal level adherence in baseline method, but it was slightly increased to 66%. The chi square value of 0.58 was not significant at the p=0.74. In consideration of pill count method, 38% had optimal level adherence in baseline method, but it was markedly increased to 48%. Still the chi square value of 4.29 was not significant at the p=0.11. It's depicted that there was no significant changes in control group of HIV infected adolescents. Even though there were many different adherence rates were estimated in various methods, the missed dose history was highly correlated with pill count method only. So the investigator has taken the mean adherence score of pill count method in order to evaluate the effectiveness of adherence improvement in both groups.

Nyogea D et al (2015) reported that only 70% of study participants had optimal level of adherence through pill count method. The study findings suggested that biological parent remains a key determinant of adherence among children and teenagers.[224] **Kang E et al (2014)** assessed the factors associated with high rates of antiretroviral medication adherence among perinatal HIV youth (13-21 years) in Thailand. Among the various methods of 24 hrs, '7' days, visual analog method and pill count method, the reliable measure of pill count mean adherence range was 83.5 to 99.8%.The optimal adherence was significantly associated (P<0.05) with treatment outcomes, psychological status, social support, and positive attitude of medications.[225] The other study objectively measured and positively associated with rising Nevirapine (NVP) concentration in hair but the associations were not statistically significant. [226] It was also supported by other study results included in the review of literature.[115,116, 202]

Table 5.3.2 (c) showed effectiveness of HIV interventional package on level of ART adherence score in both groups of the HIV infected adolescents. In experimental group, the mean ART adherence score in pretest was 85.36 and post test score was 98.74. The mean difference in ART score with 95% confidence interval was 13.38 and percentage of adherence gain score was 13.4%. However, in control group, the mean ART adherence score in pretest was 85.60 and post test score was 90.54. The mean difference in ART score with 95% confidence interval was 4.94 and percentage of adherence gain score was only 4.9%. Its denoted that there was marked improvement in adherence level of HIV infected adolescents in experimental group than the control group.

It was supported by RCT on 116 participants initiating their first or second regimen of ART in the Netherlands. The intervention group received an individualized educational counseling session for improving QOL at baseline and at each follow-up visit (0, 4, 24, and 48 weeks). The control group received standard-of-care and clinical follow-up. At week 48, 94% in the intervention group vs. 69% of those in the control group achieved >95% self-reported adherence (p = 0.008); 89% of the intervention group vs. 66% of the control had HIV viral loads <400 copies/mL (p = 0.026). He concludes that specific and maintained psycho educative interventions based on excellence on clinical practice are useful to keep high levels of adherence as well as high levels of viral suppression.[227]

Table 5.3.3(a) compared the interpretation of 'Z' score on HIV infected adolescents in both groups. In experimental group, 7% were severely malnourished, 22% moderately malnourished in baseline assessment whereas in the 6th month evaluation it was reduced to 1% and 18 % respectively. The chi square value of 9.48 was significant at p=0.05*. However in control group, there was no significant improvement from baseline to the 6th month evaluation. The chi square value of 0.10 was not significant at p=0.99. The other cross sectional study also found that, higher risk of stunting (OR 5.33, 95% CI: 2.83–10.04) and thinness (OR 4.7, 95% CI: 2.44–9.06) and lower prevalence of overweight or obesity (OR 0.33, 95% CI: 0.14–0.78) was seen in with the severity of vertical HIV infection and the consequences of prolonged ART.[139] The similar study results revealed that, increased in fat mass is associated with better QOL.[215] The similar findings also found in higher alterations in

the soft tissue (OR=0.216; 95% CI=0.057-0.811; p=0.030) and higher normal BMI (OR=0.498; 95% CI=0.252-0.987; p=0.066) in the intervention group than the control group.[13] The study in Tanzania also suggested that better dietary counseling and prerequisite of macro and micro-nutrient supplements will be necessary to attain optimal nutrition for most of HIV-infected children in resource-limited regions.[228]

Table 5.3.3(b) showed effectiveness of HIV interventional package on nutritional gain score in both groups of the HIV infected adolescents. In experimental group, the baseline assessment showed that 28% of participants were malnourished whereas in the 6th month evaluation it reduced to 19%. The percentage wise gain score was 9.3%. However in control group, the baseline assessment showed that, 29% of participants malnourished whereas in 6th month evaluation it was reduced to 28%. The percentage wise gain score was 1.5% only. It's depicted that the experimental group has gained more nutritional score when compare to the control group. **Anitha V et al (2014)** found that, after 12 week of yoga training program enhanced micronutrient adsorption and increased physical fitness among rural school children and adolescents than the control group.[229]

Table 5.3.4 (a, b, c) showed comparison of baseline level, 3rd and 6th month level of the mean & S.D of QOL score in both groups of the HIV infected adolescents. In baseline assessment, all the QOL domains in both groups had more or less equal mean value. i.e., the total mean value was 163.7 and 162.9 respectively and the mean difference score was 0.73. It was tested with Student Independent test and proved that all variables are not significant. But in 3rd and 6th month in the experimental group there was slight improvement in all QOL domains i.e., the total mean value was increased from 163.6 to 187.8 and 215.6. In control group, it increased from 162.9 to 164.3and 166.02 and the total mean difference score was 23.43 and 49.61. The t-test proved that the significant improvement in all QOL domains at $p \leq 0.001$***.

The similar findings also supported by the low cost approach of yoga improved psychosomatic state of PLHIV and regular practice of MBSR is essential to enhance the QOL of adolescents.[230,231] The another similar study also found the HIV infection was associated with a negative impact on QOL among children with lower scores of physical, school, and emotional functioning and health symptoms. The

results suggested that, ARV treatment to be associated with improved QOL among HIV-infected children.[232]

Table 5.3.4 (d) showed effectiveness of HIV interventional package on QOL score in both groups of the HIV infected adolescents. In experimental group, the mean QOL score in pretest was 163.66 and post test score was 215.64. The mean difference in QOL score with 95% CI was 51.97 and percentage of QOL gain score was 15.1%. However, in control group, the mean QOL score in pretest was 162.93 and post test score was 166.02. The mean difference in QOL score with 95% CI was 3.09 and percentage of QOL gain score was only 0.9%. It's denoted that, there was marked improvement in QOL of HIV infected adolescents in experimental group than the control group.

It was supported by **Andrinopoulos K et al (2012**) suggested that patients with low CD4+ T-cell counts showed the higher use of health care utilization, demonstrating how early HIV diagnosis can helps to reduce health care costs.[59] The other review article also supported that patients with elevated CD4 count had improved QOL than those with low CD4 count.[157]

Table 5.3.5 showed overall effectiveness of HIP components in both groups of the HIV infected adolescents. In adherence rate, the experimental group has gained 13.4% and control group 4.9%. The difference was 8.5%. Considering with nutritional status, the gain score was 9.3% in experimental group and 1.5% in control group. The difference was 7.8%. In regard to QOL the gain score was 15.1% in experimental group and 0.9% in control group. The difference was 14.2%. It's revealed that, the experimental group has gained more score than the control group. It was supported by **Pathak RS et al 2010** evaluated that the effect of pranayama and yogasana program on immunity of hundred HIV infected individuals in west Bengal, India. At the 6th month results showed that, the significant increase in CD4 count ($P<0.05$) in experimental group. The study concluded that the practice of yogasana and pranayama by HIV infected individuals would increase their longevity.[233]

In addition the other review articles also suggested that health promotion by nurses can lead many positive health outcomes including adherence, quality of life, patients' knowledge of their illness and self-management.[234,235] The above findings of the present study suggested that there is significant improvement in post test score on

adherence rate, nutritional status and QOL of HIV infected adolescents in the experimental group alone. Since the second hypothesis of H_1 is rejected here.

The correlation of ART adherence level with nutritional status and quality of life on HIV infected adolescents in experimental and control group are discussed in section 5.4. The correlation co-efficient was calculated by Karl Pearson correlation coefficient method in both groups.

Table 5.4.1 showed correlation of ART adherence and nutritional status of HIV infected adolescents in both groups. In experimental group, the baseline value showed that poor correlation between ART and nutritional score. But in the 3rd and the 6th month there was fair and moderate correlation between ART and nutritional score since r =0.31, 0.42 was significant at p=0.01** and at p=0.001*** respectively. Whereas in control group, throughout the assessment period showed that there was a poor correlation between ART with nutritional score because of 'r' value was lesser than 0.2. It's depicted that the adherence and nutrition are directly propositional. The finding revealed that there is a positive correlation between the adherence and nutritional level of the HIV infected adolescents in experimental group.

The similar findings was supported by **Kabue MM et al (2008)** evidenced in their study, after beginning of ART resulted in significant improvement in mean standardized weight for-age Z-score ($P < 0.001$), and the height – for - age and Z-score ($P < 0.05$). The study findings found that, weight gain was more rapid than height after initiation of ART.[236] **Eby J et al (2015)** identified that association between the adherence and VL relationship among adolescents with Medication Event Monitoring System (MEMS) with diaries. The 273 HIV infected adolescents on ARV treatment were monitored with MEMS for 30 days preceding a VL measurement. The handwritten diaries were used to comprehensively record deviations from recommended use (bottle opened but does not taken or bottle not opened and dose taken).The adherence was highly associated with VL and improved nutritional status (OR 1.05, $p < 0.001$).[237]

The study conducted in Chennai and Madurai revealed that, among 231 HIV infected children the prevalence of underweight was 63%, stunting with anemia 58%, wasting 16% and overall 33–45% were moderately or severely malnourished even at

CD4 >25%.The height & weight for age Z scores , and weight for height were highly associated with CD4 cell counts. The results found that, under nutrition and stunting are common among HIV-infected children at all stages of the disease in India. The early and aggressive nutritional intervention along with optimal adhernce is required, if long-term outcomes are to be improved.[238]

Table 5.4.2 showed correlation of ART adherence with QOL of HIV infected adolescents in both groups. In experimental group, the baseline value showed that poor correlation between ART adherence and QOL score. But in the 3rd and the 6th month there was fair and moderate correlation between ART adherence and QOL score since r=0.31, 0.43 was significant at p=0.05** and p=0.001*** correspondingly. Whereas in control group, throughout the assessment period showed that, there was a poor correlation between ART adherence and QOL score because 'r' value was lesser than 0.2. It's depicted that the adherence and QOL are directly propositional. The finding revealed that there is a positive correlation between the ART adherence and QOL of the HIV infected adolescents in experimental group.

The similar findings was supported by **Mannheimer et al (2005)** reported that participants had 100% ART adherence attained significantly good QOL scores when compared to those with poorer ART adherence.[239] The other study conducted in South Africa also found, the optimal adherence improved the overall QOL and observed it was persistent along with > 95 % adherence over the 12 month of study period.[240]

The above findings suggested that, there is significant correlation between ART adherence with, nutritional status and QOL of HIV infected adolescents in experimental group alone. Since the third hypothesis of H_2 is rejected here.

The association of the gain score findings of HIP in both groups of HIV infected adolescents with demographic variables of HIV infected adolescents / caregivers are discussed in section 5.5.

Table 5.5.1(a) and 5.5.3 (a) showed association between the ART adherence and QOL gain score with demographic variables of HIV infected adolescents with their caregivers in experimental group. In that the age and sex of adolescents, caregiver's age, sex, relationship with adolescents and residence variables were

shown significant association with adherence and QOL gain score. Regarding age and sex of adolescents, the younger age of 10-12 years and males were gained high gain score of 15.89, 54.96 and 14.71, 54.35 respectively was significant at the $p \leq 0.05$*. Because the younger ages of 10-12 years were under the supervision of caregivers and especially more attention is given to males since the LFTU rates was slightly higher makes to gain more benefits when compared to the age group and the female adolescents.

In consideration with caregivers age and sex, the younger of 20-35 years and females gained high gain score of 15.99, 57.80 and 14.83, 53.98 respectively was significant at p=0.05*. Since the younger ages of female caregivers were played a major role to attain the high gain scores when compared to other age categories and males. In regard to relationship with adolescents and residential area, the high gain score of 17.48, 58.25 and 14.99, 56.19 was seen with mothers and adolescents residing in rural areas. It was significant at $p \leq 0.04$* and 0.05* respectively. Because the primary caregivers of mothers showed a great attention towards the adolescents health and the adolescents residing in the rural areas followed the interventions in disciplined manner, adopted the diet modifications makes easy to gained more score than the other type of caregivers and residing in urban areas. The rest of other demographic variables were not associated with adherence gain score.

Table 5.6.1 (a & b) & 5.6.3 (a & b) showed the influencing factors for ART adherence and QOL gain score by using Uni and Multivariate logistic regression analysis in experimental group. In Univariate analysis, the influencing factors of adolescents age and sex, age and sex of caregivers , relationship with adolescents and residence were significant with unadjusted OR with 95 % CI . While in multivariate analysis, the sex of caregiver and residence were not significant at p= 0.60 and 0.18, with adjusted OR 1.3 & 1.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI.

The similar findings were supported by the following studies , **Kuntawee C et al (2010)** revealed, the HIV infected children's (78.7%) were in need of improvement in QOL. The factors associated with poor QOL includes, having others as main caretakers OR 4.64, parental death OR 4.19, age of caregivers above 45 years OR 9.52, and family income > 5,000/- month OR 5.25 with 95 % CI. However, on

multivariate analysis, only age of caregiver was a significant predictor for QOL of the child. The other controversial view of the study includes, children who were cared by caregivers and aged 45 years or above had a better quality QOL than those whose caregivers were 20-45 years old (OR 6.32, 95% CI 1.12-35.62). Therefore, to improve QOL among HIV infected children, age of caregiver is an important factor to be considered.[241]

In the other articles also indentified the caregiver's age of 25–34 years (AOR = 22.27) and 35–44 years (AOR = 7.14) were most probable to adhere than other age groups .[202] The other study also found that, children living with caregivers were more likely to have poor adherence compared to biological parents with OR = 2.84, 95% CI: 1.04-7.77. The children of primary school age were less significant compared to who never went to school i.e., preschool age children with OR = 2.39, 95% CI: 0.69-8.28.[224] The another study from **Lowenthal ED et al (2015)** revealed that absence of a primary caregiver an adolescent's clinic visit was significantly associated with virologic failure (OR 4.1 95% CI, 1.5–4.3).[242]

The other similar studies reported that, 90.4 % study population had ≥ 95% adherence maintained on their ART cards in rural health facilities (P< 0.05) was significantly associated with optimal adherence to ART.[243- 44] The controversial view from **Ench AU (2013)** stated that**,** predictors of poor adherence includes mother as the primary caregiver (OR 3.32; 95% CI, 1.33-8.67), It may be due to mother illness because of majority of Pediatric HIV is acquired through vertically by MTCT.[121] The another view from **Ndiaye M et al (2013)** identified that, male adolescents up to 65% are in non-adherent group (P = 0.02). In the multivariate logistic regression model in gender wise only the male sex (OR3.29, 95% CI, 1.13–9.54; P = 0.03) was independently associated with suboptimal ART adherence than the females due to failure to get the medicines from the pharmacy (9.7% vs. 30% P = 0.03).[245]

Hansana V et al (2013) through multivariate analysis revealed that, secondary school of education, dislike exercise and forgot to take ART drugs were mainly related with non-adherence with 95% CI.[210] The other study revealed that the mothers had completed tertiary education (OR: 0.10; 95%CI: 0.03-0.37) or other forms of education such as vocational trainings etc (OR: 0.16; 95%CI: 0.04-0.63) were likely to have good QOL than those whose mothers had no formal level of education.[246] The

other article revealed that boys scored slightly higher than girls in each domain. But, significant gender differences were only found in relation to physical well-being, peers and the overall HRQOL score.[58] The other similar study also identified that, the psychosomatic and environmental factors should be integrated in the physical and clinical assessment may be associated with strong association with QOL domains.[247]

Table 5.5.2(a) showed association between the nutritional status with demographic variables of HIV infected adolescents/caregivers in experimental group. In that, the age and education of adolescents, caregiver's age, sex, relationship with adolescents and residence variables were shown significant association with improvement in nutritional status. Regarding adolescents age ,the majority of 92% were normal in the younger age of 10-12 years and only 8 % were in malnourished when compare to other age categories and it was significant at p=0.001***.In consideration with education, the highest 93% and 87 % were normal in primary and middle level educated adolescents and it was significant at p=0.001***. Because the higher education makes to misinterpret the correct information and perceive in wrong way to adopt the worst lifestyle changes made the adolescents to get less score.

In regard to caregiver's age, the majority of 94 % were normal in younger age of 20-35 years and it was significant at p=0.03*.In relationship with adolescents, the highest percentage of 92 % were associated with mothers when compare to the other categories and it was significant at 0.04*.In regard to residence, the majority of 88% were associated with rural and it its significant at p=0.05%. The remaining other demographic variables were not associated with nutritional status of HIV infected adolescents. It depicted that there was a significant association between the nutritional statuses of HIV infected adolescents with specific demographic variables.

Table 5.6.2 (a & b) shows the influencing factors for nutrition gain score by using uni and multivariate logistic regression analysis in experimental group. In univariate analysis, the influencing factors of adolescents age & sex, age & sex of caregiver, relationship with adolescents and residence were significant with unadjusted OR with 95 % CI. Whereas in multivariate analysis, the sex of caregiver and residence were not significant at p= 0.14 and 0.33 with adjusted OR 1.5 & 0.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI. Another study revealed that HIV/AIDS orphan children living with their

elderly relatives (59%) and no formal education were associated with poor nutritional status.[248]

This findings are supported by the following review articles **Lwanga F et al (2015)** identified the risk factors for stunting in male (AOR: 4.0; 95% CI: 1.81- 7.02) and residence in rural settings (AOR: 6.0; 95% CI 2.70-12.16).[94] **Imam MH et al (2011)** through bivariate analysis revealed that the overall perception of QOL was better in the respondents living in urban area, higher in females and all caregivers in less than 35 years of age.[159]

Thapa R (2015) identified the association between literacy status of caregivers with poor nutrition was found significant. i.e., caregivers who were not educated through formal education 2-3 times got undernourished with AOR =2.31with 95% CI 1.10-4.82.[249] The other cross-sectional study from West Bengal, India identified the correlation of height and QOL indicates that enduring undernourishment consequentially at the end in stunting may correlate with lower levels of QOL.[250] In both the studies, the positive correlation was seen between weight and BMI with all four domains. Notably, height is also found to be significantly correlated with three domains (psychological, level of independence and environment) of QOL.

These result findings highlights the need for enhanced socio-psychosocial support, better environment and educational strategies for improving the health related QOL among people living with HIV.

The above findings suggested that, there is an association between the gain score findings of ART adherence, nutritional status and QOL of HIV infected adolescents with demographic variables in experimental group alone. Since the final hypothesis of H_4 is rejected here.

Chapter - VII

Summary, Recommendations, Nursing Implications and Conclusion

CHAPTER – VII

SUMMARY, RECOMMENDATIONS, IMPLICATIONS AND CONCLUSION

"If a society is to preserve stability and a degree of continuity it must learn how to keep its adolescents from imposing their tastes, values and fantasies on everyday life". - Eric Hoffer

The randomized controlled trial was used to evaluate the effectiveness of HIP on HIV infected adolescents attending ART clinic. The total of 388 HIV infected adolescents was divided in to experimental (195) and control group (193) by simple random technique. The data was collected through structured interview schedule by modified adolescent adherence questionnaire, modified QOL questionnaire (ACTG), nutritional assessment questionnaire and anthropometric variables. The data were collected from HIV infected adolescents / caregivers from four ART centres namely, Institute of Child Health and Hospital For Children (ICH) Egmore, Rajiv Gandhi Government General Hospital (RGGGH), Kilpauk Medical College and Hospital, (KMCH) and Government Hospital of Thoracic Medicine (GHTM).

The HIV interventional package (HIP) is given to experimental group alone and the selected asanas (Padmasana, Vajrasana, Pranayama Trikonsana, Ardhamatsyendrasana or Ushtrasana, Bhujangasana & Shavasana) were demonstrated by the researcher. But the conservative care was given to control group. At end of the 6^{th} month the cursory instructions regarding HIP and practice of asana were also given to control group. Simultaneously the data were collected from both groups at '0'month, the 3^{rd} and the 6^{th} month intervals. The collected data were analyzed by using of both descriptive and inferential statistics. Here the investigator found the major findings of the study were listed below:

7.1 MAJOR FINDINGS OF THE STUDY

Regarding the CD4 count

- In experimental group, the CD4 count were 40% in 601-900 cells/mm^3, 10% in 901-1200 cells/mm^3 and only 4 % in>1200 cells/mm^3 of baseline assessment. But

at the 6th month evaluation it was increased to 61 % , 24 % and 6% in respective of the CD4 counts and only 9% were the CD4 count of 301-600 cells/mm^3. The chi square value of 71.47 was significant at P=0.001***. Whereas in control group there was no marked improvement in CD4 count from baseline to the 6th month evaluation. The chi square value of 3.89 was not significant at P=0.14. It denoted that there is a marked improvement in CD4 count of the HIV infected adolescents in experimental group.

- In baseline assessment, the mean score was 664.86 in experimental group and 669.72 in control group. The mean difference was 4.86. Where as in the 6th month assessment of mean score in the experimental and control group was 840.30 and 703.35 respectively. The mean difference was 136.96. The paired t-test value of 7.21 was significant at p=0.001*** in experimental group. It depicted that, there is statistically significant improvement in CD4 count in experimental group than the control group.

Regarding the level of adherence rate

- However there are various methods was used in this study for to assess the ART adherence level, since the pill count was highly correlated with missed dose history in both groups. In baseline assessment, 44% had optimal level adherence but it increased to 93% at 6th month in the experimental group. The chi square value of 149.14 was significant at p=0.001***. Whereas in the control group, 38% had optimal level adherence in baseline, but it slightly increased to 48% at the 6th month. The chi square value of 4.29 was not significant at p=0.11. It revealed that there is statistically a significant improvement in the experimental group than the control group.

- In experimental group, the mean ART adherence score in pretest was 85.36 and the post test score 98.74. The mean difference in ART score with 95% confidence interval was 13.38 and percentage of adherence gain score was 13.4%. However, in the control group, the mean ART adherence score in pretest was 85.60 and the post test score was 90.54. The mean difference in ART score with 95% confidence interval was 4.94 and percentage of adherence gain score was only 4.9%. It denoted that there is marked improvement in adherence level of HIV infected adolescents in experimental group than the control group.

➢ Regarding the reasons for the non-adherence of ART for HIV infected adolescents in baseline assessment showed that, there were 41% and 36% of adolescents only in the not applicable category in experimental and control groups. The remaining adolescents had many reasons for the non adherence includes, forgot (33% vs. 40%)) boring (6% vs. 5%), busy scheduled (10% vs. 7%) travelling (7% vs. 9%) and not having finance to come and collect the drugs (2% vs. 1%) and adverse effects of drugs (1% vs. 0.5%) respectively in both groups. But after HIP, in experimental group not applicable category was increased to 89 % and 94% respectively in subsequent evaluation but still 6% of adolescents had non adherence problems because of forgot. Whereas in control group, the not applicable category increased up to 46% and 62% only in further evaluation period. The chi square value of 88.98 and 60.69 was significant in p=0.001***.

➢ In consideration of aids for improving adherence to ART in both groups of HIV infected adolescents in baseline assessment, the half of percentage (47% and 50%) of adolescents were using pillboxes and nearly 44% and 46% of adolescents were not using any aids to improve the adherence. Whereas in the experimental group got investigator reinforcement counseling and also the diary used as a remainder cue along with previous aids. But in the control group there was no special aids used to improve the adherence and no marked changes in the aids from the baseline to the 6^{th} month evaluation. The chi square value of 189.50 and 182.45 were significant at p=0.001***. It depicted that the reminder cue of diary has effectiveness to improve the adherence among HIV infected adolescents in experimental group.

➢ These findings depicted that the motivational counseling and interventional diary has effectiveness to increase the adherence to ART among HIV infected adolescents in experimental group (13.4%) than the control group (4.9%). The gain score differences of 8.5% showed the effectiveness of HIP in the improvement of adherence level in experimental group of HIV infected adolescents.

Regarding Nutritional status

➢ Regarding the anthropometric variables of weight, BMI, Mid arm Circumference, Skin fold thickness (Triceps) and waist circumference of HIV infected adolescents in experimental group showed a significant improvement from

baseline to the 6th month evaluation at the p=0.05* except the height. Where as in control group there was no significant changes in the anthropometric variables of HIV infected adolescents.

- In experimental group, the repeated measures of ANOVA F' test showed the statistically significant improvement in all the anthropometric variables except height at p=0.001***. It showed that, except height there wass a marked improvement in all other nutritional variables of HIV infected adolescents. But the Bonferroni t–test revealed that, all the variables had significance from baseline to the 6th month evaluation at p<0.01* and the 3rd to 6th month evaluation also had significance at P<0.05* except the height. It denoted that, there is also a minimal improvement in height of the HIV infected adolescents. Whereas in control group, all nutritional variables of HIV infected adolescents had no significance in ANOVA F-test and Bonferroni t–test. It revealed that there is no marked improvement in the all nutritional variables of HIV infected adolescents in the control group.

- Regarding the interpretation of 'Z' score on HIV infected adolescents, in experimental group, 7% were severely malnourished and 22% were moderately malnourished in baseline assessment whereas in the 6th month evaluation it reduced to 1% and 18% respectively. The chi square value of 9.48 was significant at p=0.05*.However in control group, there was no significant improvement from baseline to 6thmonth evaluation. The chi square value of 0.10 was not significant at p=0.99.

- In consideration with nutritional gain score in experimental group, the baseline assessment showed that 28% of participants were malnourished where as in 6th month evaluation it reduced to 19%. However in control group the baseline assessment showed that, 29% of participants were malnourished where as in the 6th month evaluation it reduced to 28% only. It depicted that, the experimental group has gained more (9.3%) score when compare to the control group. (1.5%).

- These findings revealed that the reinforcement of nutritional counseling have effectiveness to increase the nutritional level of HIV infected adolescents in the experimental group than the control group. The gain score difference of 7.8% showed

the effectiveness of HIP in the improvement of nutritional status of HIV infected adolescents in experimental group.

- Regarding clinical signs and symptoms, the dry skin, skin rashes, oral problems, loss of appetite, nausea, vomiting and diarrhea were reduced from baseline to 6th month evaluation in experimental group and it was significant at p=0.01*.But Seborric dermatitis, texture and color of hair, eye problems no marked improvement in the study period. Where as in the control group there was no significant changes seen in the HIV infected adolescents.

Regarding Quality of Life

- In regard to QOL on HIV infected adolescents, in experimental group, 81% had poor QOL, none of them had good QOL in baseline assessment whereas in 6th month 14% had good QOL and subsequently reduced the poor QOL to 23%). The chi square value of 174.19 was significant at p=0.001*.However in control group, there was no significant improvement from baseline to 6th month evaluation. The chi square value of 0.10 was not significant at p=0.99.

- In experimental group, the mean QOL score in baseline was 163.66 and 6th month was 215.64. The mean difference in ART score with 95% confidence interval was 51.97 and percentage of adherence gain score was 15.1%. However, in control group, the mean QOL score in baseline was 162.93 and 6th month was 166.02. The mean difference in ART score with 95% confidence interval was 3.09 and percentage of adherence gain score was only 0.9%. It denoted that, there is a marked improvement in QOL of HIV infected adolescents in experimental group than the control group.

- This finding depicted that, the strategies of QOL counseling and yoga has effectiveness to increase the QOL of HIV infected adolescents in experimental group than the control group. The gain score difference of 14.2 % showed the effectiveness of HIP in the improvement of QOL of HIV infected adolescents in experimental group.

➢ The above findings suggests that there is significant improvement in post test score on adherence rate, nutritional status and QOL of HIV infected adolescents in the experimental group alone. Since the hypothesis of H_0 and H_1 is rejected here.

Regarding correlation of ART adherence with Nutritional status and QOL

➢ In considering with nutritional status, in experimental group the baseline assessment showed that poor correlation between ART adherence and nutritional score. But in, the 3rd and 6th month evaluation there is fair and moderate correlation between ART adherence and nutritional score since r=0.31, 0.42 was significant at p=0.01** Whereas in control group, throughout the assessment period showed that, there is a poor correlation between ART adherence and nutritional score because of 'r' value was lesser than 0.2. It showed that adherence rate and nutrition is directly propositional. It revealed that there is a positive correlation between the ART adherence with nutritional status of the HIV infected adolescents in experimental group.

➢ In regard to ART adherence and QOL score, in baseline assessment showed that poor correlation between ART adherence with QOL score. But in the 3rd and 6thmonth evaluation there is fair and moderate correlation between ART with QOL score since r=0.31, 0.43 was significant at p=0.05**. Whereas in the control group, throughout the assessment period showed that there is a poor correlation between ART adherence and QOL score because of 'r' value was lesser than 0.2. It denoted that, adherence rate and QOL are directly propositional. It depicted that there is a positive correlation between the adherence with QOL of the HIV infected adolescents in the experimental group.

➢ The above findings revealed that there is significant correlation between ART adherence with nutritional status and QOL of HIV infected adolescents in experimental group alone. Since the research hypothesis of H_2 is rejected here

Regarding association of ART, Nutritional status and QOL of HIV infected adolescents in experimental group with demographic variables

➢ Regarding ART adherence gain score, In the univariate analysis, the influencing factors of adolescents age & sex, age & sex of caregivers, relationship with adolescents and residence were significant with unadjusted OR with 95% CI.

Whereas in the multivariate analysis, the sex of caregiver and residence were not significant at p=0.60 and 0.18 with adjusted OR 1.3 & 1.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI. It depicted that adolescent's age of less than 15 years and male, caregiver's age of less than 35 years, parents especially mothers and adolescence residing in rural areas were highly associated with adherence improvement.

- Considering with nutritional gain score, in the univariate analysis, the influencing factors of adolescents age & education, age & sex of caregivers, relationship with adolescents and residence were significant with unadjusted OR with 95% CI. Whereas in the multivariate analysis, the sex of caregivers and residence were not significant at p=0.14 and 0.33 with adjusted OR 1.5 & 0.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI. It revealed that adolescent's age of 10-12 years and who were in primary level education, caregivers age of 20-35 years and mothers are highly associated with nutritional improvement of HIV infected adolescents.

- In regard to QOL gain score, in the univariate analysis, the influencing factors of adolescents age and sex, age and sex of caregivers, relationship with adolescent and residence were significant with unadjusted OR with 95% CI. Whereas in multivariate analysis, the sex of caregivers and residence were not significant at p= 0.60 and 0.3 with adjusted OR 1.3 & 1.5 respectively. The rest of other variables were more significant with adjusted OR with 95 % CI. It depicted that adolescent's age of less than 15 years and male, caregiver's age of less than 35 years, parents especially mothers and the adolescents residing rural areas are highly associated with QOL improvement of HIV infected adolescents.

- The above findings of the study depicted that, there is significant association between the gain score findings of ART adherence, nutritional status and QOL of HIV infected adolescents with demographic variables of HIV infected adolescents / caregivers in experimental group alone. Since the hypothesis of H_4 rejected here.

7.2 RECOMMENDATIONS

Evidence suggests that, adolescents continue to have a variety of unmet needs. The evidence from adolescent's agency and autonomy is limited to studies with young

men and women aged 15-24 years. Further research is needed to examine factors under lying adolescent's adherence problems, nutritional impact, QOL and the expression of unequal gender role attitudes for adolescents 10-19 years of age.

- A similar study can be conducted on high risk groups and young women with HIV.
- A comparative study can be undertaken on gender influences, urban vs. rural and orphan vs. non orphan of HIV infected children / adolescents.
- A comparative study can be undertaken to infected adolescents with healthy controls in terms of QOL improvements.
- A longitudinal study is needed to identify long term effects of yoga and to be evaluate with biological markers.
- A Mind -fullness based relaxation techniques (meditation) are needed in HIV infected adolescents still they need relaxation techniques and psychological support to improve over all well being.
- A study can be undertaken in various clinical settings and in various ethics groups.
- A mixed method study can be undertaken to identify the psychological barriers of adolescents living with HIV / AIDS.
- The unmet needs of adolescent's areas should be focused separately and address the needs with appropriate intervention based study in order to make safe transition to adulthood.
- A need based intervention studies can be undertaken to improve adherence level, nutritional concern and QOL of adolescents with biological markers.
- A similar study can be conducted with nutritional supplementations.
- The computer based reminders cues can be studied in the adolescent groups in order to improve the adherence level.
- More research is required to examine adolescent-specific treatment concerns, including drug resistance, treatment failure and loss to program rates among ALHIV since many adolescents are requiring the second and the third-line regimens.

- Operations research should be undertaken to assess the impact of '**life skills building**' programs to identify effective interventions suitable for scale-up. The impact of limited autonomy and decision making on the age at marriage and long term reproductive health outcomes, educational attainment, and access to employment among adolescents needs to be studied.

7.3 NURSING IMPLICATIONS

The nurses are the center part of the multi disciplinary team in hospital, other health and ART care centres for assessing, planning and evaluating the outcome of any kind of treatment and management of PLHIV. The paradigm of HIV prevention has shifted to treatment as prevention strategies, it is essential to recognize factors like adherence promotion and retention in care to ARV regimens among HIV-positive adolescents and youth. This study findings further contribute to the evidence based clinical research for the future researchers. This study reports stimulate creative and innovative thoughts among the health professionals to evolve better strategies for further research and improve the QOL of ALHIV.

7.3.1 Nursing Education

- One of the most challenges facing student nurses is that recognizing and using appropriate strategies to meet the health education needs of ALHIV in regard to commitment to life saving drugs, nutrition and prevention of HIV/AIDS. A training / Continuing Nursing Education (CNE) can be conducted on this topic/issues.

- In the nursing curriculum, the importance should focus to the Pediatric HIV/AIDS especially on adolescent age groups. The student nurse educators should need a adequate knowledge and necessary training is essential to impart optimal adherence to ART and managing the ALHIV in ART centres.

- The HIV interventional package (HIP) module developed for this study can be used in all ART centres and College of Nursing as health education material for students.

- The curriculum plan to be extended to alternative medicine of yoga and pranayama helps to improve the overall well being of nursing students.

- The nurse educators should arrange for periodical educational camps for student nurses regarding reproductive health of adolescents, prevention strategies of HIV/ AIDS and especially reinforce safer sexual practices among high risk groups in the community.

- The Indian Nursing Council (INC) / Tamilnadu Nurses and Midwives Council (TNMC) should take up this type of interventions as educational program for student nurses includes symposium/workshop/seminars /conferences on the rules and regulations of nurses involved in adolescent HIV care.

- Periodical in service education for Nurses and Nursing students can be conducted on adolescents HIV care with regard to national guidelines.

7.3.2 Nursing practice

- The nursing fraternity should co-ordinates with nongovernmental organization in regard to implementation and scaling up of HIV control and prevention programs and safer sex practices among youths in the community and as well as the hospital periodically.

- The community health nurse should plan and conduct periodical training programs for school teachers, parents and village health workers on adolescent reproductive health, importance of nutrition in the puberty and HIV prevention.

- The study findings should develop positive attitudes to the ART staff nurses to provide appropriate counseling in regard to adherence improvement, importance of anti oxidants in the diet and strategies to enhance the QOL of all PLHA.

- The knowledge obtained from this research has to be translated into nursing service both in hospital and community settings. In hospitals,

    - ✓ Every hospital should have special training to HIV nurse who can look after HIV infected people including adolescent HIV clients.

- ✓ The nurse specialist can do the following duties,
    - Chronic diseases management including health monitoring and symptomatic management.
    - Acute care
    - Health promotion and disease prevention
    - Palliative care
    - Mental health monitoring
    - Positive living support and advocacy
    - Referral management
    - Adherence and nutritional care
    - Strategies that enhance QOL.

- ➢ In community, the public health nurse can make necessary arrangements for youth clubs and health camps especially counseling program on prevention of HIV and premarital counseling.

7.3.3 Nursing Research

- ➢ More of the qualitative and quantitative research studies can be undertaken in the area of adolescent health.

- ➢ The research and practice should consider intervention approaches that address the "live experience" of individuals in HIV care, which includes adherence challenges for those on ART, impact of nutrition and also other life priorities that influence treatment-related decisions to enhance the QOL.

- ➢ Disseminate the findings through conferences, seminars, publications in professional, national and international journals and worldwide websites helps to find the thirst areas of research in HIV/AIDS.

- ➢ Government should allot more funds for the nursing research in regard to HIV/AIDS.

7.3.4 Nursing Administration

- Nurse administrators have the responsibility to increase knowledge and awareness about ART and prevention of HIV/AIDS to community. The refresher courses for all health care professionals to be conducted periodically.

- The health professionals at all levels should be given exclusive training like in service education and continuing education for handling ALHIV. The health professionals of same gender should focus the problem of boys and girls individually.

- The nurse administrators should consult with positive networks for to promote community participation for ALHIV in order to create life skills and to be dynamic part in community programs.

- The administrators motivate the health care professionals to focus on adolescent friendly clinics. Through that, periodical screening of adolescent health problems, HIV testing and counseling, ART initiation and voluntary medical male circumcision (VMMC) are ready to implement the need based service.

- The nursing fraternity allots appropriate funds for care, monitoring and other interventions for PLWA.

- Through this study findings nurse administrators help the policy makers to frame appropriate plan for the welfare of the HIV positive adolescents.

CONCLUSION

We cannot always build the future for our youth,
But we can build our youth for the future.

Franklin D. Roosevelt

The young people are our future as well as the world's greatest resource. But the HIV epidemic brought a terrible toll on adolescents and youth have become increasingly vulnerable to transmit and acquire HIV infection. The paradigm of HIV prevention has moved to treatment as prevention strategies, it is essential to identify factors like adherence promotion and retention in care to antiretroviral regimens, promoting nutritional status among HIV-positive adolescents and youth. The successful transition of HIV infected children through adolescence into adulthood requires the multi disciplinary team approach including sexual and reproductive health, psycho social support and vocational training in order hopefully build up for their future.

The study reports revealed that, in the experimental group pretest mean score was 85.36 in adherence and 163.66 in QOL. But in the 6th month evaluation, it was increased to 98.74 and 215.64 respectively. In corresponding to the improvement of HIP components, the mean difference score with 95 % confidence interval was 13.38 & 51.97 and percentage of gain score was 13.4% in adherence and 15.1% in QOL. But in the control group, there was no significant change in mean difference score and the percentage of gain score increased to 4.9% in adherence and 0.9% in QOL. In regard to nutritional status, the both groups baseline assessment showed 28% and 29% of HIV infected adolescents had malnourished. But in the 6th month evaluation, It reduced to 19% and 28% respectively. In percentage wise nutritional gain score was increased to 9.3 % in experimental and 1.5% in control group.

This study finding suggests that adolescent focused interventions including behavior modifications are essential to improve the CD4 count, adherence rate, nutritional status and enhance quality of life. The global targets of zero infections, zero discrimination and zero deaths in the adolescent population for HIV is within our reach but adolescents centered interventions are needed as in tailored approach in order to improve the overall wellbeing of adolescents. This study finding revealed that the motivational counseling with interventional aids of diary and yoga practice makes the adolescents to build a chance for a safe, happy, healthy and productive nation in the future.

References

REFERENCES

1. Mothi SN, Swamy VHT, Lala MM, Karpagam S et al., Adolescents living with HIV in India - the clock is ticking. Indian Journal of Pediatrics. 2012; 79(12): 1642-7. doi:10.1007/s12098-012-0902.

2. Adolescent health and development. WHO Regional office for South-East Asia. Available from: http://www.searo.who.int/entity/child_adolescent/topics/ adolescent_health/en/. Accessed on January 2016.

3. UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance, Pediatric HIV surveillance among infants and children less than 18 years of age.2013. Availablefromhttp://apps.who.int/iris/bitstream/10665/85513/1/9789241505833_ eng.pdf. Accessed on April, 2016.

4. Adolescents in India: A desk review of existing evidence and behaviors, programs and policies." 2013. New Delhi: Population Council & UNICEF. Available from, http://in.one.un.org/img/ uploads/ Adolescents_in_India.pdf. Accessed on December 2015.

5. Sunitha S & Gururaj GK. Health behaviors& problems among young people in India: Cause for concern & call for action. Indian J Med Res. 2014; 140: 185-208. Available from http://icmr.nic.in/ijmr/2014/august/0805.pdf

6. Idele P, Gillespie A , Porth T Suzuki C et al., Epidemiology of HIV/AIDS Among adolescents : Current status ,Inequities and data gaps . J Acquir immune defic syndrome.2014; 66: (2):144-52.

7. Lall P, Lim SH, Khairuddin N ,KamarulzamanA et al., Review: An urgent need for research on factors impacting adherence to and retention in care among HIV - positive youth and adolescents from key populations. J Int AIDS Soc. 2015; 18(1):19393

8. Bekker LG and Hosek S .HIV and Adolescents: Focus on young key populations. J Int AIDS Soc. 2015; 18(2): 20076. doi: 10.7448/IAS.18.2.20076

9. Progress for Children: A report card on adolescents. Socio-demographic profile of adolescents: No.10 April 2012 UNICEF. Figure: 2.1 Page 6.Availablefrom: http://www.unicef.org/publications/files/Progress_for_Children__No._10_EN_04 232012.pdf.

10. Sivagurunathan C, Umadevi R, Rama R, GopalakrishnanS. Adolescent Health: Present Status and Its Related Programmes in India. Are We in the Right Direction? Journal of Clinical and Diagnostic Research.2015;9(3:)1-6. doi: 10.7860/JCDR/2015/11199.5649

11. Shisana O, Rehle T, Simbayi LC, Zuma, K et al. (2014) South African National HIV Prevalence, Incidence and Behaviour Survey, 2012. Cape Town, HSRC Press. Available from: http://www.hsrc.ac.za/uploads/page Content/4565/SABSSM%20IV%20LEO%20 final.pdf

12. United Nations Children's Fund, Towards an AIDS-Free Generation – Children and AIDS: Sixth Stocktaking Report, UNICEF, New York;2013.Available in http://www.unaids.org/sites/default/files/media_asset/20131129_stocktaking_report_children_aids_en_0.pdf.

13. Global Report: UNAIDS report on the global AIDS epidemic. 2013. Accessed on September 2015. Available from http://files.unaids.org/en/media/unaids/ contentassets/documents/epidemiology/2013/gr2013/UNAIDS_Global_Report_ 2013_en.pdf

14. Mouli VC , Armstrong A, Amin A , Ferguson J. Journal of the International AIDS Society. 2015; 18 (5):20297. Available in http://www.jiasociety.org/index.php/jias/article/view/20297 | doi.org/10.7448/IAS.18.6.20297

15. HIV and AIDS Estimates, July 2015.UNAIDS. Updated on November 2016.Available in http://data.unicef.org/hiv-aids/global-trends.html.

16. Thematic segment: HIV, adolescents and youth. UNAIDS Program Coordinating Board Thirty-Third meeting report. 2013; November 21. UNAIDS / PCB (33) / 13.22. Available in http://files.unaids.org/en/media/unaids/contentassets/ documents/pcb/2013/pcb33/agendaitems/20131121_Thematic-segment-HIV-%20youthadolescents%20.pdf.

17. Realizing the Health and Wellbeing of Adolescents. EWEC Technical Content Work stream Working Group on Adolescent Health.22 May 2015; Accessed on 24.2.16. Availableinhttp://www.everywomaneverychild.o rg/images/06_FINAL _March_ 2015_ EWEC_Adolescent_Health_March_25.pdf.

18. World Health Organization. Health for the World's Adolescents, A second chance in the second decade. 2014. Accessed on 10.6.16 Available in http://apps.who.int/adolescent/seconddecade/files/1612_MNCAH_HWA_Executive_Summary.pdf

19. UNFPA, UNESO, and WHO. Sexual and reproductive health of young people in Asia and Pacific, A review of issues,polices and program, Bangkok. UNFPA. 2015. Available in http://apps.who.int/ adolescent/second-decade/files/1612MNCAH_HWA_Executi ve_Summary.pdf

20. Naswa S, Marfatia YS, Adolescent HIV/AIDS: Issues and challenges. Indian Journal of sexually transmitted diseases. 2010; 31: 1-10. doi: 10.4103/0253-7184.68993.

21. Bhattacharya S.HIV and AIDS: prevalence and treatment in India and around the World, India Real Time. The wall street journal. Published on Dec 1, 2015. Accessed on 3.5.16. Available in http://blogs.wsj.com/indiarealtime /2015/12/01/hiv-and-aids-prelence-and-treatment-in-india-and-around-the-world/

22. Javalkar P, Prakash R, Isac S, Washington R et al., An Estimation of Mortality Risks among People Living with HIV in Karnataka State, India: Learning from an Intensive HIV/AIDS Care and Support Programme. Plos one.2016;11(6). doi:10.1371/journal.pone.0156611..

23. No adolescent living with HIV left behind: a coalition for action, UNAIDS 2014. Accessedon27.1.16.Available in http://www.gnpplus.net/assets/2014_ NoALHIV Left Behind4-copy.pdf

24. Lost In Transitions .Current issues faced by adolescents living with HIV in Asia Pacific.2014.Available in http://unesdoc.unesco.org/images/ 0022/002253/ 225361e.pdf

25. Agwu AL and Fairlie L. Antiretroviral Treatment, Management Challenges and Outcomes in perinatally HIV-infected adolescents. J Int AIDS Soc. 2013; 16:18579

26. National AIDS Control Organization. Annual Report 2015-16. Accessed on 28.07.16. Available in http://www.naco.gov.in/upload /2016%20Data/ Annual%20Report/ Annual%20Report%202015-16_NACO.pdf

27. Okoye AA and Picker LJ. CD4+ T cell depletion in HIV infection: mechanisms of immunological failure. Immunol Rev. 2013; 254(1): 54–64. doi:10.1111/imr.12066. Available in http://www.ncbi.nlm.nih.gov/pmc/articles/ PMC3729334/pdf/nihms 459538.pdf

28. AIDS info, clinical guidelines portal, for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents. Last updated: January 28, 2016. Accessed on 15.3.16. Available in https://aidsinfo.nih.Gov/ guidelines/html/1/adult-and-adolescent-arv-guidelines/10/initiation-of-antiretroviral-therapy.

29. World health Organization .Consolidated Guidelines on the Use of Antiretroviral Drugs for Treating and Preventing HIV Infection. Recommendations Form a Public Health Approach. June 2013. Available in http://apps.who.int/iris/bitstream/10665/85321/1/9789241505727_eng.pdf?ua=1

30. Gokarn A, Narkhede MG, Pardeshi GS, Doibale MK. Adherence to antiretroviral therapy. J Assoc Physicians India. 2012; 60:16-20. PMID: 23781665.

31. Paterson D L, Swindells S, Mohr J, Brester M et al., Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. Annals of Internal Medicine. 2000; 133 (1):21-30. PMID: 10877736

32. Sung H K, Gerver M S, Fidler S,Ward H et al., Adherence to antiretroviral therapy in adolescents living with HIV: Systematic review and meta-analysis. AIDS.2014; 28(13) 1945-56. doi: 10.1097/QAD.0000000000000316.

33. Cruz M L, Cardoso C A, Darmont M Q, Souza E et al., Viral suppression and adherence among HIV-infected children and adolescents on antiretroviral therapy: results of a multicenter study. J Pediatr (Rio J). 2014; 90(6):563-71. doi: 10.1016/j.jped.2014.04.007.

34. Cluver LD , Hodes RJ, Toska E Kidia KK et al., HIV is like a tostsi. ARV are your guns: Associations between HIV disclosure and adherence to ART among adolescents in south Africa. AIDS. 2015; 29(1):57-65. doi:10.1097/ QAD.0000000000000695.

35. Adefolalu O A, Nkosi Z Z et al., The complex Nature of adherence in the management of HIV/AIDS as a chronic Medical Condition. Diseases. 2013; 1(1), 18-35. doi:10.3390/diseases1010018.

36. Patrikar S, Subramanian S, Vasudevan B , Bhatti V et al., Profile of HIV patients on second line ART: The Indian Experience . Journal of Clinical Research. 2015;6(459). Available in http:// dx.doi.org/10.4172/2155-6113.1000459.

37. Close KL, Rigamonti AK. Psychosocial aspects of HIV/AIDS: Children & Adolescents. HIV Curriculum for the Health Professional. 2005; 295-309. Available in http://www.aidsdatahub.org/sites/default/files/documents/ Psychosocial_Aspects_of_HIVAIDS_Children_& Adolescents.pdf.

38. Mofenson LM and Cotton MF. The challenges of success: adolescents with perinatal HIV infection. Journal of the International AIDS Society. 2013; 16:18650 Available in. http://dx.doi.org/10.7448/IAS.16.1.18650

39. Taddeo D, Egedy M, Frappier JY. Adherence to treatment in adolescents. Pediatrics Child health. 2008;13(1):19-24.PMCID 2528818

40. Resiner SL, Mimiga MJ, Skeer M, Perkovich B et al., A Review of HIV Anti retroviral adherence and intervention studies among HIV infected Youth, Top HIV med. 2009;17(1): 14-25PMID:19270345

41. Usitalo A, Leister E, Tassiopoulos K , Allison S etal., Realtionship between viral load and self report measures of medication adherence among youth with perinatal HIV infection. AIDS care. 2014;26(1)107-15. doi: 10.1080/09540121.2013.802280..

42. Simoni J M, Amico K R, Smith L, Nelson K. et al., Anti retroviral Adherence Interventions: Translating research findings to the real World clinic. Curr HIV/AIDS Rep.2010; 7(1): 44-51. doi: 10.1007/s11904-009-0037-5

43. Nachega J B, Hislop M, Nguyen H et al., Antiretroviral therapy adherence, virologic and immunologic outcomes in adolescents compared with adults in southern Africa. J Acquir Immune Defic Syndr. 2009; 51:65-71.

44. Wanchu A, Kaur R, Bamberry P et al., Adherence to generic reverse transcriptase inhibitor - based antiretroviral medication at a tertiary centre in North India. AIDS Behav. 2007; 11: 99-102

45. Nutrition in Adolescence –Issues and Challenges for the Health Sector Issues in Adolescent Health and Development.world Health Organization.2005. Available in http://apps.who.int/iris/bitstream/10665/43342/1/9241593660_eng.pdf

46. Nutrition and HIV/AIDS: A Training Manual for Nurses and Midwives ECSA-HC, FANTA, and LINKAGES. 2008; 54-60. Available from http://www.fantaproject.org/sites/default/files/resources/Training_Manual_Complete.pdf

47. Dale Ames Kline, HIV/AIDS - Immune Function & Nutrition, Nutrition Dimension/Gannett Education. Falls Church, Nov 2011; 1-33.VA 22042:1-800-866-0919. Available from http://www.nutrition411.com/pdf/HIV%20AIDS, %20Immune %20function%20&20Nutrition.pdf

48. Kashou AH and Agarwal A. Oxidants and Antioxidants in the Pathogenesis of HIV/AIDS, The Open Reproductive Science Journal, 2011;3:154-161 Available from http://benthamopen.com/contents/pdf/TORSJ/TORSJ-3-154.pdf.

49. Nutrition assessment, counseling and support for adolescents and adults living with HIV a programming guide. Food And Nutrition In The Context Of HIV And TB. Guidance Note 2014. Available in http: //www.cmamforum.org/Pool/Resources/NACS-for-adolescents-and-adults-with-HIV-2014.pdf

50. The Canadian AIDS Treatment Information Exchange (CATIE) supplement sheet. Anti oxidants spring : 2012:1-4. Available from http://www.catie.ca

51. Kosmiski L, Energy expenditure in HIV infection. Am J Clin Nutr. 2011; 94(6): 1677–82. doi: 10.3945/ajcn.111.012625

52. Realizing the Rights of Adolescents. Chapter II. The State Of The World's Children 2011. Available in http://www.unicef.org/sowc2011/pdfs/SOWC-2011-Main-Report-chapter-2_12082010.pdf.

53. Chatterjee A, Bosch RJ, Kupka R,Hunter DJ et al., Maternal disease stage and child under nutrition in relation to mortality among children born to HIV Infected women in Tanzania. Acquired immune deficiency syndrome.2007;46(5):447-60. doi:10.1017/S1368980009990802

54. Giraldo R. Nutritional therapy for the treatment and prevention of AIDS. Southern African Development Community (SADC) Health Meeting. Johannesburg, South Africa, November 28 and 29, 2002. Available in http://www.robertogiraldo.com/eng/papers/ReportOfSADCMeeting.html/

55. Coovadia HM. Bobat.R Zinc deficiency and supplementation in HIV/AIDS. Nutrition Research.2002; 22:179-191 doi: http://dx.doi.org/10.1016/S0271-5317(01)00386-4.

56. Basavarajaiah. DM, Murthy NB. Leelavathy, Maheshappa K. Assessment of QOL of People living With HIV/AIDS in Karnataka State. International Journal Of Scientific & Technology Research.2012;1(10)

57. Basavaraj K H, Navya M A, Rashmi R. Quality of life in HIV/AIDS. Indian J Sex Transm Dis 2010;31:75-80

58. Masquillier C, Wouters E, Loos J and Nöstlinger C. Measuring Health-Related Quality of Life of HIV-Positive Adolescents in Resource-Constrained Settings. Plos One. 2012; 7(7). doi: 10.1371/journal.pone.0040628

59. Andrinopoulos K, Clum G, Murphy DA Harper G. Health Related Quality Of Life and Psychosocial Correlates Among Hiv-Infected Adolescent And Young Adult Women In The Us. AIDS Educ Prev. 2011 Aug; 23(4): 367–381.

60. Bunupuradah T , Puthanakit T, Kosalaraksa P. Quality of life among untreated Thai and Cambodian children without severe HIV symptoms. AIDS Care. 2011 ; 29:2962–2967.

61. Lee GM, Gortmaker SL, McIntosh K, Michael D et al., Quality of life for Children and Adolescents: Impact of HIV Infection and Antiretroviral Treatment. Pediatrics. 2006, 117 (2) 273-283; DOI: 10.1542/peds.2005-0323.

62. Goldin N, Patel P, Perry K, The global youth well being index, A report of CSIS youth , prosperity and security initiative and the international youth foundation. April 2014.Availablein http://www.youthindex.org/reports/globalyouth wellbeing index.pdf.

63. Bekker LG, Johnson L, Wallace M and Hosek S. Building our youth for the future.J Int AIDS Soc. 2015; 18; 2: (1). doi: 10.7448/IAS.18.2.20027.

64. Lang T, Heylen E, Perumpil S, Shet. A. Quality of life and psychosocial well-being among children living with HIV at a care home in Southern India. Vulnerable Child Youth Stud. 2014;9 (4):345-352.

65. Oberdorfer P, Louthrenoo O, Puthanakit T, Sirisanthana V et al., Quality of Life Among HIV-Infected Children in Thailand . Journal of the International Association of Physicians in AIDS Care.2008; 7: (3).141-47 doi: 10.1177/1545109708318877.

66. Tao Xu. Quality of life of children living in HIV/AIDS-affected families in rural areas in Yunnan, China. AIDS Care. 2010;390- 396.

67. Oluwafemi O Oguntibeju. Quality of life of people living with HIV and AIDS and Antiretroviral therapy. HIV/AIDS - Research and Palliative Care 2012:4 117–124.Available in https;//dx.doi.org/10.2147/HIV.S32321

68. Patrica Garcia. Impact of adherence and highly active ART on survival in HIV infected patients. Journal of Acquired immune Deficiency syndrome. 2002; 30(1):105-110.

69. Shonil A. Bhagwat. Yoga and Sustainability. The journal of yoga.2008: 7;1 Available from http://www.journalofyoga.org/yogaandsustain.pdf

70. Cho M, Ye X, Dobs A, Cofrancesco J. Prevalence of complementary and alternative medicine use among HIV patients for perceived lipodystrophy. J Altern Complement Med 2006; 12: 475–482. Available from http://www.ncbi.nlm.nih.gov/ pubmed/16813512

71. Stacie Stukin. Healing HIV: A Holistic Approach. Yoga journal.Aug28, 2007 downloaded on 06.07.15 Available from www.yogajournal.com/article/ health/health-hope-and-hiv

72. Chapel Hill. Psychosomatic Medicine University of North Carolina: 2008 downloaded on 05.07.15 .Available from www.yogajournal.com/article/ health/health-hope-and-hiv

73. Heather Boerner. HIV/AIDS- protect your immune system. Yoga journal. Oct 2009.downloaded on 06/07/15.Available from http://www.yogajournal. com/article/health/positively-healing-2/

74. Matt McMillen. Yoga for People with HIV. Hemaware. Jan 2009.Available on 01.07.2010 downloaded on 06/07/15 Available from http://www.hemaware.org /story/yoga-eople-hiv

75. Joseph B, Nair PM, Nanda A. Effects of naturopathy and yoga intervention on CD4 count of the individual receiving ART –Report from Human Immuno deficiency virus sanatorium, Pune. Int J Yoga .2015; 6:8: 122-7. Available from http;//www.ijoy.org.in/text.asp/2015/8/2/122/158475.

76. Michael Solis. Yoga for people living with HIV. 2010.downloaded on 07/07/15 Available from http://www.yogapoint.com/therapy/yoga_for_people with_HIV.htm#S

77. Sengupta P.Health Impacts of Yoga and Pranayama: A State-of-the-Art Review. Int J Prev Med. 2012; 3(7): 444–458.

78. Woodyard C Exploring the therapeutic effects of yoga and its ability to increase quality of life. Int J Yoga. 2011 Jul-Dec; 4(2): 49–54.doi: 10.4103/0973-6131.85485

79. UNAIDS ,Gap Report 2014. Beginning of the End of the AIDS Epidemic. Available inwww.unaids.org/en/media/ unaids /content assets/ 2014/UNAIDS_ Gap_report_en.pdf.

80. Core epidemiology Slides. UNAIDS. July 2015. Accessed on 27.12.15. Available inhttp://www.unaids.org/sites/default/files/media_asset/20150714_epi_core_en.p df

81. UNAIDS Fact sheet 2016. Report of 2015 global statistics ending the AIDS epidemic 2030. Available in http://www.unaids.org/sites/default/files/media _asset/UNAIDS _FactSheet_en.pdf..

82. UNAIDS report on the global AIDS epidemic 2013. Available in http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Global_Report_ 2013_en_1.pdf.

83. UNICEF East Asia and Pacific Regional Office, Adolescents under the Radar In The Asia-Pacific AIDS Response, December 2015. Available in http://www.unicef.org/ eapro/Adolescents_Under_the_Radar_final.pdf

84. Dr. Y. D. Badgaiyan . Status and management of HIV/AIDS in India power point slides; 2014. Available in http://www.slideshare.net/dharmendragahwai / hiv-aids-in-india.

85. HIV and AIDS estimates, July 2015. UNAIDS. Uploaded on March 2016. Accessed on 23.7.16. Available a thttp://data.unicef.org/hiv-aids/global-trends.html.

86. India HIV Estimations 2015. TECHNICAL REPORT National AIDS Control Organization& National Institute of Medical Statistics, ICMR Ministry of Health & Family .Welfare Government of India. Available in http://www.naco.gov.in/upload/2015%20MSLNS/HSS/India%20HIV% 20Estimations % 202015.pdf.

87. National AIDS Control Organization .Department of AIDS Control, Ministry of Health & Family Welfare. Annual Report 2013-14. Accessed on 02.12.15.Available in http://164.100.12.21/upload/2014%20mslns/NACO_English%202013-14.pdf

88. Kalyani.V, Vasanthi. R. A Geographical Distribution of AIDS Cases in Tamilnadu District Wise (2008 – 2014) Journal of Engineering Research and Applications.2015;5:2(5) 90-99. Available in http://www.ijera.com/papers/Vol5_issue2/Part%20-%205/I502059099.pdf.

89. District Profiles of Tamilnadu. A joint initiative of Tamilnadu State AIDS Control Society (TANSACS), AIDS Prevention and Control Project(APAC).December 2011.

90. ART set up and procurement. Unit-3, HIV care and ART. A course for health care providers. Power point slides. Available in http://slideplayer.com/slide/7342609/#.

91. Nursing care of patients with HIV/ AIDS facilitator's Guide. Family health International 360. July 2011. Available in https://www.fhi360.org/sites/default/files/media/documents/Nursing% 20Care% 20of%20Patients%20with%20HIV-AIDS%20-%20Facilitator %20 Guide .pdf.

92. Koerich C, SantosFCD, MeirellesBHS , ErdmannAL. Management of nursing care of the adolescent living with HIV/AIDS Esc. Anna Nery. 2015; 19:1. Available in http://dx.doi.org/10.5935/1414-8145.2015001

93. Koech E, Teasdale CA, Wang C, Fayorsey R et al., Characteristics and outcomes of HIV-infected youth and young adolescents enrolled in HIV care in Kenya. AIDS. 2014;28:2729–2738.DOI:10.1097/QAD.0000000000000473

94. Lwanga F, Wanyenze RK, Matovu, JKB, Chimulwa T et al., Nutritional Status of HIV infected Adolescents Enrolled into an HIV-care Program in Urban and Rural Uganda: A Cross sectional Study. World Journal of Nutrition and Health. 2015; 3(2): 35-40. doi: 10.12691/jnh-3-2-2

95. Fawzi MCS, Eustache E, Oswald C, Surkan P et al., Psychosocial Functioning Among HIV-Affected Youth and Their Caregivers in Haiti: Implications for Family-Focused Service Provision in High HIV Burden Settings. AIDS Patient Care And STDs.2010;24:(3)147-58..DOI: 10.1089=apc.2009.0201

96. Naoroibam R, Metri KG, Bhargav H, Nagaratna R et al., Effect of Integrated Yoga (IY) on psychological states and CD4 counts of HIV-1 infected Patients: A Randomized controlled pilot study. Int J Yoga. 2016; 9 (1): 57-61

97. All In to #End Adolescent AIDS.2015.Available at http://www.unaids.org/sites/ default/ files/media_asset/20150217_ALL_IN_brochure.pdf

98. Denise F. Polit and Cheryl Tatano Beck, Nursing Research, Generating and Assessing Evidence for Nursing practice.5th ed.Philadelphia: Lippincott Willams and wilkins publications; 2011.

99. Park K. Text book of preventive and social medicine.23rd ed. Jabalpur:M/s Banarsidas Bhanot publishers; 2015. pp 343-55, 433-38

100. M.S. Bhatia, Vijay Grover, Ravi Gupta. A Text book on HIV infection and AIDS in Adolescents. NewDelhi: New Age International Publishers;2009.

101. Antiretroviral therapy in guidelines for HIV infected adults and adolescents. May-2013. Department AIDs control, National AIDS Control Organization. Ministry of Health And Family Welfare. Government of India. Available in http://www.hivpolicywatch.org/duremaps/data/guidelines/IndiaAdultARTguidelines2013.pdf.

102. Fick C, Fairlie L, Moultrie H, Woollett N etal., Working with adolescents living with HIV: A handbook for healthcare providers. Johannesburg: Wits RHI and Southern African HIV Clinicians Society, 2015..

103. WHO/CDS/IMAI. General Principles of Good Chronic Care. Integrated management of adolescent and adult illness interim guidelines for first level facility health workers.2004.3 Revision.

104. World Health Organization. 7.6 Third-line ART Consolidated ARV guidelines, June 2013. Available in http://www.who.int/hiv/pub/guidelines/arv2013/art/ third lineart/en/index 2.html.

105. Ferrand RA, Briggs D, Ferguson J, Penazzato M et al., Viral suppression in adolescents on antiretroviral treatment: A review of the literature and critical appraisal of methodological challenges. Trop Med Int Health. 2016; 21(3): 325–333. doi:10.1111/tmi.1265. Available from http://researchonline. lshtm.ac.uk/2478671/

106. Kukoyi O, Renner L, Powell J , Barry Oet al., Viral load monitoring and Anti retroviral treatment outcomes in a pediatric HIV cohort in Ghana. BMC Infectious Diseases.2016;16:58.DOI 10.1186/s12879-016-1402-9

107. Okatch H, Beiter K, Eby J Chapman J et al.,Brief Report: Apparent Antiretroviral Over adherence by Pill Count is Associated with HIV Treatment Failure in Adolescents. J Acquir Immune Defic Syndr. 2016 .PMID:26990822

108. Carly H & Cluver L (2015) Factors associated with adherence to antiretroviral therapy among adolescents living with HIV/AIDS in low- and middle-income countries: a systematic review, AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV.2015;27(7):805-816,
doi: 10.1080/09540121.2015.1011073

109. Cordova E, Yañez J, Claudia G Ismael R. Safety and efficacy of antiretroviral therapy in perinatally HIV-1 infected patients following transition to an adult HIV-care hospital with virological failure in Buenos Aires, Argentina. Enferm Infecc Microbiol Clin. 2015;33(2):133–140 doi: 10.1016/j.eimc.2014.05.005

110. Kim SH, McDonald S, Kim S, Foster C, et al., Importance of Self-Motivation and Social Support in Medication Adherence in HIV-Infected Adolescents in the United Kingdom and Ireland: A Multicentre HYPNET Study. AIDS Patient Care STDS. 2015 Jun;29(6):354-64. doi: 10.1089/apc.2014.0335.

111. Marvin BE, MacDonel KK, Leslie F. Acceptability and Feasibility of a Cell PhoneSupport Intervention for Youth Living with HIVwith Nonadherence to Antiretroviral Therapy. AIDS PATIENT CARE and STDs:2015;Vol29: N0 6,. doi: 10.1089/apc.2014.0282

112. Orrell C,Cohen K, Med M, Bangsberg DRet al., A Randomized Controlled Trial of Real-Time Electronic Adherence Monitoring With Text Message Dosing Reminders in People Starting First-Line Antiretroviral Therapy.J Acquir Immune Defic Syndr 2015;70:495–502 doi: 10.1097/QAI.0000000000000770

113. Shet A , Costa AD, Kumarasamy N,Rewari RR et al., Effect of mobile telephone reminders on treatment outcome in HIV: evidence from a Randomized Controlled Trial in India. BMJ 2014;349. doi: http://dx.doi.org /10.1136/bmj.g5978.

114. Chaiyachati KH, Ogbuoji O, Price M, Suthar AB et al., Interventions to improve adherence to antiretroviral therapy: a rapid systematic review AIDS.2014;28(2):S187–S204. doi:10.1097/QAD.0000000000000252

115. Intasan J, Bunupuradah T, Vonthanak S , Kosalaraksa P et al., Comparison of Adherence Monitoring Tools and Correlation to Virologic Failure in a Pediatric HIV Clinical Trial.AIDS Patient Care STDS. 2014;28(6):296-302. doi: 10.1089/apc.2013.0276.

116. Maduka O and Tobin-West C.I. Barriers to HIV Treatment Adherence: Findings from a Treatment Center in South-South, Nigeria. International Journal of Tropical Disease & Health. 2014; 4(12):1233-1244 doi: 10.9734/IJTDH/2014/12186

117. Evans D, Menezes C , Mahomed K, Macdonald P et al., Treatment Outcomes of HIV-Infected adolescents attending public-sector HIV clinics across Gauteng and Mpumalanga, South Africa. AIDS Research And Human Retroviruses .2013; 29(6):892-900. doi: 10.1089/aid.2012.0215

118. Maduka O, Tobin-West CI. Adherence counseling and reminder text messages improve uptake of antiretroviral therapy in a tertiary hospital in Nigeria. Niger J Clin Pract 2013;16: 302-8. doi: 10.4103/1119-3077.113451

119. Donell MK, king SN, Huszti H,Mar Belzer M et al., Barriers to Medication Adherence in Behaviorally and Perinatally Infected Youth Living with HIVAIDS Behav. 2013 January; 17(1): 86–93. doi:10.1007/s10461-012-0364-1.

120. Shroufi A, Gunguwo H, Dixon M, Nyathi M et al., HIV-infected adolescents in southern Africa can achieve good treatment outcomes: Results from a Retrospective cohort study. AIDS. 2013; 27: 1971–1978. doi:10.1097/QAD.0b013e32836149ea

121. Ugwu R & Eneh A. Factors influencing adherence to paediatric antiretroviral therapy in Portharcourt, South- South Nigeria. Pan African Medical Journal. 2013; 16:30. doi:10.11604/pamj.2013.16.30.1877. Available in http://www.panafrican-med-journal.com/ content/ article/ 16/30/full/Pan.

122. Buchanan AL, Montepiedra G, Sirois PA , Kammerer B et al., Barriers to Medication Adherence in HIV-Infected Children and Youth Based on Self- and Caregiver Report. Pediatrics. 2012 ; 129: 5. doi:10.1542/peds.2011-1740.

123. Dowshen N, Kuhns LM, Johnson A, Holoyda BJ et al., Improving Adherence to Antiretroviral Therapy for Youth Living with HIV/AIDS: A Pilot Study Using Personalized, Interactive, Daily Text Message Reminders.J Med Internet Res.2012;14(2):e51. doi:10.2196/jmir.2015.

124. Kikuchi K, Poudel KC, Muganda J,Majyambere A et al.,High Risk of ART Non-Adherence and Delay of ART Initiation among HIV Positive Double Orphans in Kigali, Rwanda. PLoS ONE.2012; 7(7): e41998. doi:10.1371/journal.pone.0041998

125. Wasti SP, Simkhada P, Randall J, Freeman JV et al., Factors Influencing Adherence to Antiretroviral Treatment in Nepal: A Mixed- Methods Study. PLoS ONE. 2012; 7(5): e35547. doi:10.1371/journal.pone.0035547

126. Mellins CA Tassiopoulos K, Malee K, Moscicki AB et al., Behavioral Health Risks in Perinatally HIV-Exposed Youth: Co-Occurrence of Sexual and Drug Use Behavior, Mental Health Problems, and Non adherence to Antiretroviral Treatment. AIDS Patient Care And STDs.2011; 25 (7): 413-22.DOI: 10.1089/apc.2011.0025.

127. Yengopal V, Kolisa Y, Thekiso MD, Molete MP et al., The child and adolescent with HIV in resource Poor countries. Oral Diseases .2016; 22 (1): 25–34 doi:10.1111/odi.12411.

128. Ifitezue LC and Sosanya ME Nutritional assessment of children orphaned from human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS), and Implementing a food based intervention to improve their nutritional status in Bauchi metropolis, Nigeria.2015; 7(9):130-137. DOI: 10.5897/JAHR2015.0331

129. Pires P, Marega A and Craegh J. Food insecurity and ART non adherence, Nampula, Mozambique. International Journal of Research.2015;02(12):92-98.Available in :http:// international journalofresearch.org/

130. Sales-Peres SHC, Costa AH, Mapengo MA, Yamashita JM et al., Oral Health Status and Anthropometric Conditions among HIV Infected Adolescents on Antiretroviral Therapy in Mozambique. J HIV Clin Scientific Res .2015; 2(1): 105

131. Shet A, Bhavani PK , Kumarasamy N. Arumugam K et al., Anemia, diet and therapeutic iron among children living with HIV: a prospective cohort study BMC Pediatrics .2015; 15(164)1-9.DOI 10.1186/s12887-015-0484-7

132. Swetha GK, Hemalatha R, Prasad UV, Murali V et al., Health & nutritional status of HIV infected children in Hyderabad, India. Indian J Med Res. 2015;141(1):46-54.PMCID: PMC4405939

133. Anyabolu HC, Adejuyigbe EA , Adeodu OO. Serum Micronutrient Status of HAART-Na\ve, HIV Infected Children in South Western Nigeria: A Case Controlled Study AIDS Research and Treatment. 2014. Available at http://dx.doi.org/10.1155/2014/351043

134. Hillesheim E, Lima LR, Silva RC, Trindade EB. Dietary intake and nutritional status of HIV-1-infected children and adolescents in Florianópolis, Brazil . Int J STD AIDS. 2014; 25: (6)439-47.doi:10.1177/0956462413512808.

135. Modlin CE, Naburi H, Hendricks KM, Lyatuu G et al., Nutritional Deficiencies and Food Insecurity Among HIV-infected Children in Tanzania. International Journal of MCH and AIDS. 2014; 2 (2):220-228. Available online at www.mchandaids.org.

136. Braitstein P, Ayaya S, Nyandiko WM, Kamanda A, et al., Nutritional Status of Orphaned and Separated Children and Adolescents Living in Community and Institutional Environments in Uasin Gishu County, Kenya. Plos One.2013;8(7): e70054. doi:10.1371/journal.pone.0070054

137. Mudzinge D, Nyazika TK , Chisango TJ. Zhou DT et al., Differences in Serum Levels of Magnesium, Phosphate, and Albumin for HAART-Experienced and HAART-Na\ve Female Patients attending Parirenyatwa Opportunistic Infections Clinic in Harare, Zimbabwe.ISRN AIDS.2013;Article ID 383214. Available in http://dx.doi.org/10.1155/2013/383214

138. Schtscherbyna A, Pinheiro MFMC, Mendonc¸LMCD , Gouveia C et al., Factors associated with low bone mineral density n a Brazilian cohort of vertically HIV-infected adolescents. International Journal of Infectious Diseases.2012;16 (12):e872–8.Available in http://dx.doi.org/10.1016/j.ijid.2012.07.019

139. .Barros Ramalho LC, Gonc alves EM¸ Carvalho WRD, Junior GG et al., Abnormalities in body composition and nutritional status in HIV-infected children and adolescents on antiretroviral therapy. International Journal of STD & AIDS 2011; 22(8): 453– 6 DOI: 10.1258/ijsa.2011.010516

140. Liu E, Spiegelman D, Semu H , Hawkins C et al., Nutritional Status and Mortality Among HIV Infected Patients Receiving Anti retroviral Therapy in Tanzania. The Journal of Infectious Diseases 2011; 204: 282–90. DOI: 10.1093/infdis/jir246

141. Mohd. Nasir MT, Yeo J, Huang MSL, Koh MT et al., Nutritional Status of Children Living with HIV and Receiving Antiretroviral (ARV) Medication in the Klang Valley, Malaysian J Nutrition. 2011; 1: (1)19-30.

142. Souza DT, Rondo PH, Reis LC. The nutritional status of children and adolescents with HIV/AIDS on Anti-retroviral therapy. J Trop Pediatr. 2011;57(1):65-8.doi: 10.1093/tropej/fmq035.

143. Banerjee T, Pensi T, Banerjee D. Impact of HAART on survival, weight gain and resting energy expenditure in HIV-1-infected children in India Annals of Tropical Pediatrics: International Child Health.2010;30:1:27-37. doi:10. 1179/146532810X12637745451915

144. Steenkamp L, Dannhauser A, Walsh D, Joubert G et al., Nutritional, immune, micro nutrient and health status of HIV-infected children in care centres in Mangaung. S Afr J Clin Nutr. 2009; 22(3) 131-36. doi:10.1080/16070658.2009.11734234

145. Stephensen CB, Marquis GS, Kruzich LA. Douglas S et al., Vitamin D status in adolescents and young adults with HIV infection1–3. Am J Clin Nutr .2006; 83(5):1135– 41

146. Kruzich LA, Marquis GS, Carriquiry AL, Wilson CM et al., .US youths in the early stages of HIV disease have low intakes of some micronutrients important for optimal immune function. Journal of the American dietetic association. 2004;104 (7): 1095–1101. doi: http://dx.doi.org/10.1016/j.jada.2004.04.021

147. Anmol G, Randhir K, Vishal S, Goel RKD et al., Pattern of physical activity among school going adolescents (10-18 years) in district Ambala, Haryana. Int J Health Sci Res. 2016; 6(2):59-64.

148. Galano E, Turato ER, Delmas P, Cote J et al. Experiences of adolescents sero positive for HIV/AIDS:a qualitative study. Rev Paul Pediatr.2016;34(2):171-77 Available in http://dx.doi.org/10.1016/j.rppede.2015.08.019

149. Nichols SL, Chernoff MC, Malee K, Sirois PA et al.,Learning and Memory in Children and Adolescents With Perinatal HIV Infection and Perinatal HIV Exposure. Pediatric Infectious Disease Journal. 2016; 35: 6:649–54. doi: 10.1097/INF.0000000000001131

150. Akpa OM & Bamgboye EA. Correlates of the quality of life of adolescents in families affected by HIV/AIDS in Benue state, Nigeria 2015; 10(3)225-42. doi:10.1080/17450128. 2015. 1066914

151. Buczynski AK, Leao ATT, de Souza IPR (2015) Evaluation of Quality of Life in HIV Infected Children and Children with Cancer. Dentistry 5: 276. doi:10.4172/2161-1122.1000276.

152. Tanaka LF, Latorre MR, Silva SM, Konstantyner TCRO et al., High prevalence of physical inactivity among adolescents living with HIV/AIDS Rev Paul Pediatr. 2015;33(3):326-31 Available in http://dx.doi.org/10.1016/j.rpped.2014.12.003

153. Bharathi, Pai M S, Nayak BS. Quality of life and Social Support among Children Living with HIV (CLHIV) in South India IOSR (IOSR-JNHS)2014; 3: II 6:55-58.

154. Kumar SGP, Dandona R, Kumar GA, Ramgopal SP et al., Depression among AIDS orphaned children higher than among other orphaned children in southern India. International Journal of Mental Health Systems. 2014; 8:13. doi:10.1186/1752-4458-8-13

155. Qiao S, Li X, Zhao G and Zhao J et al., The role of perceived social support in loneliness and self-esteem among children affected by HIV/AIDS: a longitudinal multilevel analysis in rural China AIDS 2014; 28 (3):369–77. doi:10.1097/QAD.0000000000000338

156. Wu X, Chen J, Huang H ,Liu Z et al., Perceived stigma, medical social support and quality of life among people living with HIV/AIDS in Hunan, China. Applied Nursing Research. 2015 ;28(2):169-74. doi: 10.1016/j.apnr.2014.09.011.

157. Gowda S, Channabasappa AN, Dhar M, Krishna D. Quality of life in HIV/AIDS patients in relation to CD4 count: A cross-sectional study in Mysore district. Int J Health Allied Sci 2012;1:263-7

158. Rajeev K H, Yuvaraj B Y, Nagendra Gowda M R, Ravikumar S M. Impact of HIV/AIDS on quality of life of people living with HIV/AIDS in Chitradurga district, Karnataka. Indian J Public Health 2012; 56:116-21. doi: 10.4103/0019-557X.99901.

159. Imam MH, Karim MR, Ferdous C, Akhter S et al., Health related quality of life among the people living with HIV.Bangladesh Med Res Counc Bull. 2011; 37(1):1- 6 PMID: 21710808.

160. Zhao G, Li X , Fang X , Zhao J et al., Functions and sources of perceived social support among children affected by HIV/AIDS in China. AIDS Care. 2011; 23(6): 671–679. doi:10.1080/09540121.2010.525619

161. Kumakech E, Cantor-Graae E, Maling S, Bajunirwe. F et al., Peer-group support intervention improves the psycho social well-being of AIDS orphans: cluster randomized trial.Soc Sci Med. 2009; 68(6):1038-43.
doi: 10.1016/j.socscimed.2008.10.033.

162. Lee SJ, Detel R , Borus R ,Jane M et al., The Effect of Social Support on Mental and Behavioral Outcomes Among Adolescents With Parents With HIV/AIDS. Am J Public Health.2007; 97(10):1820-26. doi:10.2105/AJPH.2005.084871

163. Wig N, Lekshmi R, Pal H, Ahuja V, Mittal CM, Agarwal SK. The impact of HIV/AIDS on the quality of life: A cross sectional study in north India. Indian J Med Sci 2006;60:3-12

164. Garg S, Chandla SS. Effect of nadi shodhan pranayama on pulmonary functions. Int J Health Sci Res. 2016; 6(4):192- 6.

165. .Sethi JK, Nagendra HR, Ganpat TS.Yoga improves attention and self-esteem in underprivileged girl student. J Edu Health Promot. 2013; 2(55)PMC3826026

166. Felver J C, Butzer B, Olson KJ , Smith LM et al., Yoga in public school improves adolescent mood and affect .Contemp Sch Psychol. 2015 ;September ; 19(3): 184–192. doi:10.1007/s40688-014-0031-9.

167. Marwar N, Katendra T, Bagul R, Bembalkar S et al., Sudarshan kriya yoga improves quality of life in healthy people living with HIV (PLHIV) : results from an open label randomized clinical trial. Indian J Med Res.2015; 141(1):90-99. PMC4405947.

168. Unniraman P, Chandran KM , Unnikrishnan P et al., Effect of yoga on menstrual problems in adolescents. International journal of yoga and Allied sciences.2015; 4(1):15-21.

169. Cramer H, Lauche R and Dobos G. Characteristics of randomized controlled trials of yoga: a bibliometric analysis. BMC Complementary and Alternative Medicine.2014;14: 328. Avaialble in http://www.biomedcentral.com/1472-6882/14/328.

170. Gupta V, Singh Y, Vikramaditya B, Singh H et al., Immediate Effect of Nadi Shodhana Pranayama on Some Selected Parameters of Cardio respiratory and Mental Efficiency. Journal of Current Trends in Clinical Medicine & Laboratory Biochemistry. 2014; 2(3):12-15.

171. Trivedi I. Impact of Manomay kosh Sadhana on adolescents Mental Health. Journal of International Academic research for multidisciplinary. 2014; 2(6): 459-63

172. Menon A J, Glasebrook C et al., Randomized control trial to evaluate yoga based peer support group for human immunodeficiency virus positive Zambian adolescents. Journal of AIDS and HIV Research. 2013; 5(1):12-19. DOI: 10.5897/JAHR12.027.

173. Babu N, Pradhana B, Nagendra HR. A comparative study on two yogic relaxation techniques on anxiety in school children. Int J Yoga .2013; 1(2):65-8.DOI: 10.4103/2347-5633.157887

174. Shaju S and Umarani J . Pranayama And Stress Reduction-A Quasi Experimental Study. Review of Research, 2013; 2 (10). Available online at www.reviewofresearch.net

175. Somarriba G, Mitnik GL, Ludwig DA, Neri D et al., Physical Fitness in Children Infected with the Human Immunodeficiency Virus: Associations with Highly Active Antiretroviral Therapy. AIDS Research and Human Retroviruses.2013; 29(1):112-20.DOI: 10.1089/aid.2012.0047.

176. Sushant S and Khyati SS. Effect of pranayama on pulmonary functions - An Overview. International Ayurvedic Medical Journal.2013; 1(2). Available in www.iamj.in/images/upload/9.pdf

177. Anand U, Sharma MP. Impact of a Mindfulness-Based Stress Reduction Program on Stress and Well-Being in Adolescents: A Study at a School Setting. J. Indian Assoc. Child Adolesc. Ment. Health 2011; 7(3):73-97.

178. Gopal A, Mondal S, Gandhi A, Arora S et al., Effect of integrated yoga practices on immune responses in examination stress- A preliminary study. Int J Yoga. 2011;4(1):26-32.doi: 10.4103/0973-6131.78178

179. Mueller J, Alie C, Jonas B, Brown E et al., A quasi-experimental evaluation of a community-based ART therapy intervention exploring the psychosocial health of children affected by HIV in South Africa. Tropical Medicine and International Health.2011;16 (1):57–66.doi:10.1111/j.1365 3156.2010.02682.x

180. Cade PT, Reeds DN, Mondy KE, Overton ET et al., Yoga life style intervention reduces blood pressure in HIV infected adults with cardio vascular disease risk factors. HIV Med. 2010; 11(6): 379-88. doi: 10.1111/j.1468-1293.2009.00801

181. Mendelson T, Greenberg MT, Dariotis JK, Gould L F et.al. Feasibility and preliminary outcomes of a school-based mindfulness intervention for urban youth. J Abnorm Child Psychol. 2010;38: 985–994. doi. 10.1007/s10802-010-9418-x Available in http://prevention.psu.edu/media/prc/ files/ Mendelson etal. mindfulness2010.pdf

182. Ross A and Thomas S. The Health Benefits of Yoga and Exercise: A Review of Comparison Studies. The Journal of Alternative and Complementary Medicine.2010;16(1): 3-12. doi:10.1089/acm.2009.0044

183. Yarasheski KE. US Clinical trials. Yoga for the management of HIV metabolic syndrome .2010;Clinical Trials.gov IdentifierNCT00627380. Available in https://clinicaltrials. gov/ ct2/show/NCT00627380

184. Basavanthappa, B. Nursing Theories. Ist ed., Jaypee Brothers Medical Publishers (P) Ltd: New delhi; 2007.pp147- 68.

185. Imogene M. King, Theoretical foundations for Nursing. King's Conceptual System and Theory of Goal Attainment and Transactional Process. 2011. Available in http://nursingtheories.weebly.com/imogene-m-king.html.

186. Cardoso CA, Pinto JA, Candiani, TM, Carvalho IR et al., The impact of highly active antiretroviral therapy on the survival of vertically HIV-infected children and adolescents in Belo horizonte, Brazil. Memórias do Instituto Oswaldo Cruz.2012; 102: 532-538. Available in http://dx.doi.org/10.1590/S0074-02762012000400014.

187. Matida LH, SilvaMH, Tayla A, Succi RCM et al., Prevention of Mother to child Transmission of HIV in Sao paulo state, Brazil, An update AIDS.2005;19:4.S37-S41.

188. Lorenz R, Grant E, Muyindike W, Maling S et al., Caregivers' Attitudes towards HIV Testing and Disclosure of HIV Status to At-Risk Children in Rural Uganda Plos one.2016;11(4). doi: http://dx.doi.org/10.1371/journal.pone.0148950.

189. Menon A, Glazebrook C, Campain N, Ngoma M (2007) Mental health and disclosure of HIV status in Zambian adolescents with HIV infection: implications for peer-support programs. J Acquir Immune Defic Syndr 46: 349–354.

190. Butler AM, Paige L. Williams, Lois C. Howland et al., Impact of Disclosure of HIV Infection on Health-Related Quality of Life Among Children and Adolescents With HIV Infection. Pediatrics. 2009;123;935. doi: 10.1542/peds.2008-1290.

191. Botros D, Somarriba G, Neri D,Miller LT. Interventions to Address Chronic Disease and HIV: Strategies to Promote Exercise and Nutrition Among HIV-Infected Individuals Curr HIV/AIDS Rep.2012; 9: 351. doi:10.1007/s11904-012-0135-7

192. Ogalha C, Luz E, Sampaio E, Souza R et al., A randomized, clinical trial to evaluate the impact of regular physical activity on the quality of life, body morphology and metabolic parameters of patients with AIDS in Salvador, Brazil J Acquir Immune Defic Syndr. 2011; 57(3). S179-85. doi: 10.1097/QAI.0b013e31821e9bca.

193. Bharathi , Pai MS , Nayak BS. Stigma And Discrimination Among Children Living With HIV (CLHIV) In South India. ASia Pacific Journal of Research. 2014; Vol:I Issue XVIV. Available in http://apjor.com/downloads/201120149.pdf

194. Gupta AK, Rawat N, Rai K, Rana S, Chakraborty S. Orphan and vulnerable children infected or affected by HIV/AIDS in Delhi – situational analysis and state government's initiative of household economic strengthening. Vulnerable Child Youth Stud. 2013; 8 : 161–170. doi: 10.1080/17450128.2012.738949

195. Gupta R, Shringi S, Mahajan V, Venkatesh G, Srivastava K. A study of psychological impact of diagnosisof HIV in Children and Adolescents in Indian population. HIV/AIDS Res and Treat Open J. 2015; 1(1): 16-20. Available in http://dx.doi.org/10.17140/HARTOJ-1-102.

196. Hoff T, Greene L, Davis J. Kaiser Family Foundation. Sexual health knowledge, attitudes and experiences. Menlo Park, CA: Henry J. Kaiser Family Foundation; 2003. National survey of adolescents and young adults.

197. Barennes H,Tat S,ReinharzD Vibol U. Perceived stigma by children on antiretroviral treatment in Cambodia BMC Pediatrics.2014; 14(1):300. doi: 10.1186/s12887-014-0300

198. Biressaw S, Abegaz WE, Abebe M,Taye WA et al., Adherence to Antiretroviral Therapy and associated factors among HIV infected children in Ethiopia: unannounced home-based pill count versus caregivers' report BMC Pediatrics. 2013; 13:132: doi:1471-2431/13/132.

199. Lata S and Verma S Mental health of HIV/AIDS orphans: A review Journal of AIDS and HIV Research. 2013; Vol. 5(12), pp.455-467. doi: 10.5897/JAHR2013.0271.

200. .Jong E, Oudhoffc LA, Epskamp C ,Marlies N. et al., Predictors and Treatment Strategies of HIV-related Fatigue in the Combined Antiretroviral Therapy Era. AIDS. 2010;24(10):1387-1405.

201. Tran BX, Nguyen LT, Nguyen NH. Determinants of antiretroviral treatment adherence among HIV/AIDS patients: a multisite study. Glob Health Action 2013, 6: 19570 http://dx.doi.org/10.3402/gha.v6i0.19570

202. Eticha T and Berhane L. Caregiver-reported adherence to antiretroviral therapy among HIV infected children in Mekelle, Ethiopia BMC Pediatrics 2014, 14:114Available athttp://www.biomedcentral.com/1471-2431/14/114.

203. Ernesto AS, Pinto de Lemos RMB, Huehara ML et al., Usefulness of pharmacy dispensing records in the evaluation of adherence to antiretroviral therapy in Brazilian children and adolescents. braz j infect dis. 2012;16(4):315–320 http://dx.doi.org/10.1016/j.bjid.2012.06.006.

204. Gross. R, Bandason T, Langhaug L, Mujuru H et al., Factors associated with self-reported adherence among adolescents on antiretroviral therapy in Zimbabwe AIDS Care. 2015; 27(3) : 322–326. doi:10.1080/09540121.2014.969676.

205. Steele RG, Grauer D .Adherence to antiretroviral therapy for pediatric HIV infection: review of the literature and recommendations for research. Clin Child Fam Psychol Rev 2003; 6:17-30

206. Machtinger EL, Bangsberg DR. Adherence to HIV Antiretroviral therapy. HIV Insite knowledge base chapter. May 2006. Available in http://hivinsite.ucsf.edu/InSite?page=kb-03-02-09

207. Koole O, Denison JA, Menten J, Tsui S. Reasons for Missing Antiretroviral Therapy: Results from a Multi-Country Study in Tanzania, Uganda, and Zambia PLoS One. 2016; 11(1): e0147309. . doi: 10.1371/journal.pone.0147309

208. Wanchu A, Kaur R, Bambery P, Singh S. Adherence to generic reverse transcriptase inhibitor-based antiretroviral medication at a Tertiary Center in North India. AIDS Behav. 2007; 11:99–102.

209. Sahay S, Reddy SK, Dhayarkar S. Optimizing adherence to antiretroviral therapy. Indian J Med Res. 2011 Dec; 134(6): 835–849.doi: 10.4103/0971-5916.92629.

210. Hansana V, Sanchaisuriya P ,Durham J et al., Adherence to Antiretroviral Therapy (ART) among People Living With HIV (PLHIV): a cross-sectional survey to measure in Lao PDR.BMC Public Health 2013, 13:617.Available in http://www.biomedcentral.com/1471-2458/13/617.

211. Knobel H, Carmona A, López JL, Gimeno JL et al., Adherence to very active antiretroviral treatment: impact of individualized assessment. Enferm Infecc Microbiol Clin.1999; 17(2):78-8. PubMed ID: 10193067

212. Maureen E. Lyon, Connie Trexler,(2004) A Family Group Approach to Increasing Adherence to Therapy in HIV-Infected Youths: Results of a Pilot Project AIDS Patient Care and STDs. June 2004 17(6): 299-308. doi:10.1089/108729103322108175.

213. Jeanine U. Condo1, Anastasia Gage2, Nancy Mock Sex differences in nutritional status of HIV-exposed children in Rwanda: a longitudinal study Tropical Medicine and International Health. 2015; 20: 1: 17–23. doi:10.1111/tmi.12406

214. Tang AM ,Quick T, Chung M et al., Nutrition Assessment, Counseling, and Support Interventions to Improve Health-Related Outcomes in People Living With HIV/AIDS: A Systematic Review of the Literature J Acquir Immune Defic Syndr .2015; 68: 3.

215. Teklemariam Z , Mitiku H , Mesfin F et al., Prevalence of anemia and nutritional status among HIV-positive children receiving antiretroviral therapy in Harar, Ethiopa HIV/AIDS Research and Palliative Care .2015;7 :191–196. Available in http://dx.doi.org/10.2147/HIV.S78845 taken from review reference.

216. Chokephaibulkit, K, Saksawad R, , Bunupuradah T, Rungmaitree S, Prevalence of Vitamin D Deficiency among Perinatally HIV Infected Thai Adolescents Receiving Antiretroviral Therapy Pediatr Infect Dis J. Nov 2013 ; 32(11): doi:10.1097/INF.0b013e31829e7a5c.

217. Cribier B, Mena ML, Rey D, Partisan M. Nail Changes in Patients Infected With Human Immunodeficiency Virus. A Prospective Controlled Study. Arch Dermatol. 1998; 134(10):1216-1220. doi:10.1001/archderm.134.10.1216.

218. Sehgal VN, Aggarwal AK, Srivastava G, Chatterjee K. Nail biology, morphologic changes, and clinical ramifications: part II. Skinmed. 2011; 9(2):103–107.

219. Sheth TN, Barts Sc, Choudhry NK, Matt Bowes et al., The Relation of Conjunctival Pallor to the Presence of Anemia. J Gen Intern Med. 1997 Feb; 12(2): 102106.doi: 10.1046/j.1525-1497.1997.00014.

220. Tukei VJ, Asiimwe A, Maganda A, Atugonza R et al., Safety and tolerability of antiretroviral therapy among HIV-infected children and adolescents in Uganda. J Acquir Immune Defic Syndr. 2012 Mar 1;59(3):274-80. doi: 10.1097/QAI.0b013e3182423668

221. Swindells S, Mohr J, Justis JC, Berman S et al., Quality of life in patients with human immuno deficiency virus infection: impact of social support, coping style and hopelessness. Int J STD AIDS. 1999 Jun;10(6):383-91

222. Diniz LO, Pinto JA Quality of life of HIV-infected children in Brazil. Julio-agosto. 2009:66. Available in http://www.scielo. org.mx/pdf/bmim/v66n4/v66n4a6.pdf.

223. Caroline F, Mc Donald S, Frize G, Ayers S et al.,"Payment by Results"--financial incentives and motivational interviewing, adherence interventions in young adults with perinatally acquired HIV-1 infection: a pilot program. AIDS Patient Care, STDS. 2014; 28(1):28-32. doi: 10.1089/apc.2013.0262.

224. Nyogea D, Mteng S, Henning L, Franzeck FC et al., Determinants of antiretroviral adherence among HIV positive children and teenagers in rural Tanzania: a mixed methods study. BMC Infectious Diseases (2015) 15:28 doi 10.1186/s12879-015-0753-y

225. Kang E, Delzell DAP, Chhabra M, Oberdorfer P et al., Factors associated with high rates of antiretroviral medication adherence among youth living with perinatal HIV in Thailand. Int J STD AIDS OnlineFirst, published on July 30, 2014. doi:10.1177/0956462414545524.

226. Olds KP, Kiwanuka JP, Nansera D et al., Assessment of HIV antiretroviral therapy adherence by measuring drug concentrations in hair among children in rural Uganda. AIDS Care. 2015; 27(3) : 327–332. doi:10.1080/09540121.2014. 983452 .

227. Tuldrà A, Fumaz CR, Ferrer MJ, Bayés R, et al., Prospective randomized two-Arm controlled study to determine the efficacy of a specific intervention to improve long-term adherence to highly active antiretroviral therapy. J Acquir Immune Defic Syndr. 2000; 25:221-8.

228. Modlin CE, Naburi H, Hendricks KM et al., Nutritional Deficiencies and Food Insecurity Among HIV-infected Children in Tanzania. International Journal of MCH and AIDS. 2014: 2; 2; 220-228.Available online at www.mchandaids.org.

229. Anita.V, Sanjay.S, Singh GT, Dattatraya KD et al., Effect of Yoga practices on micronutrient absorption and physical fitness in rural residential school children. A randomized controlled trial. Int. J. Res. Ayruved. Pharm. 2014; 5(2). doi: 10.7897/2297/4343.05236.

230. Marwar.N, Katendra .T, Bagul.R et al., Sudarshan kriya yoga improves quality of life in healthy people living with HIV (PLHIV) : results from an open label randomized clinical trial. Indian J Med Res.2015; 90-99.

231. Anand U, Sharma MP. Impact of a Mindfulness-Based Stress Reduction Program on Stress and Well-Being in Adolescents: A Study at a School Setting. J. Indian Assoc. Child Adolesc. ment. Health 2011; 7(3):73-9.

232. Banerjee T, Pensi T, Banerjee D. HRQoL in HIV-infected children using PedsQL 4.0 and comparison with uninfected children. Qual Life Res. 2010;19(6):803-12. doi:10.1007/s11136-010-9643-3.

233. Pathak RS, Mitra .M. Effect of pranayama and yogasana programme on immunity of HIV infected individuals. AIDS .2010; XVIII international AIDS conference : Abstract no CDD0952.

234. Bosch-Capblanc X., Abba K., Prictor M., Garner P. Contracts between patients and healthcare practitioners for improving patients' adherence to treatment, prevention and health promotion activities. The Cochrane Database of SystematicReviews2009;2007:1-7

235. Keleher H., Parker R., Abdulwadud O., Francis K. Systematic review of the effectiveness of primary care nursing. International Journal of Nursing Practice2009; 15:16-24.

236. Kabue MM, Kekitiinwa A, Maganda A, Risser JM, Chan W, Kline MW. Growth in HIV-infected receiving antiretroviral therapy at a paediatric infectious diseases clinic in Uganda. AIDS Patient Care STDS. 2008; 22:245–25.

237. Eby J, Chapman J, Marukutira T et al., The adherence-outcome relationship is not altered by diary-driven adjustments of microelectronic monitor data Pharmaco epidemiol Drug Saf. 2015; 24 (12):1313-20. doi: 10.1002/pds.3887. Epub 2015 Oct 12.

238. Swaminathan S, Padmapriyadarshini C, Yoojin L, Sukumar B et al., Nutritional Supplementation in HIV-Infected Individuals in South India: A Prospective Interventional Study. Clin Infect Dis. (2010) 51 (1): 51-57.doi: 10.1086/653111

239. Mannheimer SB, Matts J, Telzak E, et al. Quality of life in HIV-infected individuals receiving antiretroviral therapy is related to adherence. AIDS. 2005; 1710–22.

240. Wouters E, Heunis C, Van rensburg D, Meulemans H. Physical and emotional health outcomes after 12 months of public-sector antiretroviral treatment in the Free State Province of South Africa: a longitudinal study using structural equation modelling. BMC Public Health. 2009; 9:103.

241. Kuntawee C, Fungladda WT , Kaewkungwal J, Chotpittayasunon T. Social factors related to quality of life among HIV infected children in Ubon Ratchathani province, Thailand.The Southeast Asian journal of tropical medicine and public health.2010; 41(5):1136-44.

242. Lowenthal ED , Marukutira T, Tshume O, BA, Chapman J, Parental Absence From Clinic Predicts Human Immunodeficiency Virus Treatment Failure in Adolescents JAMA Pediatr. 2015 May 1; 169(5): 498–500. doi: 10.1001/jamapediatrics.2014.3785

243. Eneh AU. Ugwu Ro Factors influencing adherence to paediatric antiretroviral therapy in Porthar Court, South- South Nigeria. Pan Afr Med J. 201329; 16:30. doi: 10.11604/pamj.2013.16.30.1877.

244. Barungi NN, Elyanu P, Asire B, Katureebe C, et al., Adherence to antiretroviral therapy and retention in care for adolescents living with HIV from 10 districts in Uganda. BMC Infect Dis. 2015; 15: 520. doi: 10.1186/s12879-015-1265-5.

245. Ndiaye M, Nyasulu P Nguyen H. Risk factors for suboptimal antiretroviral therapy adherence in HIV-infected adolescents in Gaborone, Botswana: a pilot cross-sectional study. Patient Preference and Adherence 2013:7 891–895.

246. Akpa OM, and Bamgboye EA. Correlates of the Quality of life of Adolescents in families affected by HIV/AIDS in Benue State, Nigeria.Vulnerable Child Youth Stud. 2015; 10(3): 225–242. doi:10.1080/17450128.2015.1066914.

247. Klug Passos SM, Mattos Souza LD. An evaluation of quality of life and its determinants among people living with HIV/AIDS from Southern Brazil .Cad. Saúde Pública, Rio de Janeiro.2015; 31(4):800-814. Available in http://dx.doi.or/10.1590/0102-311X00000514

248. Kikafunda JK and Namusoke HK(2006)Nutritional status of HIV/AIDS orphaned children in households headed by the elderly in Rakai District, South western, Uganda. African Journal of Food Agriculture Nutrition and Development.2006;6:1

249. Thapa R, Amatya A, Pahari DP, Bam K et al., Nutritional status and its association with quality of life among people living with HIV attending public anti-retroviral therapy sites of Kathmandu Valley, Nepal. AIDS Research and Therapy.2015; 12:14. doi: 10.1186/s12981-015-0056-9.

250. Bhowmik A, Ghugre P, Udipi S, Guha SK. Nutritional Status and Quality of Life of Women with HIV/AIDS. Am J Infect Dis. 2012; 8(1):13–8.

Annexures

LET'S GET TO ZERO TOGETHER

LIST OF ANNEXURES

S.No.	ANNEXURES
i	Assessment tools a. English b. Tamil
ii	Assessment of Counseling Schedules
iii	HIV Interventional Package (HIP) module
iv	a. Information sheet - English and Tamil b. Informed consent - English and Tamil c. Assent Form - English and Tamil
v	List of Experts given their Content Validity
vi	Certificate of Approval
vii	Publications and Paper Presentations
viii	Photo documentation of thesis
ix	A Special Hand book of Yoga for HIV infected Adolescents – English and Tamil
x	Adherence and Yoga maintenance Diary

Annexure-i (a)

ASSESSMENT TOOLS

SECTION A

PART I – DEMOGRAPHIC DATA OF ADOLESCENTS

1. Name of the subject: ART no: Place:
2. Age (years)
    1.10-12
    2.13-15
    3.16-18 ☐
3. Sex
    1. Male
    2. Female ☐
4. Educational status
    1. Primary level
    2. Middle level
    3. Secondary
    4. Higher secondary ☐
5. Religion
    1. Hindu
    2. Muslim
    3. Christian
    4. Others ☐

PART II - DEMOGRAPHIC DATA OF CAREGIVERS

6. Name of the Care giver
7. Age (years)
    1.20-35
    2.36-50
    3.>50 ☐
8. Sex
    1. Male
    2. Female. ☐

9. The caregiver's relationship with the subject is,

1.Father

2.Mother

3.Others (Grandmother/ Grandfather/ Uncle/ Aunty/Guardian) ☐

10. Educational status

1. No formal education

2. Up to school level

3. Up to college level ☐

11. Occupational status

1. Employed

2. Unemployed

3. Not Applicable ☐

12. Annual income of care giver's for,

1. Up to 12,000 Rs/-

2. Up to 24,000 Rs/-

3. >24,000 Rs/-

4. Not applicable. ☐

13. Residence

1. Rural

2. Urban ☐

PART III - CLINICAL INFORMATION RELATED TO ADOLESCENTS

14. The adolescent diagnosed as HIV positive is ,

1. Less than 5 yrs

2. 5 - 10yrs

3. >10 yrs. ☐

15. The probable route of HIV transmission is,

1. Mother to child transmission

2. Blood transfusion

3. Sexual transmission

4. Unknown ☐

16. The HIV stage of the subject includes,

1. Stage I

2. Stage II

3. Stage III ☐

17. The subject has been on ART for
    1. 3months -1 year
    2. 1- 5 years
    3. >5 years.

18. The subject had previous history of the tuberculosis? Yes /No ☐

18. a. If yes, the history of ATT drugs for subject is,

    1. Completed.

    2. On ATT ☐

    3. Discontinued

19. The caregiver disclosed the HIV information to the adolescent: Yes /No

20. The level of CD4 count before initiating ART was …….

21. The latest CD4 count,
    1. '0' month 2. 6^{th} month

PART IV - BACK GROUND INFORMATION OF ADOLESCENTS/ CAREGIVERS (Includes the family and social history)

22. The parental living status of subject is,

    1.Father - Alive /Dead /Unknown

    2.Mother - Alive /Dead /Unknown

    3. Siblings - Alive /Dead /Unknown ☐

23. The parental /siblings HIV status of subject is,

    1. Father - Positive /Negative /Unknown

    2. Mother - Positive /Negative /Unknown ☐

    3. Siblings - Positive /Negative /Unknown

24. The subject is residing with biological parents : Yes / No

24a. If, No the subject is living with,

    1.Family members

    2.NGO ☐

    3.Non biological parents

25. The healthcare facilities are accessible for other : Yes / No
    health related problems

26. The caregiver has adequate financial support : Yes / No

27. The caregiver has adequate social support : Yes / No

    if yes,

    a) You have received any help pertaining to your adolescent health condition from relatives & neighbor ? : Yes / No

b) You have received any Governmental support like financial / health related/others? : Yes / No

c) You have any NGO support for adolescent's survival? : Yes / No

d) You have find discrimination of adolescent in society? : Yes /No

if yes,

1. Family Members
2. Relatives
3. Neighbors.
4. Schools
5. Others.

e) Do you satisfied with available social support? Yes / No

28. The caregiver's came to know about the basic information on HIV/ART through,

1. Newspaper
2. TV / Cinema
3. Health Care Professionals
4. Others (specify)

29. The most of the ART information and benefits are informed by,

1. Doctors
2. Nurse
3. Counselors
4. Others (specify)

30. Do you know the basic information on HIV/ART? Yes / No

If Yes,

a) AIDS is caused by

1. Micro bacteria
2. Fungus
3. HIV virus
4. Low immunity

b) AIDS/ HIV transmitted through is

1. Touching the HIV infected People with bare hand.
2. Hugging the adolescents living with HIV
3. Sexual intercourse
4. Sharing plates of the HIV infected people with others.

c) Transmission can be prevented by using the,

1. Condoms
2. Hot water
3. Clean clothes
4. Alcohol

d) The HIV/AIDS can be diagnosed by

1. Urine
2. Blood
3. Sputum
4. All the above

e) The AIDS/HIV can be cured by using ART? Yes / No

SECTION-B

MODIFIED ADOLESCENT ADHERENCE ASSESSMENT QUESTIONNAIRE (AIDS Clinical Trial Group- ACTG))

1. The subject is consuming ART in,

1. I line drugs
2. Alternative I line drugss
3. II line drugs

1a. Name of the drug is,

1. ZLN 2.SLN 3. ZLE 4.SLE 5. ALN 6. ALE 7.TLE 8.AL/LR

2. The ART medications can be administered by

1. Self
2. Care givers

3. Is there any previous exposure to adherent assessment tool? Yes / No

4. Is there any previous hospitalization of the subject for the past 3 months? Yes / No

4a. If yes, because of

1. OI
2. Side effects of ART
3. Others

5. Do you know the exact dose of the ART medications? Yes / No

6. Do you know the exact dosage frequency of ART medications? Yes / No

7. Is there any change in ART therapy for the past 3 months? Yes / No

If yes, reason ……

8. Do you feel, the subject has medication burden Yes / No

If yes, reason …….

9. Do you feel difficulty in giving drugs to the subject Yes / No

If yes, reason ……

10. Do you feel, whether the subject is depressed while giving the medicines? Yes / No

If yes, reason …….

11. Table to Assess Adherence to HIV Medications: **5 - POINT RESPONSE SCALE**

"Thinking of the medications PRESCRIBED to subject by the doctor(s), please answer the following questions."

Response options: **Never = 0; Rarely = 1; Sometimes = 2; Often = 3; Always = 4**

0 1 2 3 4

Do you ever forget to give medications?

Are you careless at times about giving medications?

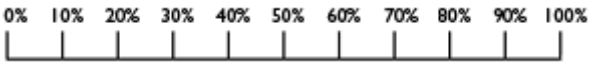
When subject feel better, do you sometimes stop giving medications?

Sometimes, if subject feel worse when you give medications,
do you stop giving them?

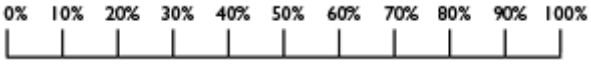
12. **VISUAL ANALOG METHOD** : List codes for all antiretroviral drugs that subject was prescribed to take in last 30 days. Identify up to 3 drugs.

DRUG A: **DRUG B :** **DRUG C :**

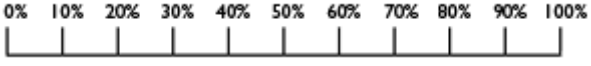
DRUG A:



DRUG B:



DRUG C:



Interpretations:

0% means not given / taken any drugs

50% means taken/given in half level of drugs

100% means taken /given the medicine daily as prescribed by the doctors

13. The **'3' days recall method** of Adherence can be calculated by ,

% Adherence= Number of doses expected to be taken – Number of doses missed x100
Number of doses expected to be taken for the past 3 days

14. The percentage of adherence by **pill count method** can be calculated by ,
(Missed dose correlates with pill count mentioned in ART medical record book)

% Adherence = Number of pills expected to be taken - Number of pills missed x 100
Number of pills expected to be taken for 1 month

15. The reason for non-adherence includes,
    1. Not applicable.
    2. Forgot.
    3. Boring/fatigue
    4. Got in the way of daily schedule (school work) too busy/busy schedule
    5. Travelling
    6. Not having finance to come and collect the drug.
    7. Not available in pharmacy
    8. Medicines caused me to have other physical symptoms/side effects ☐
    9. Others (specify)

16. The subject can utilize any of the following aids for improving adherence,
    1. Pill boxes
    2. Calendars
    3. Reminders in the mobile
    4. Buddy system ☐
    5. Diary
    6. Nil

SECTION-C

PART I - NUTRITIONAL ASSESSMENT

I. ANTHROPOMETRIC ASSESSMENT

1. Height	:	cms
2. Weight	:	Kgs
3. BMI	:	Kg/m^2
4. Waist circumference	:	cms
5. Mid upper arm circumference	:	cms.
6. Skin fold thickness (Triceps)	:	mm
7. "Z" Score	:	

PART II

II.CLINICAL HISTORY/ASSESSMENT FOR THE SUBJECT

8. Have you been given treatment for any nutritional deficiency? Yes / No

If yes, a. name of the deficiency disorder ……..

b. Treatment ……

9. Are you dewormed of your subject regularly? Yes / No

10. Do you have iron deficiency anemia at present? Yes / No

11. Have you lost your weight for the last 3 months? Yes / No

11a. If yes,

a. 0-5% b.5-10 % c. >10% of present body weight.

12. At present, do you have any of the following signs and symptoms?

a. **Skin**

Dry skin : Yes / No

Nails : Yes / No if yes,

Koilonchia / Ridged nails/Discoloration

b. **Head/ Hair**

Color : Pigmented/ depigmented

Texture : Shiny /Dull / Thin/ Pluck ability

Infections/injuries: Yes/No , If yes, ……..

c. **Eyes** : Yes/No, If yes,

Xeropthalmia / Bitot's spot / Paleness in conjunctiva

d. **Oral** : Yes/ No, if yes,

Stomatitis / Glossitis / Bleeding gums / Dryness of lips

e. **Gastro Intestinal**

System : Yes/ No, if yes

Appetite / Nausea / Vomiting/ Streotorrhoea / Diarrhea

f. **Extremities** : Muscle wasting : Yes / No

Oedema : Yes / No

Lipo dystrophy : Yes / No

SECTION -D
MODIFIED QUALITY OF LIFE ASSESSMENT QUESTIONNAIRE
(For Ages 5 - 11 Years)

1. **General Health Ratings:** These statements ask about the health and behavior of adolescents.

A. On the scale from 1 to 10 **(1 being very worst, and 10 being the very best)**
How has adolescent feeling, on the average, of the past 3 months?

	The Very Worst He /She Ever Felt ↓									**The Very Best He /She Ever Felt** ↓
1. Overall, in general ?	1	2	3	4	5	6	7	8	9	10
2. Physically ?	1	2	3	4	5	6	7	8	9	10
3. Emotionally?	1	2	3	4	5	6	7	8	9	10
4. About their School work?	1	2	3	4	5	6	7	8	9	10

B. For the following statements, decide which phrase best describes adolescent's health over the past 3 months, and then answer your choice.
During the past 3 months,

	Never or Rarely	**Some of the Time**	**Almost Always**
1. My Adolescent's health is excellent……	1	2	3
2. My Adolescent seems to resist illness very well ……	1	2	3
3. My Adolescent seems less healthy than other adolescent I know ……..	1	2	3
4. When there is something going around, my adolescent usually catches it……	1	2	3
5. My adolescent is somewhat confused……	1	2	3
6. My adolescent seems accident-prone ……	1	2	3
7. When my adolescent is sick or injured, he / she usually recovers quickly ……	1	2	3

II. Physical Functioning

How much if at all, has adolescent's health interfered with his / her activities during the past 4 weeks?

How much has adolescent's health interfered with?

	Not at all	A Little bit	Moderately	Quite a bit	Extremely
1. The kinds or amount of vigorous activities your adolescent can do, like lifting heavy objects, running, or participating in strenuous sports?	1	2	3	4	5
2. The kinds or amount of moderate activities your adolescent can do, like bowling?	1	2	3	4	5
3. Walking uphill or climbing a few flights or stairs?	1	2	3	4	5
4. Walking one block?	1	2	3	4	5
5. Bending, lifting or stooping?	1	2	3	4	5
6. Eating, dressing, bathing or using the toilet?	1	2	3	4	5

III. Psychological Well-Being

These statements are about behavior problems of adolescents. You decide which phrase describes adolescent's behavior over the past 3 months, and then answer your choice.

Thinking about your adolescent, during the past 3 months….

	Often true	Some times true	Not true
1. My adolescent has sudden changes in mood or feelings …	1	2	3
2. My adolescent feels or complains that no one loves him / her	1	2	3
3. My adolescent is rather high strung, tense, and nervous	1	2	3
4. My adolescent cheats or tells lies……	1	2	3
5. My adolescent is too fearful or anxious……..…	1	2	3
6. My adolescent argues too much……	1	2	3
7. My adolescent has difficulty in concentrating, cannot pay attention for long.	1	2	3
8. My adolescent is easily confused, seems to be in a fog……	1	2	3
9. My adolescent bullies or is cruel or mean to others ……	1	2	3
10. My adolescent is disobedient at home……..……	1	2	3
11. My adolescent is disobedient at school……	1	2	3
12. My adolescent does not seem to feel sorry after his/ her misbehavior…….	1	2	3
13. My adolescent has trouble getting along with other adolescents……..…	1	2	3

III. Psychological Well-Being (continued)

Thinking about your adolescent, during the past 3 months……

	Often true	**Some times true**	**Not true**
14. My adolescent has trouble getting along with teachers ……	1	2	3
15. My adolescent is impulsive, or acts without thinking……	1	2	3
16. My adolescent feels worthless or inferior……	1	2	3
17. My adolescent is not liked by other adolescent……	1	2	3
18. My adolescent has a lot of difficulty getting his / her mind off certain thoughts.……	1	2	3
19. My adolescent is restless or over active, cannot sit still……	1	2	3
20. My adolescent is stubborn sullen or irritable……	1	2	3
21. My adolescent has a very strong temper and loses it easily……	1	2	3
22. My adolescent is unhappy, sad or depressed……	1	2	3
23. My adolescent is withdrawn and does not involve with others…	1	2	3
24. My adolescent breaks things on purpose and deliberately destroys his / her own or other's things……	1	2	3
25. My adolescent clings to adults……	1	2	3
26. My adolescent cries too much……	1	2	3
27. My adolescent demands a lot attention……	1	2	3
28. My adolescent is too dependent on others……..	1	2	3

IV. Social and Role Functioning

A. 1. How many days adolescent was bedridden due to any illness or injury?

0	1-2	3-5	6-10	11-15	> 16
(1)	(2)	(3)	(4)	(5)	(6)

2. Did illness or injury keep your adolescent away from school? (if during a vacation period, refer to the last month school was open)

0	1-2	3-5	6-10	11-15	> 16
(1)	(2)	(3)	(4)	(5)	(6)

B. Please select only one answer for each question:

3. What grade is your adolescent now? (or will be in, if between grades?)

3rd Std…..……[ ] 4th Std…..……[ ]
5th Std..…… [ ] 6th Std…… [ ]
7th Std.....……..…[ ] Not in school..…… [ ]
Others (specify)… [ ]

Correct to age/delay

4. Has your adolescent ever repeated a grade for any reason?....…… Yes / No

5. In general, is your adolescent limited in school attendance because of his /her health ? Yes / No

6. In general, is your adolescent limited in the kind or amount of other activities because of his / her health?..... Yes / No

7. In general, has your adolescent participated in school sports?…… Yes / No

8. Does your adolescent go to a special class or get special help in school because of a disability or health problems? …….. Yes / No

8.a .What type of special help does your adolescent receive?

Reading ……..….. [ ]
Learning disability……. [ ]
Speech or Language……...[ ]
Physical Therapy / Occupational Therapy ... [ ]
More than one of above…….[ ]
Others……..…….. [ ]

V. Health Care Services

A. During the past 4 weeks . . . .

1. How many times did illness or injury make it necessary for your adolescent to use any medicines other than ART and vitamins that a doctor prescribed?

0	1-2	3-4	5-6	7-9	> 10
(1)	(2)	(3)	(4)	(5)	(6)

2. How many times, you brought medications for adolescent from pharmacy without a prescription from a doctor?

0	1-2	3-4	5-6	7-9	> 10
(1)	(2)	(3)	(4)	(5)	(6)

3. How many visits did your adolescent make to a clinic, hospital or emergency room to see a doctor, nurse or other specialist?

0	1-2	3-4	5-6	7-9	> 10
(1)	(2)	(3)	(4)	(5)	(6)

4. How many times, did your adolescent sickness need to use medical help including from medical practicenaires functioning his/her in daily life?

0	1-2	3-4	5-6	7-9	>10
(1)	(2)	(3)	(4)	(5)	(6)

B. 5. Does the adolescent has undergoing any alternative treatment for improve his/her health?

1. Herbal supplements
2. Massage therapy
3. Yoga
4. Acupuncture
5. Nil

VI. Symptoms

The following questions ask about symptoms or feelings of adolescent might had during the past 4 weeks. Please answer how distressing the following symptoms have been for adolescent, during the past 4 weeks. How much was adolescent distressed by this symptom or feeling?

	Not at All	Very Mildly	Mildly	Moderately	Very Much	Extremely
1. Physical or bodily pain	1	2	3	4	5	6
2. Coughing, wheezing	1	2	3	4	5	6
3. Nausea, vomiting, abdominal / stomach pain	1	2	3	4	5	6
4. Diarrhea	1	2	3	4	5	6
5. Rash, itching, or other skin problems	1	2	3	4	5	6
6. Fatigue, weakness	1	2	3	4	5	6
7. Feeling dizzy or lightheaded	1	2	3	4	5	6
8. Fever, night sweats, shaking, chills	1	2	3	4	5	6
9. Loss of appetite	1	2	3	4	5	6
10. Trouble in sleeping	1	2	3	4	5	6
11. Eye trouble, problem with vision	1	2	3	4	5	6
12. Headache	1	2	3	4	5	6
13. Dry or painful mouth, trouble in swallowing	1	2	3	4	5	6
14. Chest pain or tightness	1	2	3	4	5	6
15. Difficulty breathing or Catching breath	1	2	3	4	5	6
16. Runny nose, sinus trouble	1	2	3	4	5	6
17. Muscle aches, joint bone pain	1	2	3	4	5	6
18. Pain, numbness, or tingling in hands or feet	1	2	3	4	5	6
19. Ear aches	1	2	3	4	5	6
20. Overall discomfort	1	2	3	4	5	6

MODIFIED QUALITY OF LIFE ASSESSMENT QUESTIONNAIRE
(For Ages 12 - 20 Years)

1. **General Health Ratings:** These statements ask about the health and behavior of adolescents.

A. On the scale from 1 to 10 (**1 being very worst, and 10 being the very best**)
How has adolescent feeling, on the average, of the past 3 months?

	The Very Worst He /She Ever Felt ↓									**The Very Best He /She Ever Felt** ↓
1. Overall, in general ?	1	2	3	4	5	6	7	8	9	10
2. Physically ?	1	2	3	4	5	6	7	8	9	10
3. Emotionally?	1	2	3	4	5	6	7	8	9	10
4. About their School work?	1	2	3	4	5	6	7	8	9	10

B. For the following statements, decide which phrase best describes adolescent's health over the past 3 months, and then answer your choice
During the past 3 months,

	Never or Rarely	**Some of the Time**	**Almost Always**
1. My Adolescent's health is excellent……	1	2	3
2. My Adolescent seems to resist illness very well ……	1	2	3
3. My Adolescent seems less healthy than other adolescent I know ……..	1	2	3
4. When there is something going around, my adolescent usually catches it……	1	2	3
5. My adolescent is somewhat confused……	1	2	3
6. My adolescent seems accident-prone ……	1	2	3
7. When my adolescent is sick or injured, he / she usually recovers quickly ……	1	2	3

II. Physical Functioning

How much if at all, has adolescent's health interfered with his / her activities during the past 4 weeks?

How much has adolescent's health interfered with?

	Not at all	A Little bit	Moderately	Quite a bit	Extremely
1. The kinds or amount of vigorous activities your adolescent can do, like lifting heavy objects, running, or participating in strenuous sports?	1	2	3	4	5
2. The kinds or amount of moderate activities your adolescent can do, like bowling?	1	2	3	4	5
3. Walking uphill or climbing a few flights or stairs?	1	2	3	4	5
4. Walking one block?	1	2	3	4	5
5. Bending, lifting or stooping?	1	2	3	4	5
6. Eating, dressing, bathing or using the toilet?	1	2	3	4	5

III. Psychological Well-Being

These statements are about behavior problems of adolescents. You decide which phrase describes adolescent's behavior over the past 3 months, and then answer your choice.

Thinking about your adolescent, during the past 3 months….

	Often true	Some times true	Not true
1. My adolescent has sudden changes in mood or feelings …	1	2	3
2. My adolescent feels or complains that no one loves him / her	1	2	3
3. My adolescent is rather high strung, tense, and nervous	1	2	3
4. My adolescent cheats or tells lies……	1	2	3
5. My adolescent is too fearful or anxious……..…	1	2	3
6. My adolescent argues too much……	1	2	3
7. My adolescent has difficulty in concentrating, cannot pay attention for long.	1	2	3
8. My adolescent is easily confused, seems to be in a fog……	1	2	3
9. My adolescent bullies or is cruel or mean to others ……	1	2	3
10. My adolescent is disobedient at home……..……	1	2	3
11. My adolescent is disobedient at school……	1	2	3
12. My adolescent does not seem to feel sorry after his/ her misbehavior…….	1	2	3
13. My adolescent has trouble getting along with other adolescents……..…	1	2	3

III. Psychological Well-Being (continued)

Thinking about your adolescent, during the past 3 months……

	Often true	Some times true	Not true
14. My adolescent has trouble getting along with teachers ……	1	2	3
15. My adolescent is impulsive, or acts without thinking……	1	2	3
16. My adolescent feels worthless or inferior……	1	2	3
17. My adolescent is not liked by other adolescent……	1	2	3
18. My adolescent has a lot of difficulty getting his / her mind off certain thoughts.	1	2	3
19. My adolescent is restless or over active, cannot sit still……	1	2	3
20. My adolescent is stubborn sullen or irritable……	1	2	3
21. My adolescent has a very strong temper and loses it easily……	1	2	3
22. My adolescent is unhappy, sad or depressed……	1	2	3
23. My adolescent is withdrawn and does not involve with others…	1	2	3
24. My adolescent breaks feels others are out to get him/her……	1	2	3
25. My adolescent hangs around with kids who get into trouble ……	1	2	3
26. My adolescent is secretive, keeps things to himself/herself……	1	2	3
27. My adolescent worries too much ……	1	2	3
28. My adolescent is too dependent on others……..	1	2	3

IV. Social and Role Functioning

A. 1. How many days adolescent was bedridden due to any illness or injury?

0	1-2	3-5	6-10	11-15	> 16
(1)	(2)	(3)	(4)	(5)	(6)

2. Did illness or injury keep your adolescent away from school? (if during a vacation period, refer to the last month school was open)

0	1-2	3-5	6-10	11-15	> 16
(1)	(2)	(3)	(4)	(5)	(6)

B. Please select only one answer for each question:

3. What grade is your adolescent now? (or will be in, if between grades?)

4th Std…..…….……[ ]	5th Std……..[ ]
6th Std…...…… [ ]	7th Std….……[ ]
8th Std..…… [ ]	9th Std…….……[ ]
10th Std.....……..…. [ ]	11th Std…….. .[ ]
12th Std.....……..….. [ ]	Correct to age/delay

4. Has your adolescent ever repeated a grade for any reason? Yes / No

5. In general, is your adolescent limited in school attendance because of his /her health ? Yes / No

6. In general, is your adolescent limited in the kind or amount of other activities because of his / her health? Yes / No

7. In general, has your adolescent participated in school sports? Yes / No

8. Does your adolescent go to a special class or get special help in school because of a disability or health problems? Yes / No

8.a.What type of special help does your adolescent receive?

Reading ……..….. [ ]
Learning disability……. [ ]
Speech or Language……...[ ]
Physical Therapy / Occupational Therapy ... [ ]
More than one of above…….[ ]
Others……..…….. [ ]

V. Health Care Services

A. During the past 4 weeks . . . .

1. How many times did illness or injury make it necessary for your adolescent to use any medicines other than ART and vitamins that a doctor prescribed?

0	1-2	3-4	5-6	7-9	> 10
(1)	(2)	(3)	(4)	(5)	(6)

3. How many times, you brought medications for adolescent from pharmacy without a prescription from a doctor?

0	1-2	3-4	5-6	7-9	> 10
(1)	(2)	(3)	(4)	(5)	(6)

3. How many visits did your adolescent make to a clinic, hospital or emergency room to see a doctor, nurse or other specialist?

0	1-2	3-4	5-6	7-9	> 10
(1)	(2)	(3)	(4)	(5)	(6)

4. How many times, did your adolescent sickness need to use medical help including from medical practicenaires functioning his/her in daily life?

0	1-2	3-4	5-6	7-9	>10
(1)	(2)	(3)	(4)	(5)	(6)

B. 5. Does the adolescent has undergoing any alternative treatment for improve his/her health?

1. Herbal supplements
2. Massage therapy
3. Yoga
4. Acupuncture
5. Nil

VI. Symptoms

The following questions ask about symptoms or feelings of adolescent might had during the past 4 weeks. Please answer how distressing the following symptoms have been for adolescent, during the past 4 weeks. How much was adolescent distressed by this symptom or feeling?

	Not at All	Very Mildly	Mildly	Moderately	Very Much	Extremely
21. Physical or bodily pain	1	2	3	4	5	6
22. Coughing, wheezing	1	2	3	4	5	6
23. Nausea, vomiting, abdominal / stomach pain	1	2	3	4	5	6
24. Diarrhea	1	2	3	4	5	6
25. Rash, itching, or other skin problems	1	2	3	4	5	6
26. Fatigue, weakness	1	2	3	4	5	6
27. Feeling dizzy or lightheaded	1	2	3	4	5	6
28. Fever, night sweats, shaking, chills	1	2	3	4	5	6
29. Loss of appetite	1	2	3	4	5	6
30. Trouble in sleeping	1	2	3	4	5	6
31. Eye trouble, problem with vision	1	2	3	4	5	6
32. Headache	1	2	3	4	5	6
33. Dry or painful mouth, trouble in swallowing	1	2	3	4	5	6
34. Chest pain or tightness	1	2	3	4	5	6
35. Difficulty breathing or Catching breath	1	2	3	4	5	6
36. Runny nose, sinus trouble	1	2	3	4	5	6
37. Muscle aches, joint bone pain	1	2	3	4	5	6
38. Pain, numbness, or tingling in hands or feet	1	2	3	4	5	6
39. Ear aches	1	2	3	4	5	6
40. Overall discomfort	1	2	3	4	5	6

Annexure-i (b)

பகுதி - அ
ஆராய்ச்சி தொடர்புடைய அடிப்படைத் தகவல்கள்
பிரிவு - I
வளர் இளம் பருவக் குழந்தைக்களுக்கான சமுதாயக் காரணிகள்

1. பெயர் ஏ.ஆர்.டி. எண் : இடம் :
2. வயது (வருடங்களில்)
   1) 10-12
   2) 13-15 ☐
   3) 16-18
3. பாலினம்
   1. ஆண்
   2. பெண் ☐
4. கல்வித் தகுதி
   1. தொடக்கக் கல்வி
   2. நடுநிலைக் கல்வி ☐
   3. உயர்நிலைக் கல்வி
   4. மேல் நிலைக் கல்வி
5. மதம் / சமயம்
   1. இந்து
   2. முஸ்லீம்
   3. கிறிஸ்துவர் ☐
   4. பிற மதத்தினர்

பிரிவு - II
பராமரிப்பாளர் பற்றிய சமுதாயக் காரணிகள்

6. பெயர்
7. வயது (வருடங்களில்)
   1. 20-35
   2. 36-50
   3. > 50 ☐
8. பாலினம்
   1. ஆண் ☐
   2. பெண்
9. பராமரிப்பாளரின் உறவு முறை
   1. தாய்
   2. தந்தை
   3. பிற உறவுமுறை (தாத்தா / பாட்டி / அத்தை / மாமா / பாதுகாப்பாளர்) ☐

10. கல்வித் தகுதி
    1. முறையானப் படிப்பு இல்லை
    2. பள்ளிப் படிப்பு வரை ☐
    3. கல்லூரிப் படிப்பு வரை
11. பணித் தகுதி
    1. பணியில் உள்ளவர்
    2. பணியில் இல்லாதவர் ☐
    3. பொருந்தாது
12. ஆண்டு வருமானம்
    1. Rs. 12,000/- வரை
    2. Rs. 24,000/- வரை ☐
    3. Rs. >24,000/- வரை
    4. பொருந்தாது
13. வாழிடம்
    1. கிராமம் ☐
    2. நகரம்

பிரிவு - III
வளர் இளம்பருவக்குழந்தையின் நோய் தொடர்பான கேள்விகள்

14. எப்பொழுது எச்.ஐ.வி. நோய் உள்ளது என்று கண்டறியப்பட்டது?
    1. குறைந்தது 5 வருடத்திற்கு முன்
    2. 5-10 வருடத்திற்கு முன் ☐
    3. 10 வருடத்திற்கு முன்
15. நோய்த்தொற்று ஏற்பட்டதற்கான காரணிகள்?
    1. தாயிடமிருந்து குழந்தைக்கு
    2. இரத்தம் ஏற்றியதால் ☐
    3. உடலுறவின் மூலமாக
    4. மற்றவை
16. வளர் இளம்பருவக் குழந்தையின் எச்.ஐ. வியின் நிலை
    1. நிலை I
    2. நிலை II ☐
    3. நிலை III
17. எவ்வளவு காலமாக வளர் இளம்பருவக் குழந்தை கூட்டு மருந்து சிகிச்சையில் உள்ளது?
    1. 3 மாதம் - 1 வருடம் வரை
    2. 1-5 வருடங்கள் ☐
    3. 5 வருடத்திற்கு மேலாக

18. இதற்கு முன் வளர் இளம்பருவக் குழந்தைக்குக் காசநோய் இருந்ததா?
    1. ஆம்
    2. இல்லை. ☐

18.1 ஆம், ஏனில், ஏ.டி.டி மருந்தை எடுத்துக் கொண்டாரா?
    1. முழுமையாக எடுத்துக் கொண்டார்
    2. எடுத்துக் கொண்டிருக்கிறார்
    3. பாதியில் நிறுத்தி விட்டார். ☐

19. நோய் இருக்கும் நிலையைப் பற்றி வளர் இளம்பருவ குழந்தைக்கு தெரியப்படுத்தி இருக்கிறீர்களா?
    1. ஆம்
    2. இல்லை ☐

20. கூட்டு மருந்து எடுக்க தொடங்குவதற்கு முன்பு, சி.டி 4 எண்ணிக்கையின் அளவு_____

21. தற்பொழுதைய சி.டி. 4 எண்ணிக்கையின் அளவு,
    1. "0" மாதம் 2. "6" வது மாதம்

பிரிவு - IV

வளர் இளம்பருவக் குழந்தை / பராமரிப்பாளரின் குடும்ப மற்றும் சமூகம் தொடர்பான தகவல்கள்

22. பெற்றோர் / உடன்பிறந்தவர்களின் உயிர் நிலைமை,
    1. தந்தை - உயிருடன் உள்ளார் / இறந்து விட்டார் / தெரியவில்லை
    2. தாய் - உயிருடன் உள்ளார் / இறந்து விட்டார் / தெரியவில்லை
    3. உடன்பிறந்தவர்கள்- உயிருடன் உள்ளார் / இறந்து விட்டார் / தெரியவில்லை. ☐

23. பெற்றோர் / உடன்பிறந்தவர்களின் எச்.ஐ.வி நிலைமை
    1. தந்தை - உண்டு / இல்லை / தெரியவில்லை
    2. தாய் - உண்டு / இல்லை / தெரியவில்லை ☐
    3. உடன்பிறந்தவர்கள் - உண்டு / இல்லை / தெரியவில்லை

24. வளர் இளம் பருவக் குழந்தை தனது பெற்றோருடன் வசிக்கிறதா?
    1. ஆம்
    2. இல்லை ☐

24.1. இல்லையெனில், வசிப்பது
    1. குடும்ப உறவினருடன்
    2. தனியார் தொண்டு நிறுவனங்களில் ☐
    3. தத்தெடுத்த பெற்றோருடன்

25. ஆரோக்கியம் தொடர்பான பிரச்சனைகளுக்கு சுகாதார வசதி கிடைக்கிறதா? ஆம் / இல்லை. ☐

26. பராமரிப்பாளரிடம் போதுமான அளவு பண வசதி உள்ளதா?
ஆம் / இல்லை. ☐

27. பராமரிப்பாளருக்கு போதுமான அளவு சமுதாய ஆதரவு உள்ளதா?
ஆம் / இல்லை. ☐

27. ஆம், எனில்

27.1 வளர் இளம்பருவக் குழந்தையின் உடல்நிலை தொடர்பாக உங்கள் உறவினர் அல்லது அயலாரிடம் ஏதேனும் உதவி பெறுகிறீர்களா? ☐
ஆம் / இல்லை

27.2. நீங்கள் ஏதேனும் அரசாங்க உதவி பெறுகிறீர்களா? ☐
ஆம் / இல்லை

27.2. (i) ஆம் எனில் ☐
பணஉதவி / சிகிச்சை உதவி / மற்றவை

27.3. வளர் இளம்பருவக்குழந்தைக்கு அரசு தனியார் தொண்டு நிறுவனங்கள் மூலமாக ஏதேனும் உதவி பெறுகிறீர்களா? ☐
ஆம் / இல்லை ☐

27.4. நோய் தன்மையினால் வளர் இளம் பருவக்குழந்தை சமூகத்தில் ஏற்றத்தாழ்வை சந்திக்கிறதா?
ஆம் / இல்லை ☐

27.4. i) வளர்இளம்பருவக் குழந்தை ஏற்றத்தாழவை சந்திக்கிறது எனில் பின்வருனவற்றில் யார் மூலமாக,

1. குடும்ப உறுப்பினர்
2. உறவினர்
3. அயலாரிடம்
4. பள்ளியில் ☐
5. மற்றவர்கள்

27.5. தற்பொழுது கிடைக்கும் சமுதாய ஆதரவு உங்களுக்கு நிறைவாக உள்ளதா?
ஆம் / இல்லை. ☐

28. எச்.ஐ.வி / கூட்டு மருந்து சிகிச்சை பற்றிய முதன்மை தகவல்களைப் பராமரிப்பாளர், எவற்றின் மூலம் அறிவார்?

1. செய்தித்தாள்
2. தொலைக்காட்சி / சினிமா
3. உடல் நல வல்லுநர்கள் ☐
4. மற்றவைகள்

29. கூட்டு மருந்து பற்றிய நன்மைகளையும் / விளக்கங்களையும் உங்களிடம் போதியளவு யார் எடுத்துரைப்பார்?

1. மருத்துவர்
2. செவிலியர்
3. உடன் ஆற்றுப்படுத்துநர்
4. மற்றவர்கள் (நண்பர்கள்) ☐

30. எச்.ஐ.வி. / கூட்டு மருந்து சிகிச்சையின் முதன்மை தகவல்களைப் பராமரிப்பாளர் அறிவாரா?

ஆம் / இல்லை. ஆம் ஏனில் ☐

30.1. எய்டஸ் நோயின் காரணி

1. மைக்ரோபாக்டீரியா
2. பூஞ்சை ☐
3. எச்.ஐ.வி கிருமி
4. குறைந்த எதிர்ப்பு சக்தி.

30.2. எச்.ஐ.வி / எய்ட்ஸ் பரவுவது,

1. எச்.ஐ.வி நோய் தொற்றுள்ளவரை வெறும் கையுடன் தொடுவது மூலமாக
2. எச்.ஐ.வி நோய் தொற்றுள்ள குழந்தையை அணைப்பது மூலமாக
3. பாதுகாப்பற்ற உடலுறவு கொள்ளுவதால்
4. எச்.ஐ.வி நோய் பாதிக்கப்பட்டவரின் தட்டு மற்றும் உடைமைகளை பகிர்ந்துக் கொள்வதன் மூலமாக ☐

30.3. எச்.ஐ.வி. நோய் தொற்று பரவுவதைத் தடுக்க பயன்படுவது

1. ஆணுறை
2. சுடுதண்ணீர்
3. தூய்மையான உடை
4. மது அருந்துவது ☐

30.4. எச்.ஐ.வி நோய் உள்ளதை எதன் மூலம் அறியலாம்?

1. சீறுநீர்
2. இரத்தம்
3. சளி
4. எல்லாவற்றின் மூலமாகவும் ☐

30.5. எச்.ஐ.வி. நோயை கூட்டு மருந்தின் மூலமாக குணப்படுத்த இயலுமா?

ஆம் / இல்லை. ☐

பகுதி - ஆ

மாற்றியமைக்கப்பட்ட வளர் இளம்பருவக் குழந்தைகளுக்கான நிறைமைச் சதவீதத்தை கண்டறிவதற்கான தகவல்கள்

1. வளர் இளம்பருவக் குழந்தை எடுத்துக் கொள்வது,

1. முதல் நிலை மருந்து
2. முதல்நிலை - மாறுபட்ட மருந்து
3. இரண்டாம் நிலை மருந்து ☐

1. 1. மருந்துகளின் பெயர்

2. கூட்டு மருந்தை யார் மூலமாக எடுத்துக் கொள்கிறீர்கள்?

1. தானாக
2. பராமரிப்பாளர் மூலமாக ☐

3. இதற்கு முன்பு மருந்துகளின் அளவை கண்டறியும் ஆய்வில் ஏதேனும் ஈடுபட்டு இருக்கிறீர்களா? ☐

ஆம் / இல்லை

4. மூன்று மாதத்திற்கு முன்பாக மருத்துவமனையில் சேர்ந்து சிகிச்சை பெறுகிறீர்களா? ஆம் / இல்லை ☐

4.1 ஆம் எனில்,

1. நோய் தொடர்பான பிரச்சனைகள்
2. மருந்துகளின் பக்கவிளைவுகள்
3. மற்றவை ☐

5. உங்களுக்கு, மருந்து எடுத்துக்கொள்ளும் அளவைப் பற்றி தெரியுமா?

ஆம் / இல்லை ☐

6. உங்களுக்கு, மருந்து எடுத்துக் கொள்ளும் கால அளவைப் பற்றி தெரியுமா?

ஆம் / இல்லை ☐

7. மூன்று மாதத்திற்கு முன்பு கூட்டு மருந்துகளில் ஏதேனும் மாற்றம் செய்தார்களா? ஆம் / இல்லை ☐

7.1 ஆம் எனில், காரணம் .....

8. உங்கள் வளர் இளம் பருவக் குழந்தைக்கு, மருந்து உட்கொள்ளுவது கடினமாக இருக்கிறதா?

ஆம் / இல்லை ☐

8.1 ஆம் எனில், காரணம் .....

9. உங்கள் வளர் இளம்பருவக் குழந்தைக்கு மருந்துகளை கொடுப்பது கஷ்டமாக இருக்கிறதா?

ஆம் / இல்லை ☐

9.1. ஆம் எனில், காரணம் .....

10. வளர் இளம்பருவக் குழந்தைக்கு, மருந்தை கொடுக்கும் பொழுது மனஉளைச்சல், ஏற்படுகிறதா?

ஆம் / இல்லை ☐

11. எச்.ஐ.வி. மருந்துகளின் நிறைமையை கணக்கிட உதவும் `5' மதிப்பு அளவு கோல் / அட்டவணை பங்கேற்பாளரிடம் கேட்கப்பட்டது. "மருத்துவரால் குழந்தைக்கு கூறப்பட்ட மருத்துவமுறைகளை நினைவில் கொண்டு கீழ்வருவனவற்றிற்கு விடையளிக்கவும்" பதில் தேர்வு:

எப்பொழுதும் இல்லை = 0, அரிதாக = 1 சில வேளைகளில் = 2 அடிக்கடி = 3, எப்பொழுதும் = 4,

	0	1	2	3	4
நீங்கள் எப்பொழுதாவது குழந்தைக்கு மருந்துகள் கொடுக்க மறந்துள்ளீர்களா?					
குழந்தைக்கு மருந்து கொடுப்பதில் கவனக்குறைவாக இருந்திருக்கிறீர்களா?					
குழந்தை ஓரளவு நன்றாக இருக்கும்போது, எப்பொழுதாவது மருந்துகளை நிறுத்தி இருக்கிறீர்களா?					
குழந்தை உடல்நிலை சரிநிலையில்லாத நிலையில், எப்பொழுதாவது மருந்துகளை நிறுத்தி இருக்கிறீர்களா?					

12. மருந்துகளின் வண்ணத்தைக் கொண்டு, நிறைமை சுய மதிப்புரை மூலம் காணும் முறை :

கடந்த 30 நாட்களில் நீங்கள் கொடுத்த கூட்டு மருந்துகளின் அளவை கணித்து, உங்கள் பதிலை கூறவும்.

ஏ.ஆர்.டி. மருந்துகள்

மருந்து A : 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

மருந்து B : 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

மருந்து C : 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

கணக்கிடும் முறை

0% என்றால் நீங்கள் எந்த மருந்தும் கொடுக்கவில்லை

50% என்றால் உங்களிடம் உள்ளவற்றில் பாதி மருந்தை கொடுத்துள்ளீர்கள்

100% என்றால் தினமும் ஒருமுறை என அனைத்து மருந்துகளையும் கொடுத்துள்ளீர்கள்

13. கடந்த 3 நாட்களில் எடுத்திருக்க வேண்டிய மாத்திரைகளின் நிறைமை சதவீதத்தை கணக்கிடும் முறை,

$$\text{நிறைமை சதவீதம்} = \frac{\text{கடந்த 3 நாட்களில் எடுத்திருக்க வேண்டிய மாத்திரைகளின் அளவை - கடந்த 3 நாட்களில் விடுபட்ட மாத்திரைகளின் அளவு}}{\text{கடந்த 3 நாட்களில் எடுத்திருக்க வேண்டிய மாத்திரைகளின் அளவு}} \times 100$$

14. மாத்திரையின் எண்ணிக்கையைக் கொண்டு நிறைமை சதவீதத்தை கணக்கிடும் முறை,

$$\text{நிறைமை சதவீதம்} = \frac{\text{எடுத்திருக்க வேண்டிய மாத்திரைகளின் எண்ணிக்கை - எடுத்துக் கொண்ட மாத்திரைகளின் எண்ணிக்கை}}{\text{எடுத்திருக்க வேண்டிய மாத்திரைகளின் எண்ணிக்கை}} \times 100$$

15. மாத்திரையை எடுக்காமல் இருந்ததற்கான காரணங்கள்,

1. பொருந்தாது
2. மறந்து விட்டது
3. சலித்து விட்டது / சோர்வு அடைந்து விட்டது
4. நேரமின்மையால் (பள்ளி மற்றும் இதர வேலை பளுவினால்)
5. பயணம் காரணமாக
6. பண வசதியின்மை காரணமாக
7. மருந்தகத்தில் மருந்து இல்லாமையால் ☐
8. மருந்துகளின் பக்க விளைவுகள் காரணமாக
9. மற்றவை (ஏதேனும்)

16. வளர் இளம் பருவக்குழந்தை பின்வரும் உதவி பொருட்களைப் பயன்படுத்தி மருந்துகளை உட்கொள்கிறதா?

1. மாத்திரை பெட்டி
2. நாள் காட்டி
3. கைபேசி நினைவூட்டல்கள்
4. நண்பர்கள் மூலமாக
5. கையேடு ☐
6. ஏதுமில்லை

பகுதி - இ

பிரிவு - I

ஊட்டச்சத்து நிலைமையை கண்டறிவதற்கான தகவல்கள்

I. உடல் குறியீடு அளவு கோல்கள்

1.	உயரம்	:	செ.மீ
2.	எடை	:	கி.கி
3.	உடலின் மொத்த குறியீடு (Body Mass Index)	:	கி.கி / மீ^{2}
4.	இடுப்பு சுற்றளவு (Waist Circumference)	:	செ.மீ
5.	மேல்கை மத்திய பகுதியின் சுற்றளவு (Mid Upper Arm Circumference)	:	செ.மீ
6.	தசை பிடியின் அளவு (டிரைசப்ஸ்) (skin Fold Thickness –Triceps)	:	மி.மீ.
7.	`Z' மதிப்பு		

பிரிவு - II

II. வளர் இளம்பருவக் குழந்தையின் நோய் தொடர்பான தகவல்கள்

8. இதற்கு முன்பாக வளர் இளம் பருவக் குழந்தைக்கு உணவூட்ட குறைபாடு நோய் தொடர்பாக சிகிச்சை அளித்திருக்கிறார்களா?

ஆம் / இல்லை

8.1 ஆம் எனில், நோயின் பெயர் .....

சிகிச்சை தகவல்கள் .....

9. வளர் இளம்பருவ குழந்தைக்கு முறையாக பூச்சி மருந்து கொடுப்பீர்களா?

ஆம் / இல்லை

10. இப்பொழுது வளர் இளம்பருவக் குழந்தைக்கு இரத்த சோகை நோய் உள்ளதா?

ஆம் / இல்லை

11. கடந்த 3 மாதத்தில் வளர் இளம்பருவக் குழந்தையின் எடை குறைந்து உள்ளதா?

ஆம் / இல்லை

11.1 ஆம் எனில் .....

1) 0-5% 2) 5-10% 3) >10% உடலின் எடையிலிருந்து

12. பின் வருவனவற்றில் ஏதேனும் அறிகுறிகள் ஏற்பட்டு உள்ளதா?

1. தோல் - வறட்சி ஆம் / இல்லை ☐

நகம் - ஆம் / இல்லை ☐

1.1 ஆம் எனில்,

குழிநகம் / திடமான நகம் / நிறம் மாறிய நகம்

2. தலை / ரோமம் (முடி)

நிறம் - வழக்கமான நிறம் / நிறம் மாறியது

அமைப்பு - பளபளப்பான/மந்தமான/மெல்லிய/பறித்து திறன்

நோய் தொற்றும் தன்மை ஆம் / இல்லை ☐

2.1 ஆம் எனில்_____

3. கண் ஆம் / இல்லை ☐

3.1 ஆம் எனில், வறட்சியான கண் / பைடாட் ஸ்பாட் / வெளிறிய தன்மை கொண்ட வெண்படலம்

4. வாய் ஆம் / இல்லை ☐

4.1 ஆம் எனில், வாய்ப்புண் / நாக்குப்புண் / ஈறுகளில் இரத்தம் / வறண்ட உதடு

5. செரித்தல் மண்டலம் ஆம் / இல்லை ☐

5.1ஆம் எனில், பசி தன்மை / குமட்டல் / வாந்தி / கொழுப்பு கலந்த கழிச்சல் / வயிற்று போக்கு

6. கை மற்றும் கால்கள்

தசை குறைப்பு ஆம் / இல்லை

திரவக்கோர்வை ஆம் / இல்லை ☐

கொழுப்பணு சிதைவு ஆம் / இல்லை

பிரிவு ஈ
மாற்றியமைக்கப்பட்ட வாழ்க்கைத்தர மதிப்பீடு
(5 முதல் 11 வயது வரை)

I)அ. **பொதுவான ஆரோக்கிய தரம்:** பின்வரும் கேள்விகள் அனைத்தும் வளர் இளம் பருவக் குழந்தையின் ஆரோக்கியம் மற்றும் பழக்கவழக்கம் பற்றியதாகும்.

கடந்த 3 மாதங்களில் பொதுவாக உங்கள் குழந்தை எவ்வாறு இருந்தது?

		மிக மோசமாக உணர்கிறான்/உணர்கிறாள்							மிக நன்றாக உணர்கிறான்/உணர்கிறாள்		
1)	பொதுவாக, மொத்தத்தில்?	1	2	3	4	5	6	7	8	9	10
2)	உடல் ரீதியாக?	1	2	3	4	5	6	7	8	9	10
3)	மன ரீதியாக?	1	2	3	4	5	6	7	8	9	10
4)	அவர்கள் பள்ளி வேலைகள் பற்றி?	1	2	3	4	5	6	7	8	9	10

(ஆ) கீழே உள்ள வாக்கியங்களை படிக்கும்போது. கடந்த 3 மாதங்களில் உங்கள் குழந்தையின் ஆரோக்கியத்தை விளக்கும் வாக்கியத்தை தேர்வு செய்து, உங்கள் விடையுடன் ஒத்துப்போகும் பதிலைக் கூறவும்.

		எபபோதும் இல்லை (அ) அரிதாக	ஏதேனும் சில சமயங்களில்	அநேகமாக எப்போதும்
1)	என் குழந்தையின் ஆரோக்கியம் சிறப்பாக உள்ளது.	1	2	3
2)	எனது குழந்தை நோயை நன்றாக எதிர் கொள்வதாக தெரிகிறது	1	2	3
3)	எனக்கு தெரிந்த மற்ற குழந்தைகளை விட என் குழந்தை ஆரோக்கியத்தில் குறைவாக உள்ளதாகத் தோன்றுகிறது	1	2	3
4)	என் குழந்தை பொதுவாக தன்னை சுற்றி ஏதேனும் நடந்தால் பிடித்துக் கொள்கிறது.	1	2	3
5)	என் குழந்தை குழப்பமான மனநிலையில் உள்ளது	1	2	3
6)	என் குழந்தையிடம் குறும்பு தனம் மிக உள்ளது.	1	2	3
7)	என் குழந்தை நோய் வயப்பட்டாலோ அல்லது காயமடைந்தாலோ, பொதுவாக விரைவில் குணமடைந்து விடுகிறது.	1	2	3

II. உடல்ரீதியான செயல்பாடு

A. கடந்த 4 வாரங்களில், உங்கள் வளர் இளம் பருவக்குழந்தையின் ஆரோக்கியம் எந்த அளவு அவன் / அவளது செயல்பாட்டை இடைமறிக்கிறது.

எந்த அளவு உங்கள் குழந்தையின் ஆரோக்கியம் இடைமறிக்கப்படுகிறது?

		ஒருபோதும் இல்லை	மிதமாக	ஏதேனும் சில சமயங்களில்	அதிகமாக	மிக அதிகமாக
1)	உங்கள் குழந்தை செய்யும் வலிமையான செயல்கள் அதாவது பளுவான பொருள்களை தூக்குதல், ஓடுதல் மற்றும் கடுமையான உடற்பயிற்சி போன்றவை அல்லது அவற்றின் அளவு?	1	2	3	4	5
2)	உங்கள் குழந்தை செய்யும் மிதமான செயல்கள், அதாவது பந்து வீசுதல் போன்றவை அல்லது அவற்றின் அளவு?	1	2	3	4	5
3)	உயரமான இடங்களுக்கு ஏறுதல் அல்லது படிகட்டில் ஏறுதல்?	1	2	3	4	5
4)	ஒரு கட்டத்தில் நடக்கும்போது?	1	2	3	4	5
5)	சாய்தல், தூக்குதல், கவிழ்தல்?	1	2	3	4	5
6)	உண்பது, உடுப்பது. குறிப்பது அல்லது கழிவுநீக்கம்?	1	2	3	4	5

III. மனரீதியான பாங்கு

இந்த வாக்கியங்கள் அனைத்தும் வளர் இளம் பருவக்குழந்தைகளுக்கு ஏற்படும் செயல்பாட்டு பிரச்சனைகளை பற்றியது. கடந்த 3 மாதங்களில் உங்கள் குழந்தையின் நடவடிக்கையை விவரிக்கும் இந்த வாக்கியங்களை முடிவு செய்து, உங்களின் பதிலை கூறவும்.

		எப்பொழுதும் உண்மை	சில நேரங்களில் உண்மை	உண்மை இல்லை
1	என் குழந்தையின் உணர்வு மற்றும் எண்ணங்களில் திடீர் மாறுதல்கள் உண்டு.	1	2	3
2	என் குழந்தை அவளை / அவனை யாரும் நேசிக்கவில்லை என்று எண்ணுகிறது.	1	2	3
3	என் குழந்தை எப்போதும் இறுக்கத்துடனும், பதற்றத்துடனும் இருக்கிறது.	1	2	3
4	என் குழந்தை பொய் பேசுகிறது (அல்லது ஏமாற்றுகிறது.	1	2	3
5	என் குழந்தை அதிக பயத்துடன், கவலையுடன் இருக்கிறது.	1	2	3
6	என் குழந்தை அதிகமாக விவாதிக்கிறது.	1	2	3

7	என் குழந்தைக்கு கவனக்குறைவு உள்ளது. அதிக கவனம் செலுத்த முடியவில்லை.	1	2	3
8	என் குழந்தை எளிதில் குழப்பமாகி விடுகிறது / மனக்குழப்பத்தில் இருப்பதுபோல் தோன்றுகிறது.	1	2	3
9	என் குழந்தை மற்றவர்களிடம் கோபமாக இருக்கிறது.	1	2	3
10	என் குழந்தை வீட்டில் கீழ்ப்படியாமல் உள்ளது.	1	2	3
11	என் குழந்தை பள்ளியில் கீழ்ப்படியாமல் உள்ளது.	1	2	3
12	என் குழந்தை தவறிழைத்த பின்பும் அதற்காக வருந்துவதில்லை.	1	2	3
13	என் குழந்தை மற்ற குழந்தைகளுடன் சேர்வதில் பிரச்சனை கொள்கிறது.	1	2	3
14	என் குழந்தை ஆசிரியர்களுடன் பழகுவதில் பிரச்சனை கொள்கிறது.	1	2	3
15	என் குழந்தை அவசர புத்தியுடன் உள்ளது மற்றும் எதையம் சிந்திக்காமல் செயல்படுகிறது.	1	2	3
16	என் குழந்தை தாழ்வு மனப்பான்மையுடன் உள்ளது.	1	2	3
17	என் குழந்தை மற்ற குழந்தைகளால் விரும்பப்படவில்லை.	1	2	3
18	என் குழந்தை தன் சிந்தனையில் இருந்து வெளிவர கஷ்டப்படுகிறது (மன கலக்கம் உள்ளது)	1	2	3
19	என் குழந்தை மிகவும் படபடப்புடன் உள்ளது அல்லது துறுதுறுவென்று உள்ளது.	1	2	3
20	என் குழந்தை பிடிவாத குணத்துடனும், கோபத்துடனும் மற்றும் எரிச்சலூட்டும் குணத்துடன் உள்ளது.	1	2	3
21	என் குழந்தை அதிக கோபம் கொணடு மற்றும் அதை விரைவில் இழந்தும் விடுகிறது.	1	2	3
22	என் குழந்தை துயரத்துடன், சோகமான மனக்கவலையுடன் உள்ளது.	1	2	3
23	என் குழந்தை மற்றவர்களுடன் சேர்வதில்லை.	1	2	3
24	என் குழந்தை அவனுடைய / அவளுடைய பொருட்களையும், அல்லது மற்றவர்களுடைய பொருட்களையும் வேண்டுமென்றே உடைக்கின்றான் / உடைக்கிறாள்.	1	2	3
25	என் குழந்தை முதியவர்களிடம் நன்றாக பழகுகிறது.	1	2	3
26	என் குழந்தை அதிகமாக அழுகிறது.	1	2	3
27	என் குழந்தைக்கு அதிக கவனம் தேவைப்படுகிறது.	1	2	3
28	என் குழந்தை அதிகம் மற்றவரை சார்ந்து உள்ளது.	1	2	3

IV. சமூக மற்றும் சுய செயல்பாடுகள்

அ) கடந்த 4 வாரங்களில், எத்தனை நாட்கள்...

1) நோய் (அ) காயத்தினால் உங்கள் குழந்தை படுக்கையில் இருந்தது? (அநேகமாக (அ) நாள் முழுவதும்)

0	1-2	3-5	6-10	11-15	>16
(1)	(2)	(3)	(4)	(5)	(6)

2) நோய் (அ) காயத்தினால் உங்கள் குழந்தை பள்ளிக்குச் செல்வது தடைபட்டதா? (விடுமுறை நாட்களாக இருந்தால, பள்ளி இருந்த கடைசி மாதத்தை குறிப்பிடவும்)

0	1-2	3-5	6-10	11-15	>16
(1)	(2)	(3)	(4)	(5)	(6)

ஆ) ஒவ்வொரு கேள்விக்கும் ஒரு விடையை மட்டும் தேர்வு செய்யவும்.

3) உங்கள் குழந்தை தற்பொழுது எந்த வரிசையில் உள்ளது (அல்லது இருக்க வேண்டும்)

சிறுவர் பள்ளி	[ ]	குழந்தைகள் பள்ளி	[ ]
முதல் வகுப்பு	[ ]	2-ம் வகுப்பு	[ ]
3-ம் வகுப்பு	[ ]	4-ம் வகுப்பு	[ ]
5-ம் வகுப்பு	[ ]	6-ம் வகுப்பு	[ ]
7-ம் வகுப்பு	[ ]	பள்ளியில் இல்லை	[ ]
மற்றவை	[ ]		

4) உங்கள் குழந்தை ஏதாவது காரணத்திற்காக அதே வகுப்பில் திரும்பவும் இருந்ததா? .....

ஆம்/ இல்லை

5) பொதுவாக அவனின் / அவளின் ஆரோக்கியத்தால் பள்ளியின் வருகைப்பதிவில் ஏதேனும் பாதிப்பு எற்பட்டதா?

ஆம்/ இல்லை

6) உங்கள் குழந்தையின் ஆரோக்கியம் அவளின் / அவனின் பொதுவான செயல்பாட்டை குறைத்ததா?

ஆம்/ இல்லை

7) பள்ளி விளையாட்டுகளில் உங்கள் குழந்தை பங்கேற்றதா?

ஆம்/ இல்லை

8) உங்கள் வளர் இளம் பருவக்குழந்தையின் இயலாமை (அ) ஆரோக்கிய பிரச்சனையால் அவள் / அவன் சிறப்பு வகுப்புகள் (அ) சிறப்பு உதவிகள் ஆகியவற்றை பள்ளியில் இருக்கிறதா?

ஆம்/ இல்லை

ஆம்யெனில், பின்வருவான வற்றில் எந்த வகையான சிறப்பு உதவியை உங்கள் குழந்தை பெறுகிறது.

வாசிப்பதில்	..... [ ]
படிப்பதில்	..... [ ]
பேச்சு (அ) மொழி	..... [ ]
உடல் பயிற்சி / தொழில் பயிற்சி	..... [ ]
ஒன்றுக்கு மேல்	..... [ ]
மற்ற வகைகள்	

V) சுகாதார சேவைப் பயன்பாடு

அ. கடந்த 4 வாரங்களில்,

1) எத்தனை முறை உங்களது குழந்தையின் உடல் நிலை பாதிக்கப்பட்டபோது அல்லது காயம் ஆன பொழுது, மருத்துவர் பரிந்துரைத்த கூட்டு மருந்து மற்றும் சத்து மாத்திரைகளை தவிர, மற்ற மாத்திரைகளை உபயோகிக்கும் நிலையை ஏற்படுத்தியது?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

2) எத்தனை முறை, உங்களுடைய குழந்தையின் உடல் நிலை பாதிக்கப்பட்ட போது மருத்துவரின் ஆலோசனையின்றி மருந்தகத்திற்கு சென்று மருந்து வாங்கினீர்கள்?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

3) எத்தனை முறை மருத்துவர், செவிலியர் அல்லது சிறப்பு மருத்துவரை சந்திக்க உங்கள் குழந்தை மருத்துவமனை அல்லது அவசர சிகிச்சைக்கு சென்றீர்கள்?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

4) எத்தனைமுறை, உங்களுடைய குழந்தை உடல் நலக் குறைவினால் மருத்துவம் சார்ந்த உதவியை இங்கிருக்கும் மருத்துவர் தவிர, தனியார் மருத்துவரிடம், உதவி பெற்று இருக்கிறீர்கள்?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

ஆ)5) உங்கள் குழந்தை உடல் நலத்தை மேம்படுத்தும் பின்வரும் நிறைவு உண்டாக்குகிற வேறு வழி முறை சிசிச்சையை மேற்கொள்கிறதா?

அ) மூலிகை மருந்துகள்
ஆ) மசாஜ் சிகிச்சை
இ) யோகா
ஈ) அக்குபச்சர்
உ) மற்றவை.

VI. அறிகுறிகள்

கடந்த 4 வாரங்களில் உங்கள் குழந்தைக்கு இருந்த அறிகுறிகள் பற்றிய கேள்விகள் கீழே கொடுக்கப்பட்டுள்ளன.இந்த அறிகுறிகள் உங்கள் குழந்தையை எந்த அளவு துயரப்படுத்தியிருக்கிறது என்பதை கூறவும்.

		எப்போதும் இல்லை	மிக குறைவாக	குறைவாக	மிதமாக	அதிகமாக	மிக அதிகமாக
1)	உடல் வலி	1	2	3	4	5	6
2)	இருமல், மூச்சுத்திணறல்	1	2	3	4	5	6
3)	குமட்டல், வாந்தி, வயிற்றுவலி	1	2	3	4	5	6
4)	வயிற்றுப்போக்கு	1	2	3	4	5	6
5)	சிராய்ப்பு, அரிப்பு மற்றும் பிற தோல் பிரச்சனைகள்	1	2	3	4	5	6
6)	சோர்வு, பலவீனம்	1	2	3	4	5	6
7)	தலைச்சுற்று, மயக்கம் இருப்பது போல் தோன்றுகிறதா	1	2	3	4	5	6
8)	காய்ச்சல், இரவில் வியர்த்தல், நடுக்கம் மற்றும் குளிர்	1	2	3	4	5	6
9)	பசியின்மை	1	2	3	4	5	6
10)	உறக்கமின்மை	1	2	3	4	5	6
11)	கண் மற்றும் பார்வை பிரச்சனைகள்	1	2	3	4	5	6
12)	தலைவலி	1	2	3	4	5	6
13)	வாய்வலி அல்லது வறட்சி, விழுங்குவதில் பிரச்சனை	1	2	3	4	5	6
14)	நெஞ்சு வலி அல்லது அடைப்பு	1	2	3	4	5	6
15)	மூச்சுவிடுதலில் பிரச்சனை	1	2	3	4	5	6
16)	ஜலதோசம், சைனஸ் பிரச்சனை	1	2	3	4	5	6
17)	தலை வலி, மூட்டுவலி	1	2	3	4	5	6
18)	கை, கால்களில் வலி, மறத்துப்போதல், நமைச்சல்	1	2	3	4	5	6
19)	காது வலிகள்	1	2	3	4	5	6
20)	பொதுவான பிற பிரச்சனைகள்	1	2	3	4	5	6

மாற்றியமைக்கப்பட்ட வாழ்க்கைத்தர மதிப்பீடு
(12 முதல் 20 வயது வரை)

I)அ. **பொதுவான ஆரோக்கிய தரம்:** பின்வரும் கேள்விகள் அனைத்தும் வளர் இளம் பருவக் குழந்தையின் ஆரோக்கியம் மற்றும் பழக்கவழக்கம் பற்றியதாகும்.

கடந்த 3 மாதங்களில் பொதுவாக உங்கள் குழந்தை எவ்வாறு இருந்தது?

		மிக மோசமாக உணர்கிறான்/உணர்கிறாள்							மிக நன்றாக உணர்கிறான்/உணர்கிறாள்		
1)	பொதுவாக, மொத்தத்தில்?	1	2	3	4	5	6	7	8	9	10
2)	உடல் ரீதியாக?	1	2	3	4	5	6	7	8	9	10
3)	மன ரீதியாக?	1	2	3	4	5	6	7	8	9	10
4)	அவர்கள் பள்ளி வேலைகள் பற்றி?	1	2	3	4	5	6	7	8	9	10

(ஆ) கீழே உள்ள வாக்கியங்களை படிக்கும்போது. கடந்த 3 மாதங்களில் உங்கள் குழந்தையின் ஆரோக்கியத்தை விளக்கும் வாக்கியத்தை தேர்வு செய்து, உங்கள் விடையுடன் ஒத்துப்போகும் பதிலைக் கூறவும்.

		எப்போதும் இல்லை (அ) அரிதாக	ஏதேனும் சில சமயங்களில்	அநேகமாக எப்போதும்
1)	என் குழந்தையின் ஆரோக்கியம் சிறப்பாக உள்ளது.	1	2	3
2)	எனது குழந்தை நோயை நன்றாக எதிர் கொள்வதாக தெரிகிறது	1	2	3
3)	எனக்கு தெரிந்த மற்ற குழந்தைகளை விட என் குழந்தை ஆரோக்கியத்தில் குறைவாக உள்ளதாகத் தோன்றுகிறது	1	2	3
4)	என் குழந்தை பொதுவாக தன்னை சுற்றி ஏதேனும் நடந்தால் பிடித்துக் கொள்கிறது.	1	2	3
5)	என் குழந்தை குழப்பமான மனநிலையில் உள்ளது	1	2	3
6)	என் குழந்தையிடம் குறும்பு தனம் மிக உள்ளது.	1	2	3
7)	என் குழந்தை நோய் வயப்பட்டாலோ அல்லது காயமடைந்தாலோ, பொதுவாக விரைவில் குணமடைந்து விடுகிறது.	1	2	3

II. உடல்ரீதியான செயல்பாடு

A. கடந்த 4 வாரங்களில், உங்கள் வளர் இளம் பருவக்குழந்தையின் ஆரோக்கியம் எந்த அளவு அவன் / அவளது செயல்பாட்டை இடைமறிக்கிறது.

எந்த அளவு உங்கள் குழந்தையின் ஆரோக்கியம் இடைமறிக்கப்படுகிறது?

		ஒருபோதும் இல்லை	மிதமாக	ஏதேனும் சில சமயங்களில்	அதிகமாக	மிக அதிகமாக
1)	உங்கள் குழந்தை செய்யும் வலிமையான செயல்கள் அதாவது பளுவான பொருள்களை தூக்குதல், ஓடுதல் மற்றும் கடுமையான உடற்பயிற்சி போன்றவை அல்லது அவற்றின் அளவு?	1	2	3	4	5
2)	உங்கள் குழந்தை செய்யும் மிதமான செயல்கள், அதாவது பந்து வீசுதல் போன்றவை அல்லது அவற்றின் அளவு?	1	2	3	4	5
3)	உயரமான இடங்களுக்கு ஏறுதல் அல்லது படிகட்டில் ஏறுதல்?	1	2	3	4	5
4)	ஒரு கட்டத்தில் நடக்கும்போது?	1	2	3	4	5
5)	சாய்தல், தூக்குதல், கவிழ்தல்?	1	2	3	4	5
6)	உண்பது, உடுப்பது. குறிப்பது அல்லது கழிவுநீக்கம்?	1	2	3	4	5

III. மனரீதியான பாங்கு

இந்த வாக்கியங்கள் அனைத்தும் வளர் இளம் பருவக்குழந்தைகளுக்கு ஏற்படும் செயல்பாட்டு பிரச்சனைகளை பற்றியது. கடந்த 3 மாதங்களில் உங்கள் குழந்தையின் நடவடிக்கையை விவரிக்கும் இந்த வாக்கியங்களை முடிவு செய்து, உங்களின் பதிலை கூறவும்.

		எப்பொழுதும் உண்மை	சில நேரங்களில் உண்மை	உண்மை இல்லை
1	என் குழந்தையின் உணர்வு மற்றும் எண்ணங்களில் திடீர் மாறுதல்கள் உண்டு.	1	2	3
2	என் குழந்தை அவளை / அவனை யாரும் நேசிக்கவில்லை என்று எண்ணுகிறது.	1	2	3
3	என் குழந்தை எப்போதும் இறுக்கத்துடனும், பதற்றத்துடனும் இருக்கிறது.	1	2	3
4	என் குழந்தை பொய் பேசுகிறது (அல்லது ஏமாற்றுகிறது.	1	2	3
5	என் குழந்தை அதிக பயத்துடன், கவலையுடன் இருக்கிறது.	1	2	3
6	என் குழந்தை அதிகமாக விவாதிக்கிறது.	1	2	3

7	என் குழந்தைக்கு கவனக்குறைவு உள்ளது. அதிக கவனம் செலுத்த முடியவில்லை.	1	2	3
8	என் குழந்தை எளிதில் குழப்பமாகி விடுகிறது / மனக்குழப்பத்தில் இருப்பதுபோல் தோன்றுகிறது.	1	2	3
9	என் குழந்தை மற்றவர்களிடம் கோபமாக இருக்கிறது.	1	2	3
10	என் குழந்தை வீட்டில் கீழ்ப்படியாமல் உள்ளது.	1	2	3
11	என் குழந்தை பள்ளியில் கீழ்ப்படியாமல் உள்ளது.	1	2	3
12	என் குழந்தை தவறிழைத்த பின்பும் அதற்காக வருந்துவதில்லை.	1	2	3
13	என் குழந்தை மற்ற குழந்தைகளுடன் சேர்வதில் பிரச்சனை கொள்கிறது.	1	2	3
14	என் குழந்தை ஆசிரியர்களுடன் பழகுவதில் பிரச்சனை கொள்கிறது.	1	2	3
15	என் குழந்தை அவசர புத்தியுடன் உள்ளது மற்றும் எதையம் சிந்திக்காமல் செயல்படுகிறது.	1	2	3
16	என் குழந்தை தாழ்வு மனப்பான்மையுடன் உள்ளது.	1	2	3
17	என் குழந்தை மற்ற குழந்தைகளால் விரும்பப்படவில்லை.	1	2	3
18	என் குழந்தை தன் சிந்தனையில் இருந்து வெளிவர கஷ்டப்படுகிறது (மன கலக்கம் உள்ளது)	1	2	3
19	என் குழந்தை மிகவும் படபடப்புடன் உள்ளது அல்லது துறுதுறுவென்று உள்ளது.	1	2	3
20	என் குழந்தை பிடிவாத குணத்துடனும், கோபத்துடனும் மற்றும் எரிச்சலூட்டும் குணத்துடன் உள்ளது.	1	2	3
21	என் குழந்தை அதிக கோபம் கொணடு மற்றும் அதை விரைவில் இழந்தும் விடுகிறது.	1	2	3
22	என் குழந்தை துயரத்துடன், சோகமான மனக்கவலையுடன் உள்ளது.	1	2	3
23	என் குழந்தை மற்றவர்களுடன் சேர்வதில்லை.	1	2	3
24	என் குழந்தை அடுத்தவர்கள் தன்னிடம் சார்ந்து இல்லை என்பது போல் உணர்க்கிறது.	1	2	3
25	என் குழந்தை பிறர்க்கு பிரச்சனைகள் தூண்டும் நண்பர்களை சார்ந்து இருக்கிறான்	1	2	3
26	என் குழந்தை ரகசியம் மற்றும் தனது உடமைகளை பாதுகாக்கிறது.	1	2	3
27	என் குழந்தை அதிகமான கவலையுடன் உள்ளது.	1	2	3
28	என் குழந்தை அதிகம் மற்றவரை சார்ந்து உள்ளது.	1	2	3

IV. சமூக மற்றும் சுய செயல்பாடுகள்

அ) கடந்த 4 வாரங்களில், எத்தனை நாட்கள்...

1) நோய் (அ) காயத்தினால் உங்கள் குழந்தை படுக்கையில் இருந்தது? (அநேகமாக (அ) நாள் முழுவதும்)

0	1-2	3-5	6-10	11-15	>16
(1)	(2)	(3)	(4)	(5)	(6)

2) நோய் (அ) காயத்தினால் உங்கள் குழந்தை பள்ளிக்குச் செல்வது தடைபட்டதா? (விடுமுறை நாட்களாக இருந்தால, பள்ளி இருந்த கடைசி மாதத்தை குறிப்பிடவும்)

0	1-2	3-5	6-10	11-15	>16
(1)	(2)	(3)	(4)	(5)	(6)

ஆ) ஒவ்வொரு கேள்விக்கும் ஒரு விடையை மட்டும் தேர்வு செய்யவும்.

3) உங்கள் குழந்தை தற்பொழுது எந்த வரிசையில் உள்ளது (அல்லது இருக்க வேண்டும்)

4-ம் வகுப்பு	[ ]	5-ம் வகுப்பு	[ ]
6-ம் வகுப்பு	[ ]	7-ம் வகுப்பு	[ ]
8-ம் வகுப்பு	[ ]	9-ம் வகுப்பு	[ ]
12-ம் வகுப்பு	[ ]		

4) உங்கள் குழந்தை ஏதாவது காரணத்திற்காக அதே வகுப்பில் திரும்பவும் இருந்ததா? .....

ஆம்/ இல்லை

5) பொதுவாக அவனின் / அவளின் ஆரோக்கியத்தால் பள்ளியின் வருகைப்பதிவில் ஏதேனும் பாதிப்பு எற்பட்டதா?

ஆம்/ இல்லை

6) உங்கள் குழந்தையின் ஆரோக்கியம் அவளின் / அவனின் பொதுவான செயல்பாட்டை குறைத்ததா?

ஆம்/ இல்லை

7) பள்ளி விளையாட்டுகளில் உங்கள் குழந்தை பங்கேற்றதா?

ஆம்/ இல்லை

8) உங்கள் வளர் இளம் பருவக்குழந்தையின் இயலாமை (அ) ஆரோக்கிய பிரச்சனையால் அவள் / அவன் சிறப்பு வகுப்புகள் (அ) சிறப்பு உதவிகள் ஆகியவற்றை பள்ளியில் இருக்கிறதா?

ஆம்/ இல்லை

ஆம்யெனில், பின்வருவான வற்றில் எந்த வகையான சிறப்பு உதவியை உங்கள் குழந்தை பெறுகிறது.

வாசிப்பதில்	..... [ ]
படிப்பதில்	..... [ ]
பேச்சு (அ) மொழி	..... [ ]
உடல் பயிற்சி / தொழில் பயிற்சி	..... [ ]
ஓன்றுக்கு மேல்	..... [ ]
மற்ற வகைகள்	

V) சுகாதார சேவைப் பயன்பாடு

அ. கடந்த 4 வாரங்களில்,

1) எத்தனை முறை உங்களது குழந்தையின் உடல் நிலை பாதிக்கப்பட்டபோது அல்லது காயம் ஆன பொழுது, மருத்துவர் பரிந்துரைத்த கூட்டு மருந்து மற்றும் சத்து மாத்திரைகளை தவிர, மற்ற மாத்திரைகளை உபயோகிக்கும் நிலையை ஏற்படுத்தியது?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

2) எத்தனை முறை, உங்களுடைய குழந்தையின் உடல் நிலை பாதிக்கப்பட்ட போது மருத்துவரின் ஆலோசனையின்றி மருந்தகத்திற்கு சென்று மருந்து வாங்கினீர்கள்?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

3) எத்தனை முறை மருத்துவர், செவிலியர் அல்லது சிறப்பு மருத்துவரை சந்திக்க உங்கள் குழந்தை மருத்துவமனை அல்லது அவசர சிகிச்சைக்கு சென்றீர்கள்?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

4) எத்தனைமுறை, உங்களுடைய குழந்தை உடல் நலக் குறைவினால் மருத்துவம் சார்ந்த உதவியை இங்கிருக்கும் மருத்துவர் தவிர, தனியார் மருத்துவரிடம், உதவி பெற்று இருக்கிறீர்கள்?

0	1-2	3-4	5-6	7-9	>10
1	2	3	4	5	6

ஆ) 5) உங்கள் குழந்தை உடல் நலத்தை மேம்படுத்தும் பின்வரும் நிறைவு உண்டாக்குகிற வேறு வழி முறை சிசிச்சையை மேற்கொள்கிறதா?

அ) மூலிகை மருந்துகள்
ஆ) மசாஜ் சிகிச்சை
இ) யோகா
ஈ) அக்குபச்சர்
உ) மற்றவை.

VI. அறிகுறிகள்

கடந்த 4 வாரங்களில் உங்கள் குழந்தைக்கு இருந்த அறிகுறிகள் பற்றிய கேள்விகள் கீழே கொடுக்கப்பட்டுள்ளன.இந்த அறிகுறிகள் உங்கள் குழந்தையை எந்த அளவு துயரப்படுத்தியிருக்கிறது என்பதை கூறவும்.

		எப்போதும் இல்லை	மிக குறைவாக	குறைவாக	மிதமாக	அதிகமாக	மிக அதிகமாக
1)	உடல் வலி	1	2	3	4	5	6
2)	இருமல், மூச்சுத்திணறல்	1	2	3	4	5	6
3)	குமட்டல், வாந்தி, வயிற்றுவலி	1	2	3	4	5	6
4)	வயிற்றுப்போக்கு	1	2	3	4	5	6
5)	சிராய்ப்பு, அரிப்பு மற்றும் பிற தோல் பிரச்சனைகள்	1	2	3	4	5	6
6)	சோர்வு, பலவீனம்	1	2	3	4	5	6
7)	தலைச்சுற்று, மயக்கம் இருப்பது போல் தோன்றுகிறதா	1	2	3	4	5	6
8)	காய்ச்சல், இரவில் வியர்த்தல், நடுக்கம் மற்றும் குளிர்	1	2	3	4	5	6
9)	பசியின்மை	1	2	3	4	5	6
10)	உறக்கமின்மை	1	2	3	4	5	6
11)	கண் மற்றும் பார்வை பிரச்சனைகள்	1	2	3	4	5	6
12)	தலைவலி	1	2	3	4	5	6
13)	வாய்வலி அல்லது வறட்சி, விழுங்குவதில் பிரச்சனை	1	2	3	4	5	6
14)	நெஞ்சு வலி அல்லது அடைப்பு	1	2	3	4	5	6
15)	மூச்சுவிடுதலில் பிரச்சனை	1	2	3	4	5	6
16)	ஜலதோசம், சைனஸ் பிரச்சனை	1	2	3	4	5	6
17)	தலை வலி, மூட்டுவலி	1	2	3	4	5	6
18)	கை, கால்களில் வலி, மறத்துப்போதல், நமைச்சல்	1	2	3	4	5	6
19)	காது வலிகள்	1	2	3	4	5	6
20)	பொதுவான பிற பிரச்சனைகள்	1	2	3	4	5	6

Annexure- ii

ASSESSMENT OF COUNSELING SCHEDULES

The HIP interventional package (HIP) includes the following components of Adherence counseling, Nutritional counseling, strategies to enhance the quality of life of HIV infected adolescents includes demonstration of selected asana and maintenance of diary every day.Here, the investigator planned to give HIP to experimental group of HIV infected adolescents in order to increase immune power, improve nutritional status, and enhance the quality of life of ALHIV.

PART – I

ART ADHERENCE COUNSELING SCHEDULE

First, the investigator has planned to implement the adherence counseling to the care givers and HIV infected adolescents in ART clinic together.As per inclusion criteria, adolescents on ART management for a period of minimum 3 months were only enrolled in the study. So they might have undergone pre ART adherence counseling during initiation of ART. Our intervention is to focus more on to achieve 100% adherence and follow up ART counseling. The steps are as follows,

Baseline ART adherence counseling

Step 1: Assess the knowledge regarding disease and health status

- Review and assess care giver understands about subject's HIV disease and health status.
- Explain overall treatment and follow-up plan
- Importance of counseling sessions on ART.
- Monthly follow-up with physician.
- Monthly pharmacy refill and laboratory investigations as required
- Make the subject feel comfortable.

Step 2: Assess the knowledge regarding treatment and follow-ups

- Review and assess care giver's understanding and recall of treatment and follow-up plan
- Overall health and physical condition
- Disease stage and past OIs
- CD4 counts and viral load

- Expected changes in health and CD4 counts with regular ART
- Importance of more than 95% adherence
- Consequences of non-adherence.
- Past use of ARVs/Other medications
- Protective and preventive behaviors.

During the session assess,

- Care giver's beliefs and attitudes about HIV infection and treatment
- Care giver's and subjects mental health.

Step 3: **Discuss subject 'sliving conditions and social support**

- Employment and income of the care giver
- Living condition and housing
- Disclosure of HIV status
- Social support
- Dependants, other HIV infected persons
- Migrant status and travel
- Daily routine.

Step 4: **Discuss treatment plan**.

- Treatment regimen
  - ✓ Name and the dose of drugs
  - ✓ Instructions about food and fluid intake/restrictions if any,
  - ✓ Storage of medications
  - ✓ Take all the doses of all medications and do not share
  - ✓ Discuss the side effects- briefly, do not overwhelm the subjects
  - ✓ Follow-up plan
- Next counseling sessions
- Physician check up and investigations
- Contact information-Health professionals and subjects.

Step 5: **Discuss the proposed adherence strategy**

- HAART and its importance
- Treatment Buddy
- Family involvement
- Tools: Pillbox, diary, treatment reminder cues etc.

Step 6: **Identify barriers to adherence**

- Identify potential barriers from earlier discussion
- Discuss ways to address barriers.

Step 7: **Fix a date for the next appointment**

3rd AND 6th MONTH ART ADHERENCE COUNSELING

- Use an approach of continuing discussion on every month and evaluation at 3rd and 6th month.
- Repeat information whenever necessary
- Re-emphasize important issues
- Use dummy pills to repeat the instructions.

Step 1:Assess the knowledge regarding disease and health status

- Review and assess care giver understands of his/her HIV disease and health status

Step 2: Assess the knowledge regarding treatment and follow-ups

- Review and assess care giver understands and recall of treatment and follow-up plan.

Step 3: **Provide information on side effects**

- Expected side effects
- How to manage them
- When to seek care
- How to contact the health care providers.

Step 4:

- Proposed adherence strategy.

Step 5:

- Review barriers and how to address them.

Step 6:

- Fix a date for the next appointment.

NURSE ADHERENCE COUNSELOR CHECKLISTS FOR COUNSELING SESSIONS
ADHERENCE COUNSELING CHECKLIST

BASELINE COUNSELING SESSION

Subject's Name .....

Date of Counseling session.....

S.No.	ADHERENCE COUNSELING CONTENT	REMARKS
1.	**Subject's assessment**	
	Medical history	
	Knowledge of HIV/AIDS	
	Prior use of ART	
	Determine social support	
	Disclosure—have they disclosed to anyone?	
	Alcohol/drug use	
	Mental status	
2.	**Review health status**	
	Opportunistic infections	
	CD4/viral load	
	Review living conditions and the Employment	
	Housing	
	Employment/income	
3.	**Describe the treatment program and importance of adherence**	
	Drug regimen- Name/frequency/storage/dietary instructions/not to share pills	
	What ART does- suppresses virus/improves immunity/less OIs/not a cure	
	Cost	
	Side effects and what to do	
	Follow-up	
	Importance of adherence and consequences of non adherence	

4.	**Discuss adherence promotion strategies**		
	Buddy reminder—discuss role of support person		
	Pill box, diary		
	Other reminder cues		
5.	**Identify barriers to adherence**	**Yes**	**No**
	Poor communication		
	Low literacy		
	Inadequate understanding about HIV/AIDS		
	Lack of social support		
	Failure to disclose status		
	Mental health status		
6.	**Schedule next counseling session and complete appointment card**		

NURSE ADHERENCE COUNSELOR CHECKLISTS FOR

COUNSELING SESSIONS

ADHERENCE COUNSELINGCHECKLIST

3rd AND 6thMONTH COUNSELING SESSION

Subject's Name .....

Date of counseling session.....

S.No.	ADHERENCE COUNSELING CONTENT	REMARKS
1.	**Review client's understanding of HIV/AIDS**	
	What is HIV and AIDS?	
	Opportunistic infections	
	CD4/viral load	
	Effect of treatment	
2.	**Review the treatment program and importance of adherence**	
	Drug regimen	
	Dummy pill demonstration	
	What ART does—improves immunity/less OIs/ART not a cure	
	Need for continued prevention	
	Side effects and what to do?	
	Follow-up	
	Importance of adherence and consequences of non-adherence	
3.	**Review proposed adherence promotion strategies**	
	Buddy reminder—discuss role of support person	
	Pill box , diary	
	Other reminder cues	
4.	**Review barriers to adherence and progress made**	
	Poor communication	
	Low literacy	
	Inadequate understanding about HIV/AIDS	
	Lack of social support	
	Lack of self confidence	
	Mental health status	
5.	**Take/ Record subject's address and establish contact system with treatment centre**	
6	**Schedule next counseling session and complete appointment card**	

PART - II

NUTRITIONAL COUNSELLING SCHEDULE

Steps 1: Assessing dietary habits

- The investigator should ask questions about a subject's typical food intake.
- The 24-hour food recall and food frequency questionnaire can be used to estimates more accurate picture of a subject's typical eating patterns.
- The investigator can ask the client how often he or she consumes certain food groups or the consumed servings of dairy products, fruits, vegetables, grains and cereals, meats, or fats he or she consumes in a typical day, week, or month
- The investigator can assess the socioeconomic background of subjects in order to make modifications if needed in diet
- The investigator emphasize the importance of diet in health status of the subjects and the caregivers

Step 2: Identifying changes needed

- The initial dietary assessment and interview provide the basis for identifying behaviors that need to be changed.
- Identify any allergic to specific foods.
- The investigator can help to educate a person regarding the health effects of different dietary choices.
- The investigator and caregiver work together to identify areas where change is needed to prioritize changes and problem-solve related to health status**.**

Step 3: Setting goals

Theinvestigator and subject set behavior-oriented goals together.

- Goals should focus on the behaviors needed to achieve the desired dietary change, not on an absolute value, such as achieving a certain body weight and improvement in health status.

Step4:Making dietary change

- In making dietary changes, each subject's situation, background and the factors that affect food decisions must be carefully considered.

- In subject, adding new foods should be a gradual process, may start with one or two easier dietary changes the first few weeks and gradually make additional or more difficult changes over several weeks or months.

Step 5*:*Identifying barriers to change

- Once the needed changes have been identified, the investigator should think through potential problems that may arise.
- Some common barriers are changing the eating habits includes: inconvenience, social gatherings, food preferences, lack of knowledge or time, cost etc.

Step 6*:*Finding support

- Care givers &family members are encouraged to attend nutrition counseling sessions with the subject's, especially if they share responsibility for food selection and preparation.
- Although the care giver / subject must make food choices and take responsibility for dietary changes, having the support and understanding of family and friends makes success more likely.

General Advice

- Encourage to take high calories, high proteins and vitamins& minerals-rich diet.
- Instructed to eat the rainbow colored foods (choose foods from variety of colors to get most nutrients).
- Eat daily from the five food groups: staple foods, fats and oils, legumes, fruits and vegetables, and food from animals
- Drink plenty of clean water and fluids (real fruit juices and herbal green teas can be beneficial).
- Drink clean boiled water for at least 3-4 lt/day or 8-12 templar/day.
- Avoid food that may contain unboiled water like refridged drinks & butter milk.
- Avoid too much of spicy foods – chilies and masala.
- Avoid excess oil while cooking in the home and oily food like fried foods in outsides.
- Include pulses and sprouted, steamed legumes daily.
- Include at least two vegetables and one seasonal fruit daily.

- Include daily one egg and have a warm milk 2 glasses/day (after waking up and before going to bed)
- Fish is the best flesh food. Mutton & chicken can also be included.
- Try to eat regular meals even if not hungry.
- Chew food well and move around the mouth to stimulate taste receptors.
- Encourage small frequent meals of 5-6 times /day when unable to eat wholesome meals.
- Soft, mashed and moist foods are easier to eat when compare to the fried items.
- Discuss methods of food preparation which maintain hygiene and maximize nutrient retention.
- Encourage general personal hygiene like maintaining, trimmed nails and washing hands before & after eating.

PART - III

STRATEGIES / PRACTICES THAT ENHANCES QUALITY OF LIFE

The investigator should educate the care givers and subjects in ART clinic together, about the strategies and practices that could enhance quality of life .Our intervention is more focus on enhance quality of life and increase the life span of HIV infected adolescents. They are as follows,

- Instruct the care giver to provide as adequate and balanced diet for the subject.
- Keep the environment in hygiene and free from infections.
- Avoid allergic foods.
- Encourage the subject do physical work and state its importance.
- Insist to do moderate physical activity without any interference to subject's health.
- Maintain subject's personal hygiene, especially hand and oral hygiene so neatly.
- Keep the subject's emotionally stable. Entertain the subject's regularly.
- Provide opportunities for the subject to socialize with peer group.

- Keep the subject psychologically stable and sustain without any damage.
- Encourage the subject get along with friends and elders respectively.
- Encourage the care giver to concentrate on subject psychological aspect.
- Encourage care givers to provide ART medications to the subject regularly and ask them to maintain ART adherence level > 95 %.
- Encourage the subject to study the school subjects and attend the school regularly.
- Seek for medical help whenever necessary.
- Treat the subjects when she/he is sick at nearby hospital without fail.
- Encourage the spiritual aspect among the subjects.
- Provide hope and confidence among the care giver and subjects.
- Maintain good rapport with community health workers.
- Encourage adequate rest and sleep. Increase the food quantity in phased manner.
- Utilize the locally available cost effective, nutritional food.
- Provide information to the care giver regarding the Government schemes for the welfare of the HIV infected child.
- Take bath daily with soap.
- Use mosquito net when sleeping.
- Avoid scratches or injury over the skin.
- Avoid skin drying by applying coconut oil on the skin.
- Seekmedical advice for any allergy and take medication as advised without any skip.
- Keep the subjects happy and focused on care.
- Encourage the subjects do exercises regularly.
- Making these changes in your life will help you stay healthier longer, even with HIV.

The investigator plan to discuss regarding the symptomatic management to the caregivers/ subjects whenever necessary care is needed, if problem persists or not cured immediately consult with medical advice or nearer to the health centre.

PART - IV

YOGA - SELECTED ASANA AND PRANAYAMA

The investigator planned to demonstrate the asana and pranayama as a part of HIV interventional package. The first three components of HIP can be enhanced by the fourth components of yoga. Our intervention is more focus on to increase immunity, improve nutritional status and enhance quality of life of HIV infected adolescents.

General Instructions

1. Do asana in clean and well ventilated rooms.
2. Use yoga mat or 6 feet length of bed spread on the floor.
3. Do asana in empty stomach, or after empty the bowel and bladder.
4. Wait for 3 hours after a heavy meal, or two hours after a light meal.
5. Wear non-restrictive cotton clothing while practicing yoga and do not wear shoes or socks.
6. Do yoga in a relaxed manner with maximum capacity.

Asana Demonstration

The principle investigator teaches and demonstrates the selected asana during the HIV interventional package as a part of intervention. As per instruction, the HIV infected adolescent has to re demonstrate the asanas in presence of investigator on the same time. They were also given brochures for practicing the selected asanas every day for minimum10 to 15 minutes on their own at home. The selected asanas are,

1. Padmasana (1-2 min)
2. Vajrasana (1-2min)
3. Pranayama (3 min).
4. Trikonsana (2-3 min)
5. Ardhamatsyendrasana (1 minutes on each side)

   or Ushtrasana (1 min)
6. Bhujangasana (1-2 min) &
7. Shavasana(3-5min)

Once completed the asana, drink water or any liquids after 5-10 minutes. At every month visit, the investigator should assess and reinforce the HIV infected adolescents to practice the asana regularly in their life and maintain the dairy after the practice of yoga and drug intake of every day.

Benefits of asana

- ✓ Regulate blood circulation all over the body especially in thymus gland.
- ✓ Improve the digestion power and reduce the gastrointestinal problems related to OIinfections.
- ✓ Decrease the lung problems and clear the sputum from lungs.
- ✓ Enhance all the organs in our body to function normally.
- ✓ Relieve the stress, increase the immunity and enhance the overall quality of life.

Annexure-iii

HIV INTERVENTIONAL PACKAGE (HIP) MODULE

In this present study, the investigator plan to implement the following components of the HIV interventional package (HIP) to the HIV infected adolescents/ caregivers. It comprises of,

1. Adherence Counseling.
2. Nutritional Counseling.
3. Provision of educational strategies to improve the quality of life of HIV infected adolescents.
4. Yoga includes selected asanas and pranayama and
5. Maintenance of diary as remainder cue for every day after the intake of drugs and yoga practice.

The investigator implemented the following counseling sections as part of interventions in the present study.

PART – I
ADHERENCE COUNSELING

The investigator assesses ART adherence level by using Modified Adolescent Adherence Questionnaire from Pediatric AIDS clinical Trial group (PACTG). Based on ART adherence level of HIV infected adolescents, the investigator will plan for counseling section. The main goal of adherence counseling is to improve the adherence level and maintain 100 % adherence to ART.

Adherence counseling

The Nurse has a very important and unique opportunity with regard to the promotion of successful adherence. Many health care systems identified that adherence as the nurse's first responsibility when treating a client who is receiving ARV treatment. So, the professional experience of researcher has taken an initiation to improve the ART adherence to HIV infected adolescents.

Meaning of Adherence

Adherence describes how faithfully a person sticks to and participates in his or her HIV prevention, care, and treatment plan. Adherence means "the patient's behavior of taking drugs correctly - the right drug, right dose, right route, right frequency and right time". It also includes the clients attend all scheduled visits/procedures/prescription refills.

Concept of adherence

It includes the active participation of the adolescents in his or her care plan (and, if applicable, the active participation of caregivers in the client's care plan)

- It includes the adherence to both medicines and care/management
- It depends on a shared decision-making process between the subject and care givers. It determines the success of HIV prevention, care, and treatment programs
- Adherence not static , in other words, it changes over time and all ALHIV depends on their age go through different developmental stages and life changes
- A need to achieve 100 % adherence to ART to keep the correct amount of drugs in their body to fight the virus.

Adherence to care includes

- Continuing as a lifelong commitment to the care and treatment plan
- Attending appointments and tests, such as regular CD4 tests and other blood investigations as schedule.
- Taking (or giving) medicines to prevent and treat opportunistic infections.
- Participating in ongoing health education and counseling.
- Picking up medicines when scheduled and before running out.
- Recognizing when there is a problem or a change in health and coming to the clinic for care.
- Adopting a healthy lifestyle and trying to avoid risky behaviors (as much as is possible given to the client's life situation)

Adherence to treatment includes,

- Taking ART correctly, as prescribed, for a person's whole life even if he or she feels healthy ("every pill, every day")
- Taking (or giving) other medicines, such as multivitamins, as prescribed.
- Not taking any "treatment breaks"

Non Adherence

Non adherence means the subject's inability take his/her drugs or attend scheduled clinical visits (including laboratory) in the prescribed manner. The poor adherence leads to drug resistance, increased viral load and increased possibility of mortality and morbidity.

Non-adherence includes

- ✓ Missing one or many appointments at the hospital or health centre, lab, or pharmacy
- ✓ Not following the care plan
- ✓ Missing a dose or doses of medicine
- ✓ Sharing medicines with other people
- ✓ Stopping medicine for a day or many days (taking a "treatment break" or "holiday")
- ✓ Taking medicines at the wrong times
- ✓ Taking medicines without following instructions about timing or food intake

Factors affecting Adherence

The following are the lists of some common factors that can affect adolescents ART adherence.

- ✓ Lack of family support structure or help from the caregivers with decision making.(Particularly in case younger adolescents and single orphans.)
- ✓ Lack of transportation of health facility.
- ✓ Lack of financial resources.
- ✓ Lack of understanding and the need to adhere to ART

- ✓ Adolescent not believing that ART works
- ✓ Adolescent has the difficulty with medication times.(School)
- ✓ Taste and side effects from the ART.(Nausea, vomiting)
- ✓ Underlying depression.
- ✓ Stigma and discrimination
- ✓ Lack of social support at home and in the community including at school
- ✓ Lack of self confidence
- ✓ Unavailability of reminder cues- Pill boxes, diary, calendar, alarms, SMS

Importance of Optimal Adherence

- ➢ To ensure the 100% ART adherence will increase the adolescent CD4 count and to decrease the amount of viral load in the blood.
- ➢ To help ALHIV grow and develop in to healthy adult by reducing OI infections.
- ➢ To make sure adolescents get all the benefits that ART has to offer, such as feeling better, not getting sick as often or as badly, living a longer life, etc.
- ➢ To reduce the risk of spreading the virus to others.
- ➢ To keep adolescent looking and feeling good so they can get back to "normal" life, including going to school, working, socializing, and being an active family and community member .It shows the overall improvement in QOL

Suggestions to improve the adherence level

1. Ensure the services are provided on days and times that are convenient for adolescents.
2. The motivational counseling and education approach that corresponds to adolescent's maturational stage.
3. Build a relationship of trust, respect with client and ensure confidentiality.
4. Ensure that all adolescents are given reminders cues of diary to help them remember upcoming appointments.

5. Make sure to review each client's drug regimen to assess whether changes can be made to facilitate adherence (for example, changing the client to a once-daily regimen.)
6. Use fixed dose combinations of ARV when possible to reduce subject's pill burden.

Strategies to improve ART Adherence level

The investigator conducted the counseling session in groups or individual session or as a combination of two. For initial stage, individual sessions are used to find out the reason for adherence and to identify the areas in which they need extra support, and to develop an individual adherence plan. The individual counseling session should include talking with the client (and caregiver or treatment buddy) about any adherence challenges he or she may face and rule out the side effects. The group and peer support counseling conducted for mainly in orphanage adolescents those who known their status.

A **treatment buddy** or **treatment supporter** is someone who is chosen by a client to provide him or her with ongoing support for adherence to care and treatment.

A treatment buddy is usually a subject's caregiver, friend, family members, or another ALHIV who is also enrolled in care and who is a trusted person to whom the subject can disclose his or her status. Younger adolescents may have one of their primary caregivers as a treatment buddy, while older adolescents may prefer to have a friend or peer as their treatment buddy. Counsel the adolescents to utilize the following aids for improve the adherence level.

- ✓ Labels in the medicine box
- ✓ Calendar / diary
- ✓ Pill boxes
- ✓ Reminders in the mobile and cards
- ✓ Programmable wrist watches
- ✓ SMS through Mobile
- ✓ Treatment buddy.

Among the following aids, the investigator implemented the diary for improving the adherence level of HIV infected adolescents in experimental group throughout the study period. If treatment buddies or pill boxes available the investigator continued the aids along with diary in experimental group.

PART – II

NUTRITIONAL COUNSELING

Adolescents are not homogeneous. The adolescents of the same age can differ in their physical, psychological or the social development. There are many developmental differences between a young 10-year-old adolescent and a 18-year-old.These differences makes adolescents' counseling needs to be prioritized and their capacity to care for them. In nutritional counseling, the investigator helps the subjects to develop strategies to address their nutrition goals and overcome their personal barriers. The goals of the nutritional counseling and support for adolescents with HIV are listed below,

- Provide adequate nutrition in order to promote normal growth and development during puberty.
- Maintain adequate nutritional status to promote health and prevent opportunistic infections.
- Promote optimal nutrition and prevent malnutrition.
- Manage or reduce symptoms of HIV disease.
- Enhance drug compliance and efficacy through diet counseling.
- Prevent food-borne illness.
- Manage complications associated with HIV and antiretroviral therapy (ART).

The counseling strategies are based on the results of the nutritional assessment by anthropometric measurements and as well as clinical findings. The side effects experienced are targeted to address the individual needs are identified in the nutritional assessment. The nutrition counseling process involves, developing a specific management plan that takes an account of the broad range of factors that influence food intake. The consideration should be given to cultural and family background, food preferences, available budget and dietary practices. Apart from their regular diet, the investigator is given special attention to antioxidants in their diet along with major nutrients. The investigator first start the section regarding, physical access to, and availability of the food products as well as in having the financial resources to purchase them on a regular basis. Ensuring access to an adequate quantity and quality of food can contribute to improve the treatment outcomes and a better quality of life.

The investigator should help the adolescents / caregivers to understand the need to maintain an adequate diet and ways to manage common gastrointestinal problems related to HIV that may have a negative impact on diet. The nutritional status of the HIV-infected adolescents has a great impact on overall health, growth, and development. The investigator should start the counseling session with what is the purpose of taking nutritious diet and nutritional consequence of HIV for the adolescents. It also deals with the caregivers and as well as the adolescents regarding the need to take of healthy and nutritious diet in their life.

Need for healthy and nutritious diet in HIV and AIDS

- HIV and AIDS increase the body's need for food.
- People living with HIV and AIDS are more at risk for malnutrition
- When sick, more nutrients help to fight illness and need to recover faster.
- Healthy eating helps to maintain weight and increase the strength and reduce the weight loss.
- Good health delays the onset of AIDS and reduces the time and money spent on health care.
- Good nutrition helps to make pills work better and easier to take.

Nutritional consequences of HIV

Decreased food intake may result from,

- Loss of appetite
- Pain when eating
- Mechanical difficulties: chewing, swallowing, digesting, delayed in empty of the stomach.
- Mal absorption of nutrients and micro nutrients
- Small intestine alterations ,causing diarrhea
- Constipation due to inadequate intake and inactivity.

The nutritional counseling focuses on

- ✓ Educating the caregivers regarding the water and food safety with regard to purchasing, handling, preparing and storing foods
- ✓ Food budgeting and cooking
- ✓ Healthy and nutritious diet to increase weight and maintain normal growth and development and meets additional need during puberty.
- ✓ Achieving optimal intake of macro- and micro nutrients

1. Carbohydrates and fats produce energy and insulation.
2. Protein builds and repairs tissues and improves the immune system.
3. Vitamins and minerals maintain healthy lining of skin, lungs, GI tract; aid in production of bloods; vital elements for functioning of the immune system, thereby helping to protect against OIs and additional attention to specific nutrients (e.g. vitamin A, C, E and D, iron and Calcium),
4. The micro nutrients supplementation of zinc and selenium could improve immune function and delay the onset AIDS.

- ✓ Address any nutrition related complications and management, such as diarrhea, weight loss, loss of appetite, problems in chewing and swallowing, and nausea and vomiting.
- ✓ Preventing weight loss and potential wasting
- ✓ Providing nutritional counseling on simple dietary changes to increase the absorption of anti-retroviral drugs
- ✓ Drink porridge with soya flour or pounded groundnuts for increased strength
- ✓ Eat favorite and tasty foods with spices (garlic, ginger, curry), onions or tomatoes for flavor (unless you have oral thrush, diarrhea or another condition that spicy food can aggravate)
- ✓ Grind meat and chicken or cut into smaller pieces for easier eating
- ✓ Promote physical activity and exercise

Boosting antioxidants

Eat lots of colorful fruits and vegetables to get the antioxidants found in the pigments and the phytochemicals contained in the whole food. Try to include blue, purple, green, orange, red and yellow foods to get the full complement of beneficial substances. Black and green tea, mushrooms, and dark chocolate are also good sources of antioxidants. The antioxidant supplements include vitamins A, C and E, the minerals like zinc, selenium and magnesium decrease the oxidative damage and tend to decrease the severity of HIV/AIDS. The various sources of antioxidants and minerals which are easily available, affordable and accessible are listed below.

S.No.	Nutrients	Sources
1.	**Vitamin A**	Pumpkin, Carrots, Tomatoes, Sweet potatoes, and dark green leafy vegetables (especially in Spinach) Papaya, Mangoes, oranges, grapes, egg, fish and liver
2.	**Vitamin C**	Citrus foods containing of orange, Amla and Lime, Guava, strawberry, cabbage, potatoes, including sweet potatoes, dark green leaves and plantains. (Vitamin C lost when food is cut up , heated or left standing after cooking)
3.	**Vitamin E**	Wheat germ, Whole grains, nuts and seeds includes vegetable oil, butter, milk fat, egg yolk and dark green leafy vegetables.
	Zinc	Fish, meat, fortified beans, soya beans, peanuts, legumes, wheat gram, milk, and cheese.
5.	**Selenium**	Fish , meat, chicken, egg, milk, nuts and whole grains
6.	**Magnesium**	Nuts and beans, legumes and whole grains, cereals, pineapple, sweet potatoes, wheat germ, and dark leafy vegetables.
7.	**Iron**	Red meat, liver, fish, poultry, eggs, legumes, pea nuts, cereals, and dried fruits.
8.	**Calcium**	Milk, Cheese, butter, legumes, peas and green leafy vegetables.

The investigator instructed the participants to take at least 3-5 items of the antioxidants rich foods that are suggested in the diary which is easily available, affordable and accessible in the community helps to improve the nutritional status and increase the immunity.

Education on management of nutritional issues

General tips

- Encourage to take high calorie, high protein and vitamin & minerals-rich diet or eat the colors of rainbow (choose foods that are a variety of colors to get more nutrients).

- Eat daily from the five food groups: staple foods, fats and oils, legumes, fruits and vegetables, and food from animals
- Drink plenty of clean water and fluids (real fruit juices and herbal green teas can be beneficial)
- Drink only clean boiled water at least for 3-4 lt/day or 8-12 templar/ day.
- Avoid the food that may contain unboiled water like refridged drinks & butter milk.
- Avoid spicy food – chilies, pepper and too much masala.
- Avoid excess oil while cooking in the home and oily food like fried foods in outsides.
- Include pulses & sprouted, steamed legumes daily.
- Include at least two vegetables & one seasonal fruit daily.
- Include daily one egg and have a warm milk 2 glasses /day. (after waking up and before going to bed)
- Fish is the best flesh food. Mutton & chicken can also be included.
- Try to eat regular meals even if not hungry.
- Chew food well and move around the mouth to stimulate taste receptors.
- Encourage small frequent meals of 5-6 times per day when unable to eat wholesome meals.
- Soft, mashed and moist foods are easier to eat when compare to the fried items.
- Discuss methods of food preparation which maintain hygiene and maximize nutrient retention.
- Encourage general personal hygiene like maintaining, trimmed nails and washing hands before & after eating.

Poor appetite

- Eat small and frequent meals and nourishing snacks.
- Eat favorite foods and avoid strong smelling foods
- Select recipes that combine foods to give a more nutrient dense composition(high in protein, vitamins, and minerals)

Change or loss of taste

- Use flavor enhancers such as lemon, salt, or spices
- Chew food well and move around in the mouth to stimulate taste receptors.

Nausea/Vomiting

- Eat small ,frequent meals

- ❖ Avoid having an empty stomach.
- ❖ Drink after meals and the intake of fluids with meals.
- ❖ Avoid lying down directly after eating
- ❖ Eat lightly salty and dry foods to calm the stomach.

Diarrhea

- ❖ Provide more water/Oral Rehydration Solution (ORS) / Tea / Lassie in more amounts.
- ❖ Provide Rice porridge in large amounts.
- ❖ Provide any fresh fruit juices.
- ❖ After every visit to toilet, wash the child's anal area with clean water.
- ❖ After every visit to toilet, wash child's hands with soap & water.
- ❖ If persist more than 3-5 times consult with medical advice.
- ❖ Maintain follow up care

Early fullness

- ❖ Eat small, frequent meals.

Abdominal Pain

- ❖ Get medical evaluation.

The researcher emphasizes the subjects to essentials of taking the major and minors nutrients in their diet and also educate about the various sources of vitamins and minerals and the importance of taking the nutrients in illness state. The good nutrition can help to maintain and improve the nutritional status of adolescents living with HIV/AIDS. The nutritional counseling may improve health outcomes in adolescents with HIV by reducing the incidence of HIV-associated complications and delaying the progression of HIV infection, thereby improving quality of life and ultimately reducing disease-related mortality.

PART –III

STRATEGIES TO ENHANCE THE QOL

Having HIV doesn't have to stop living a complete and healthy life. With the right treatment and care the subjects can lead their life fitter, healthier and happier. The investigator counsel the HIV infected adolescents regarding positive living and to enhance the QOL**.** The investigator counsel the subject's regarding the current treatment for HIV is not a cure the disease but it can keep HIV under control and this keeps your immune system strong. Once, start of ARV drug, taking it every day is

very important to keep yourself well. The major side effect of drugs includes skin rashes, persistent cough with sputum, anemia makes need to be consulting with the medical officers. The minor side effects of the drugs can be managed by home itself with following the symptomatic management tips**.**

S. No.	Problems	Suggestions	When seek medical help
1.	**Head ache**	➢ Rest in a quiet and dark place ➢ Rub the base of your head with fingers. ➢ Take a warm bath ➢ Avoid coffee ,tea , soft drinks and foods with caffeine ➢ Use mild pain palms	➢ Vision becomes blurry or unfocused. ➢ Vomiting, fever with continuous head ache ➢ A headache is frequent or very painful.
2.	**Fatigue**	➢ Get up and go to bed at the same time on all days ➢ Sleep at least 8 hours/day ➢ Do simple and regular exercises ➢ Take balanced and nutritious diet at regular intervals.	➢ Too tried to eat or move ➢ Cannot swallow or eat enough to feel strong
3.	**Dry Mouth**	➢ Rinse mouth with clean water and salt. ➢ Suck on crushed ice or sip clean water ➢ Avoid sweets , soft drinks and coffees	➢ The problem persists with red and white spots need medical advice
4.	**Usual bad dreams**	➢ Do something happy and calm right before going to sleep ➢ Avoid food with lot of fat ➢ Avoid alcohol and unnecessary drug intake.	➢ Cannot sleep for three or more nights
5.	**Anemia**	➢ Increase the foods rich in iron like spinach, dark leafy greens, and dried fruits**.** ➢ Encourage to take egg, red meat, liver, fish and poultry**.**	➢ Feeling tried for three to four weeks and its worsening. ➢ Subject feet's are swelling

6.	**Dry Skin and Skin rashes**	➢ Use soft soap for bathing ➢ Use water and soap to clean the skin. ➢ Apply coconut oil ➢ Keep the nail trimmed and clean ➢ All the clothes used by the subject should be washed with soap and dried in sun light. ➢ Take fruits and vegetables adequately with food.	➢ If problem persist with pus or blood ➢ Not healed and have inching
7.	**Cough**	➢ Provide luke warm water for cough in children. ➢ Mild lemon juice with salt or sugar in luke warm may also be provided to subject. ➢ Mild lemon juice with honey &sugar in luke warm can also be provided. ➢ Instruct the subject's to keep a cloth or hand on the mouth when coughs. ➢ Instruct the subject's to avoid spitting the sputum on the floor.	➢ When all the measures fail, seek medical advice and follow up care. ➢ Persistent cough with sputum more than 3 days.
8.	**Fever**	➢ Provide adequate water and fluids ➢ Provide tepid sponging ➢ If need use blanket for shivering	➢ Continuous increase of running tempera-ture. ➢ Have shivering and vomiting
9.	**Dizziness**	➢ Take adequate rest and sleep ➢ Avoid lifting anything heavy or moving quickly. ➢ Avoid driving a bicycle and bike	➢ The dizziness lasts more than two days
10.	**Tingling or pain in feet and hands**	➢ Wear loose –lifting shoes and socks. ➢ Keep feet uncovered in bed. ➢ Soak feet in cold water for some time. ➢ Rub feet and hands	➢ Tingling does not reduce and gets worse. ➢ Pain so intense and cannot walk.
11.	**Hair loss**	➢ Protect hair from damage ➢ Don't dye, straighten or plait ➢ Don't buy products that promise to grow hair back. ➢ Take balanced and nutritious diet	➢ If more obvious consult with medical advice. ➢ Don't take self medications for hair growth.

Strategies to enhance the QOL

- ✓ More than 95 % of adherent to the ARV drugs are essential and to be considered as a long life commitment.
- ✓ To eat a balanced and nutritious diet, without too much fat, sugar or salt.
- ✓ Plenty of fruit and vegetables to provide fibers, vitamins and minerals.
- ✓ Avoidance of high risky behaviors includes smoking, alcohol, drug use and unsafe sex practice.
- ✓ If sexually active advice for condom use and male circumcision for safer sex practice.
- ✓ Getting tested and treated for sexually transmitted diseases, even if they are asymptomatic.
- ✓ Avoid stressful life and do activities of dancing, playing, walking and gardening can all help to get relieve from stress.
- ✓ Try to get adequate of rest and sleep
- ✓ Instruct to maintain personal hygiene especially oral and hand hygiene.
- ✓ Advice to prevent infections includes the avoidance of risky behaviors, washing hands well and often, and practicing good food safety to avoid food borne illness, and staying current on recommended vaccines.
- ✓ **Have a Little Faith** - spirituality can help people better cope with their health problems. Religion can also help to build their social circle and feel generally more positive.
- ✓ Exercise can help to build the muscles, makes bones strong, and promote us healthy. Some people who are living with HIV experience a loss of muscle mass and strength, so exercise can helps to prevent this. The practices of moderate exercise regularly or three to six times a week can help to improve the mood and as well as to improve the overall quality of life.
- ✓ Provide hope and confidence among the caregivers and subjects
- ✓ Provide opportunities for the subjects to socialize with peer group.
- ✓ Provide information to the caregivers regarding the Government schemes for the welfare of HIV infected child.
- ✓ Maintain good rapport with community health workers.
- ✓ Seek medical advice for any allergy and take medication as advised without any skip.
- ✓ Treat the subjects when he/she is sick without fail.
- ✓ Encourage the subjects get along with friends and elders respectively.
- ✓ Encourage to maintain good psychological health and happiness
- ✓ Making these changes in the life will help to stay healthier longer, even with HIV.

PART- IV
YOGA

The investigator planned to demonstrate the asana and pranayama as a part of HIV interventional package. The first three components of HIP can be enhanced by the fourth components of yoga. Our intervention is more focus on to increase immunity, improve nutritional status and enhance quality of life of HIV infected adolescents.

General Instructions

1. Do asana in clean and well ventilated rooms.
2. Use yoga mat or 6 feet length of bed spread on the floor.
3. Do asana in empty stomach, or after empty the bowel and bladder.
4. Wait for 3 hours after a heavy meal, or two hours after a light meal.
5. Wear non-restrictive cotton clothing while practicing yoga and do not wear shoes or socks.
6. Do yoga in a relaxed manner with maximum capacity.

Asana Demonstration

The principle investigator teaches and demonstrates the selected asana during the HIV interventional package as a part of intervention. As per instruction, the HIV infected adolescent has to re demonstrate the asanas in presence of investigator on the same time. They were also given brochures for practicing the selected asanas every day for minimum10 to 15 minutes on their own at home. The selected asanas are,

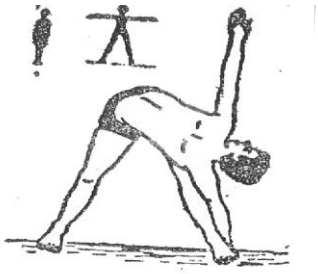
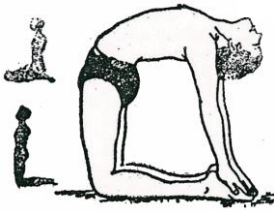
1. Padmasana (1-2 min)
2. Vajrasana (1-2min)
3. Pranayama (3 min).
4. Trikonsana (2 -3 min)
5. Ardhamatsyendrasana (1 minutes on each side)
   Or Ushtrasana (1 min)
6. Bhujangasana (1-2 min)&
7. Shavasana(3 -5min)

The procedure of doing the selected asanas and their benefits are listed in the following tables,

S. No.	Name of asana	Procedure	Benefits
1.	**Padmasana** (Lotus pose) 	1. First sit on the floor, with the legs stretched out in front of you and keep the legs together. 2. Next, fold the right ankle with the right hand and right big toe with the left hand and followed by keep on to the left thigh. 3. Similarly, fold left leg and place the foot firmly at the right upper thigh. 4. The both heels to touch the lower abdomen with the sole turned upwards. 5. Now interlocked with both legs, keep the spine, neck and the head straight. 6. Place the hands in the chin mudra (i.e., thumb finger, and index finger should have to touch and other remaining fingers should be straight) over the thighs. 7. Now, close the eyes and maintain silent for 1-2 minutes or the vision to be pointed to the nose. 8. Once completed slowly open the eyes and release the legs one by one come to normal position. If possible practice in alternating the legs.	1. It relieves the stress, relaxes our mind and increases the concentration power. 2. It improves the general well being and enhances the appetite.

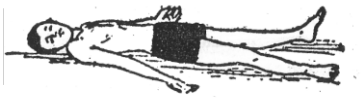
2.	**Vajrasana** (Thunderbolt or Adamant Pose)  Side View 1  Back View 1	1. Sit with legs extended together the hands by the side of the body, palm resting on the ground, finger of the hands together pointing forward. 2. Fold the right leg at the knee level and place the foot under the right buttock and sole remain inside. 3. Similarly folding the left foot, places it under the left buttock and keep hands on the respective thighs. 4. Now sit straight, gaze in front or close the eyes and remain in this posture for 30 sec to 1min. 5. While returning to the original position bends little towards right side take out the left leg and extend out. 6. Similarly extend the right leg and return to the original position.	1. It enhances the blood circulation in the lower abdomen, improves digestion and relieves constipation. 2. It relaxes the thigh muscles, ankles, hip muscles and strengthens the spine.

3.	**Pranayama** **Nadi Shodha Pranayama** (Alternative Nostril Breathing)  	1. Sit on the floor in Vajarana or Padmasana posture with spine straight 2. Keep the left hand on the left thigh in chin mudra (palm up, connecting the thumb and index finger) 3. In the right hand tuck the index finger and middle finger towards close the palm, keep the right thumb on right nose, ring finger on left nose with extended little finger. 4. Breath in through the left nostril by closing the right nostril with thumb and followed by closing the left nostril, with ring finger breath out through the right nostril. 5. Now breath in through right nostril, keeping the left nostril closed with the ring finger and followed by close the right nostril breathe out through the left nostril, It completes one round. 6. Continue the pranayama 1:2:2 ratio for 5-7 times in 1 minute. 7. Repeat the pranayama for at least for 2-3 minutes 8. Once it's completed, rub the palms together till it warm, and place it on the face. At last slowly open the eyes with smile.	1. It improves the lung function and reduces the lung diseases. 2. It increases the blood circulation to the brain, relieves the stress and relaxes the mind.

4.	**Trikonasana** (Triangle Pose) 	1. Stand straight and keep the feet apart about for 3 to 4 feet 2. Stretch out the arms sideways at shoulder level and take normal breath for 2-3 times 3. Now, take a deep breath, then exhale slowly followed by, rotate the trunk and head together around to the left side without moving the feet. 4. Simultaneously, bend the right hand and touch at the back of the heel; At the same time left arm should be straight; eyes to focus on the left hand fingers and ensure that, both knees to be straight. 5. Hold this position as per the comfort or 5-10 seconds then completes the exhalation and come to starting point. 6. Do the same procedure with the left hand. 7. Perform this asana four to six times on both sides for 2-3 minutes.	1. It is recommended for the growing children to increase their height. 2. It helps to expand the chest and efficiency of thymus gland, increase the general immunity. 3. It improves the mobility of hip joint and neck. 4. It gives proper stretch to spine. 5. It provides energy and increase the concentration. 6. It improves appetite, relieves constipation and also helps for digestion.
5.	**Ustrasana** (Camel pose) 	1. First sit in vajrasana and slowly to kneel on the floor and toes pointing back. 2. Next, stretch the arms in straight and slightly bend back ward. 3. Now, further bend backwards and slowly keep one by one of both hands to catch the heels and continue with inhalation, allowing rib cage to expand.	1. It strengthens the back; expands the chest muscles and reduces respiratory problems. 2. It strengthens the stomach muscles, relieves constipation and increases the appetite.

		4. Then press the palm of hands into the heels while draping the fingers over the soles and simultaneously contract the buttocks; stretch the spine still further keeping the neck forward. 5. Remain in this posture as per comfort or 5-10 seconds. 6. While exhaling, slowly release the hands one by one and bring back to starting posture. 7. Repeat this asana 2-4times for 1-2 minutes.	3. It also strengthens the pelvic muscles and organs.
6.	**Ardha Matsyendrasana** (The Half Spinal Twist). 	1. First sit on the floor with both legs extended and heels together. 2. Bring the left leg under the right bottom and sit on a left heel. 3. Next, cross the right foot over the left knee nearly close to the chest place it firmly on the floor; sit comfortably as in the picture. 4. Now, Inhale and bring the left hand behind right knee and catch the left knee or if possible great toe 5. While exhaling slowly, start to turn the head, then shoulders and back to the right side and right hand to catch the left lower part of hip. 6. Keep spine straight and be sure to keep the weight of the body mainly on the spine and not on the left arm.	1. It reduces the gastro intestinal and genito urinary problems. 2. It increases appetite and enhances the digestion. 3. It also strengthens the pelvic muscles and organs. 4. It helps to increases general wellbeing of the individual.

		7. Hold this posture as per comfort or 5-10 seconds; then slowly release the legs to come starting posture and same to be done on other side. 8. Do this asana 2-4times on both sides, for 2-3 minutes 9. Once completed release your legs slowly and come to normal position	
7.	**Bhujangasana (Cobra Pos**e) 	1. First, turnover on the stomach, place chin on the floor; keeping the legs together and soles facing up. 2. Place the hands with palms down, at chest level. 3. While inhale, raise the head & the upper portion of the trunk slowly, till the navel portion to leave the ground. 4. Bring the arms back to the last rib bone, keep it straight, and also close to the body 5. Now, obtain as complete arch as possible and remain this position as per comfort or 5-10 seconds. 6. Once completed, start to exhale slowly, at the same time lower the body to the floor. 7. Relax the body and rest with right or left cheek on the floor for about 2-3 seconds. Repeat this asana 3- 4 times per one minute.	1. This asana brings a rich blood supply to the spinal region, clears the chest and cures respiratory diseases. 2. Energizes and activates the upper areas of the body like head, face, neck, shoulders and chest, and gives the youthful appearance. 3. Good for troubles like constipation, indigestion and it increases the appetite and strengthens the hands.

8.	**Shanthi asana** (Quick relaxation technique) 	1. Lie down flat on back, i.e., the position of shavasana or the corpse pose (see the picture.) 2. Keep the legs apart, heels facing outside, hands by the side of the body slightly away, palms facing upwards, eyes closed gently and relax the whole body including facial muscles. 3. First, focus the mind to the abdominal region and feel the mutual expansion and contractions of abdomen. 4. Now, synchronize the breath along with the abdomen movements. i.e., While inhaling the abdomen should come out, while exhaling abdomen go inside and do this practice for minimum of 5 rounds. 5. By doing regular practice, the inhalation makes whole body to get energized with positive energies where as exhalation, feel the toxins and negative energies go out of the body. 6. After completion of above steps, slowly move the toes and bring the legs together followed by move the fingers and bring the hands close to the body. Now move the head to left and right slowly.	1. It helps to maintain the blood circulation throughout the body. 2. It relieves the stress and relaxes our mind especially abdominal muscles.

		7. Next fold the leg, turn to right and with the support of the left hand, and slowly get up and sit in comfortable position. 8. Rub the palms briskly to generate enough heat, make a cup shape and transfer the heat to the eye balls and massage the whole face gently. 9. Now open the eyes and complete this cycle within 3-5 minutes.	

Once completed the asana, drink water or any liquids after 5-10 minutes. At every month visit, the investigator should assess and reinforce the HIV infected adolescents to practice the asana regularly in their life and maintain the dairy after the practice of yoga and after the intake of drug every day.

Annexure – iv (a)

INFORMATION SHEET

I **Mrs.S.Rajathi** Ph.D Scholar, The Tamilnadu Dr.M.G.R Medical University, conducting a study on **"Impact of Nurse Initiated HIV Interventional Package (HIP) on HIV Infected Adolescents Attending ART clinic: A Randomized Controlled Trial"** for that your participation may be valuable to me.

The purpose of the study is to assess effectiveness of HIV interventional package; it includes the adherence level, nutritional status, educational strategies to improve the quality of life and yoga. The planned duration of participation involvement is up to 6 months.

I am selecting the adolescents for my study from this ART centre and if you are found eligible can agree to participate in this study. The investigator plan to implement the nursing interventions like ART adherence counseling, Nutritional counseling, educational strategies to improve the quality of life and as well as the demonstration of the selected asana to the HIV infected adolescents in order to improve their overall health and it will not affect your regular ART treatment. The expected benefits from the interventions are to increase the immune power, to build the muscle strength, improve energy, and reduce stress and to promote the quality of life of HIV/AIDS infected adolescents. There is no risk associated with this study.

The privacy of the adolescent in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared and prior permission will be getting from TANSAC.

Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.

The results of the study may be intimated to you at the end of the study period and during the study if anything is found abnormal which may aid in the management.

Caregiver's Name: **Signature:** **Date:**

Investigator's Name: **Signature:** **Date:**

Phone No: 91766 42487

Annexure iv(a)

MaT gqNfwghshf S f fhd j f t y jhs

R. uh[hjp Mfpa ehd› lhflh vk.[p. Mh kUjJt gyfiyffojjpy vr.[.tp Nehapdhy ghjpffgglLss tsh ,sk gUtf Foeijapd Mzb nulNuhituy rpfprirapy epiyjjpUjjy› czT+lljjpd epiyik› thofif juk kwWk Nahfhtpd edik gwwpa Mait Nkwnfhsfpnwd. ,jwF cqfSilagqNfwghdJ kpf Kffpakhdjhfk.

,ej Muharrpapy gqNfwgjd %yk cqfs tsh ,sk gUtf Foeijapd Neha njhwW FiwAk jdik› czT+lljjpd epiyik kwWk thofifj jujij cahjj KbAk. Nahfh ,k%dW epiyfisr rhggLjJtjwF cjTk kpf Kffpakhd clwgapwrpahFk. ,tthuharrpapd gqNfwG fhyk 6 khjkhFk.

eqfs jUk midjJ jftyfSk ufrpakhf ghJfhffggLk. ,jjftyfs midjJk ,ej MuharrpfFj jtpu NtW vjwFk gadgLjj Nghtjpyiy. ,tthuarrpapy eqfs gqNfwgjpy kpFej kfporrp. eqfs vgNghJ Ntz LkhdhYk ,ej Muharrpapy ,UeJ tpyfpf nfhssyhk. ,jdhy ,ej kUjJkidapypUeJ eqfs ngwggLk kUeJfs / kUjJt guhkhpgGfspYk vej FiwAk VwglhJ. ,ej Muharrp KbejTld eqfs tpUkgpdhy› ,ej KbTfs cqfSld gfpheJ nfhssggLk. ,jjfty ,jOld ,izjJss xgGjy gbtjjpid ifnaOjjplL ,ej Muharrpapy eqfs gqNfwfyhk.

xgGjy toqFgthpd ngah: ifnahggk Njjp

Mathshpd ngah: ifnahggk Njjp
njhiyNgrp vz. 9176642487.

Annexure – iv (b)

INFORMED CONSENT FORM

I _____ have read / heard the information in this form I was free to ask any questions and they have been answered. I am Father/Mother/Caregiver, hereby give my consent to be including my daughter/son_____as a participant in **"Impact of Nurse Initiated HIV Interventional Package (HIP) on HIV Infected Adolescents Attending ART Clinic: A Randomized Controlled Trial"**

1. I have read and understood this consent form and the information provided to me.
2. I have been explained about the nature of the study.
3. I have been informed about all the interventions pertaining to the study.
4. I have been advised about the benefits / risks associated with participation in this study
5. I agree to cooperate with the investigator and I will inform him/her immediately if my daughter/son suffers unusual symptoms.
6. I am aware of the fact that I can opt out of the study at any time without giving any reason and this will not affect my daughter/son future treatment.
7. I am also aware that the investigator may terminate my daughter/son participation in the study at any time, for any reason, without my consent.
8. I hereby give permission to the investigators to release the information obtained from my daughter/son as the result of the participation in this study to the regulatory authorities and Government agencies.
9. I have understood that my daughter/son identity will be kept confidential if data are publicly presented.
10. I have got satisfied answers for all my questions.
11. I have decided that I will permit my daughter/son to be a participant in the research study.

I am aware that if my daughter/son may have any question during this study, I can contact the investigator. By signing this consent form I attest that the information given in this document has been clearly explained to me and understood by me, I will be given a copy of this consent document.

Caregiver's Name: **Signature:** **Date:**

Investigator's Name: **Signature:** **Date:**

Phone No: 91766 42487.

Annexure iv (b)

Ra xgGjy; gbTk;

ehd _____ MaTj jfty jhspYss MaT Fwpj nfhLffggll jftiyg gbjJ / NflLj njhpeJ nfhzNld. vdfF Nfstp Nflgjw KO Rjejpuk mspffgglJ. ehd jeij / jha / ghJfhtyh Mfpa vdJ kfd / kfs _____ vr.[.tp Nehapdhy ghjpffglLss tsh ,sk gUtf Foe ijapd $lL kUeJ rpfpriraply epiyjjpUjjy> czT+lljjpd epiyik> thofif juk kwWk Nahfhtpd edik gwwpa ,ej Matpy gqNfwghsuhf gqFngw KO kdJld rkkjk mspffpNwd.

1. ehd MaTjjfty jhs kwWk Ra xgGjy gbtjjpy css MaT Fwpjj jftyfisg gbjNjd.
2. vdfF MaT FwpjJ KO tpsffKk mspffgglJ.
3. vdJ chpikfSk nghWgGfSk FwpjJ Muharrpahsh tpsffpdhh.
4. vdfF mspffggLk rpfprir Kiw FwpjJk mjd tpisTfs FwpjJk KO tpsffKk mspffgglJ.
5. ehd kfd/ kfSfF VNjDk Ntzlhj mwpFwpfs njhpejhy clNd Muharrpahs UfFj njhptpgNgd.
6. ehd ,ej Matpy vd kfis / kfid gwh ephgejkpdwp vd nrhej tpUggjjpd Nghpy jhd gqFg ngwr rkkjk mspffpNwd.
7. vd kfd / kfis ,ej Matpypueh veNeuKk gpd thqfyhk vdgijAk mjdhy vej ghjpgGk VwglhJ vdgijAk ehd GhpeJ nfhzNld.
8. ,ej Matpypueh vd kfs / kfd vej NeuKk Muharrpahsh vdDila rkkjk ,yyhkNyNa tpyffyhk vdgijAk njhpeJf nfhzNld.
9. ehd ,ej Matpd KbTfis ntspapl rkkjpffpNwd. Mdhy vdDila milashk ,ufrpakhf ghJfhffggLk vdgijAk njhpeJf nfhzNld.
10. vdJ midjJ Nfstpf SfFk jpUgjpfukhd gjpyfSk mspffgglJ.
11. vd kfd / kfs ,ej Matpy fyeJf nfhss rkkjk njhptpfpNwd. vdfF MaT elfFk NghJ Nfstp NflFk chpik cssJ vdgijAk njhpeJ nfhzNld.

ehd RaepidNthL ,ej Matpy vd kfd / kfs gqF ngw rkkjk njhptpjJ ,ej Ra xgGjy gbtjjpy ifnahggkpLfpNwd kwWk Ra xgGjy gbtk kwWk MaTjjfty jhspd efiyAk ngwWf nfhzNld.

xgGjy toqFgthpd ngah: ifnahggk Njjp

Mathshpd ngah: ifnahggk Njjp
njhiyNgrpvz. 9176642487.

Annexure – iv (c)

ASSENT FORM

You are invited to be part of the research study titled as, **"Evaluate the adherence level of ART and its barriers, CD4 count, nutrition and quality of life (QOL) of the HIV infected adolescents"**. Adolescence is viewed as a transitional period between the childhoods to the adulthood. It is a period of multiple transitions involving education, training and employment makes to be increase their QOL. But the chronic disease of HIV makes the HIV infected adolescents to shunt the growth and frequent to get the infections lead to worsen their QOL. Because of this reason, the investigator decided to give counseling regarding benefits of the optimal adherence to ART medications and how to overcome barriers, importance of nutrition and inclusion of food items, as well as how to reduce the infections and its management.

Apart from this, the investigator plans to teach and demonstrate our traditional practice of selected asanas (yoga) and instructed to follow a diary as remainder cue for after the intake the drug and yoga practice to the HIV infected adolescents. These asanas are very helpful to improve the immunity, physical growth and enhance the QOL of the HIV infected adolescents. The counseling components of adherence improvement, nutrition and QOL can be enhanced by the fourth component of this yoga. So, in order to evaluate the effectiveness the investigator divide the adolescents into two (experimental and control) groups.

The experimental group will receive the counseling from hospitals and as well as the investigator counseling and yoga practice where as the control group only will receive the hospital management. The planned duration of participation involvement is up to 6 months. During this period, the investigator used to identify the nutritional status through anthropometric measurements and collect the information regarding adherence level &QOL through standardized questionnaire from both the groups. The investigator explained to me regarding of the benefits of the research can be evaluated at the 3^{rd} and 6^{th} month intervals. So, the control group also will receive the cursory instructions of investigator counseling and demonstration of asana at the end of the research period.

In regard to this research, your answers will be kept confidential and identity will not be revealed. I would be happy if you could take part in this research. I assure you that you will not be harmed in any way throughout the research. There is no compulsion. You can withdraw from the research at anytime. You will continue to receive the routine care and medication will be given as per the hospital protocol. You have the rights to ask any questions and will get the answers from investigators regarding study at any time. Here with I am signing this form and give consent to participate in the study as in ……. group.

Adolescent's Name: **Signature:** **Date:**

Caregiver's Name: **Signature:** **Date:**

Investigator's Name: **Signature:** **Date:**

Phone no: 91766 42487

Annexure iv(c)

xgGjy; gbtk;

vr.l.tp. Nehapdhy ghjpffgglLss tsh ,sk gUtf Foe ijfSffhd $lL kUeJ rpfprirapy epiyjjpUfFk nghOJ VwgLk khwwk kwWk mij njhlu Kbahky VwgLk gpurrpidfs> rpb4 mZffspd vz zpfif> cz T+lljjpd epiyik kwWk thofif juk gwwpa Matpy eqfs xU mqfkhf ,UfFkgb cqfisf NflLf nfhsfpNwd.

tsh ,sk gUtk vdgJ Foe ij gUtjjpwFk kwWk ,sik gUtjjpwFk ,ilapyhdJ. ,ej gUtjjpy fwFk fytp jpwikfs kwWk Ntiy nraAk jpwd Mfpaitfs jhd ,thfspd thofifj jujij cahjJfpwJ. Mdhy ,ej vr.l.tp. Nehapdhy ghjpffgglLss ,fFoe ijfs cly tshrrpapy gpd jqfpAk mbffb rejhggthj Nehapfspdhyk ghjpffgglLssdh. ,jdhy ,thfspd thofifj juk KOtJkhf ghjpffggLfpwJ. ,jdhy eqfs $lL kUeJfisr rhpahd Neujjpy vLjJ nfhsStjpd edikfisAk> mjwNfwwthW cz Tfis clnfhsStJ gwwpAk> vr.l.tp. Neha rhhej gpw gpurrpidfis vtthW jtphggJ vdgijAk> kUeJfis clnfhzl gpwF ifNaL gadgLjJk Kiwfisg gwwpa MNyhridfis cqfSfF ju ,Uffpnwd.

,J klLkpdwp ,dW rhtNjr mstpy nfhzlhlggLk ekJ ghukghpa fiyahd rpy MrdqfisAk (Nahfh) cqfSfF fwWjju ,Uffpnwd. ,ej Mrdqfs midjJk cqfs clypd Neha vjphgGrfjp cly tshrrp kwWk thofif jujij cahjJk. ,ej Muharrpapy gqNfwgjpd %yk cqfspd Neha njhwW FiwAk jdik> cz T+lljjpd epiyik kwWk thofifjujij cahjj KbAk. Nahfh ,k%dW epiyfisr rhggLjJtjwF cjTk kpf Kffpakhd clwgapwrpahFk. ,ej Matpd gydfis fzlwptjwfhf Mathsh Mfpa ehd tsh ,sk gUtf Foe ijfis ,U FOffshf (Nrhjid FO kwWk flLgghlL FO) gphpjJ flLgghlL FOtpwF kUjJkidapypUeJ ngwggLk MNyhridfis klLk ikakhf itjJk kwWk Nrhjid FOtpwF kUjJtkidapypUeJ ngwggLk MNyhridfSld Mathshpd MNyhridAk kwWk Nahfh gapwrpAk fwWj jutpUffpnwd. ,ej Muharrpapd gqNfwgG fhyk 6 khjkhFk. ,ffhyflljjpy Mathsh cqfSila $lL kUeJfspd epiwik rjtjk> clytshrrp kwWk thofif jujij fzffpl cjTk Fwpggpll Nfstpfis Matpy 3 kwWk 6tJ khjjjpy cqfsplk Nflghh. mjwF eqfs jUk gjpyfs kwWk cqfSilamilahsKk ufrpakhf ghJfhffggLk.

NkYk ,ej Matpd KbTfis itjJ jhd Muharrpfspd gydfis Mathsh cWjp nraa KbAk vdgijAk njhpeJf nfhzNld. ,jdhy flLghlL FOtpwF Matpd Kbtpy Mathsh Nahfh gapwrpAld MNyhridfis nrhyyp jUthh vdgijAk njhpeJfnfhzNld. eqfs tpUkghtpllhy> ,ej Matpypueh vgnghOJ NtzLkhdhYk tpyfpf nfhssyhk. ,jdhy ,ej kUjJtkidapypUeJ eqfs ngwggLk kUeJfs kwWk kUjJt guhkhpgGfspYk vej FiwAk VwglhJ. eqfs NflFk MaT njhlhGilamidjJ Nfstpf SfFk jFej tpsffk mspffggLk vdgijAk njhpeJ nfhzNld. ,jdhy tsh,sk Foe ijahfpa ehd ,ej Matpy _____ FOtpy ,Uff rkkjk njhptpjJ Muharrpapy gqNfwgjwF xgGf nfhsfpNwd.

Foe ijapd ngah: ifnahggk Njjp

xgGjy toqFgthpd ngah: ifnahggk Njjp

Mathshpd ngah: ifnahggk Njjp
njhiyNgrp vz. 9176642487.

Annexure – v

LIST OF EXPERTS GIVEN THEIR CONTENT VALIDITY

1. **Dr. C. Susila M.Sc (N), Ph.D.**
   Principal
   Billroth College of Nursing
   Chennai-95.
2. **Mrs. J.S Elizabeth Kalavathy, M.Sc (N)**
   Principal
   College of Nursing, Madras Medical College, Chennai-3
3. **Mrs. P. Savithiri M.Sc (N)**
   Lecturer in Nursing, Education and Administration.
   College of Nursing,Madras Medical College,Chennai- 3.
4. **Mrs. P. Santhi M.Sc (N)**
   Lecturer in Child Health Nursing.
   College of Nursing, Madras Medical College, Chennai-3.
5. **Dr. T. Ravichandran MD, D.C.H**.
   Professor in Pediatrics and Nodal officer – PCOE ART
   Institute of Child Health and Hospital for Children
   Egmore, Chennai-8.
6. **Dr. N. Umakanthan MD, D.C.H.**
   Professor in Pediatrics and Head of Pediatric Intensive care Department.
   Institute of Child Health and Hospital for Children
   Egmore, Chennai-8.
7. **Dr. S. Elilarasi MD, D.C.H.**
   Professor of Paediatric Pulmonology
   Institute of Child Health and Hospital for Children
   Egmore, Chennai-8.
8. **Dr. K.Nedunchelian MD, D.C.H.**
   Head , Research and Academic department.
   Mehta Children's Hospital Pvt Ltd.,
   Chetpet, Egmore,
   Chennai-31.

9. **Dr. E. Suresh M.B.B.S, D.C.H**.
Senior ART Medical Officer.
Institute of Child Health and Hospital for Children
Egmore, Chennai-08.

10 **Dr. S. Sekar M.B.B.S, D.C.H, FHM.**
Asst.Surgeon, Senior Medical Officer in ART centre.
Rajiv Gandhi Government General Hospital,
Chennai- 03.

11. Dr. K. Nandhagopal M.B.B.S., D.V.
Senior ART Medical Officer
Government Kilpauk Medical College and Hospital,
Chennai-10.

12. Dr. S. Kalpana. M.D
Assistant Professor
Department of Pediatric Pulmonology
Institute of Child Health and Hospital for Children
Egmore,
Chennai-08.

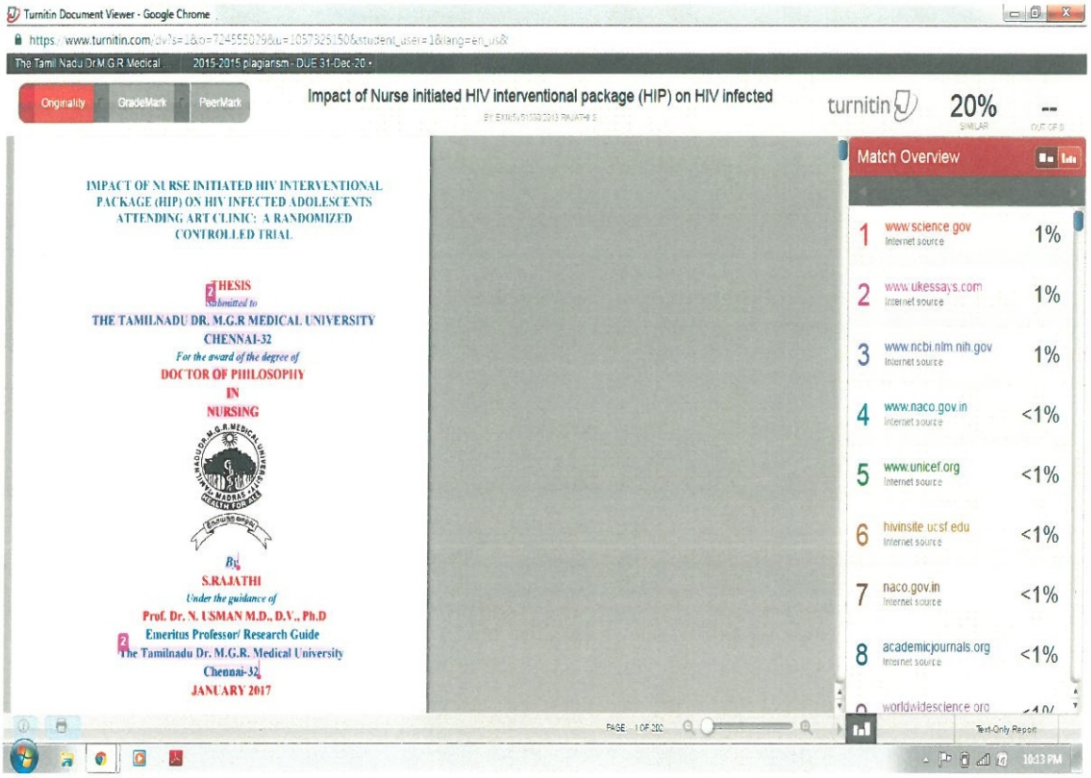
13. Mrs. SachdevMeenakshi M.Sc (N&D), CDE., CCN(USA)
Dietician
Tamilnadu Government Multi Super Specialty Hospital.
Chennai-02.

14. **Dr. R. Latha. BNYS.**
AMO, Yoga & Naturopathy.
Institute of Child Health and Hospital For Children
Egmore,
Chennai-08

15. Dr.R. Ambika BNYS
Department of Yoga and Naturopathy, Life Style and Wellness Clinic.
Rajiv Gandhi Government General Hospital,
Chennai-03

Annexure-vi

Plagiarism Report



Signature of the Guide

Dr. N. Usman, M.D, D.V, PhD.,
Emeritus Professor,
TN MGR Medical University
&
Director & HOD (Retd)
Institute of Venereology,
MMC, Chennai

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI-3

EC Reg. No. ECR/270/Inst.TN/2013
Telephone No: 044-25305301
Fax: 044-25363970

CERTIFICATE OF APPROVAL

To

S.Rajathi,
Plot No.3E, Flat No.G-1,
Patson Apartment,
Vembuli Nagar, Zamin Pallavaram,
Chennai-600 043.

Dear S.Rajathi,

The Institutional Ethics Committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled **"Impact of Nurse initiated HIV Interventional Package (HIP) of HIV infected adolescent attending ART clinic: A randomized controlled trial"** No.30102013

The following members of Ethics Committee were present in the meeting held on 08.10.2013 conducted at Madras Medical College, Chennai-3.

1. Dr.G.Sivakumar, MS FICS FAIS - Chairperson
2. Prof. Ramadevi, MD - Member
   Director i/c, Inst. of Biochemistry, MMC, Ch-3.
3. Prof.P.Karkuzhali, MD - Member
   Prof.Inst. of Pathology, MMC, Ch-3
4. Prof. Kalai Selvi, MD - Member
   Prof. of Pharmacology, MMC, Ch-3
5. Thiru S.Govindasamy, BABL - Lawyer
6. Tmt. Arnold Saulina MA MSW - Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/Chairman & Other members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

10/10/13

for Member Secretary, Ethics Committee

T-11020/38/2013-NACO (R&D)
Government of India
Ministry of Health & Family Welfare
Department of AIDS Control

9th Floor, Chandralok Building,
36, Janpath, New Delhi-110001
Dated the ~~05~~ 07th November, 2014

To,

Dr. N. Usman,
Ex- Director,
Instt. of Venerology,
2/6 Parathi Avenue, Mangammal Nagar,
Koyampedu, Chennai-600107

Subject: Research Project entitled, 'Impact of nurse initiated HIV interventional package (HIP) on HIV infected adolescentattending ART Clinic: a randomised controlled trial'' - regarding

Sir,

This is in reference to the letter received from Tamil Nadu State AIDS Control Society vide their letter no. 001616/CST/C1/TANSACS/2014, dated 04th April, 2014, with forwarding a request submitted by you to TANSACS for granting permission for undertaking the Ph.D thesis study at four ART Centres from Chennai, namely Institute of Child Health, Government Hospital of Thoracic Medicine, Kilpauk Medical college and Rajiv Ganthi Govt Genernal Hospital by Mrs Rajathi, M.Sc, Nursing student from Chennai.

The proposal has been reviewed by R & D Division and CST Division, NACO. A approval from NACO is being forwarded for undertaking this study, subject to the following conditions:

1. Copy of the proposal and Institutional Ethics Committee Clearance should be submitted to Tamil Nadu State AIDS Control Society before commencing the study
2. Copy of the final report may be submitted to NACO & Tamil Nadu State AIDS Control Society
3. Any publication out of this study will need to have prior NACO approval.

Entire expenditure for this study will be borne by the PG student and the institute undertaking this research. No technical or financial support will be provided by NACO/GOI or Tamil Nadu State AIDS Control Society.

In this regard, you may coordinate with the Project Director, Tamil Nadu State AIDS Control Society. Any adverse events observed during this study may please be communicated to NACO.

Yours faithfully,

P. Yujwal Raj 7/11/14

(Dr.Yujwal Raj)
National Programme Officer (SI)

Copy for information and necessary action to:-

1) The Project Director, Tamil Nadu State AIDS Control Society, 417, Pantheon Road, Egmore, Chennai-600008, with request to extend a support to the concerned student to undertake the study at at four ART Centres from Chennai, namely **Institute of Child Health, Government Hospital of Thoracic Medicine Tambaram, Kilpauk Medical college and Rajiv Ganthi Govt Genernal Hospital**
2) Chairman, Ethics Committee, Madras Medical College, Chennai-03, with request to closely monitor the study with respect to adherence to Ethical standards.
3) DDG (CST)/NACO/GOI

TAMILNADU STATE AIDS CONTROL SOCIETY

417, Pantheon Road, Egmore, Chennai - 600 008.
Ph : 044-2819 0467, 2819 0891 Fax No. : 91-044-2819 0465
E-mail : tnsacs@gmail.com
Website : www.tansacs.in; www.tansacsmis.org

Ref.No. 001616/CST/C1/TANSACS/2014, dt.04.04.2014

To

The Deputy Director General,
National AIDS Control Organisation(NACO),
9th Floor, Chandralok, Building,
36, Janpath,
New Delhi – 110 001

Sub: TANSACS-CST Division-Mrs.S.Rajathi, M.sc(Nursing),Plot.No.3, E/1, Falt No. G1, Patson apartment, Vembuli Nagar, Dharga Road, Zamin Pallavaram, Chennai-43 – conduct Ph.D., research work- study titled "Impact of Nurse initiated HIV interventional package (HIP) on HIV infected adolescent attending ART Clinic: a randomized controlled trial" – permission to collect data from Adolescent HIV clients attending ART Centres/clinic in Chennai-approval requested -Reg.

Ref: Mrs.S.Rajathi , representation letter, dt. 26.03.2014.

With reference to the letter cited, Mrs.S.Rajathi , M.sc(Nursing), has requested permission to conduct study titled "Impact of Nurse initiated HIV interventional package (HIP) on HIV infected adolescent attending ART Clinic: a randomized controlled trial". She has requested TANSACS to permit to collect data from Adolescent HIV clients attending ART Centres/clinic in Chennai.(copy enclosed)

In this connection, the copy of the proposal is forwarded herewith for ethical approval for her study at your end.

Encls:- (As above)

8/4/14
For Project Director

Copy to:-

7/4/14

Mrs.S.Rajathi, M.sc(Nursing),
Plot.No.3, E/1, Falt No. G1, Patson apartment,
Vembuli Nagar, Dharga Road,
Zamin Pallavaram,
Chennai-600 043

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

No.69, ANNA SALAI, GUINDY, CHENNAI - 600 032.

Website : www.tnmgrmu.ac.in Ph : 22353574, 22353576 - 79, 22301760 - 63, 22353094
E-mail : mail@tnmgrmu.ac.in Fax : 91-44-22353698

Dr. N. JEYALAKSHMI DEVI, M.D., D.G.O,
ACADEMIC OFFICER.

Ref. No.ACI(2)/51530/2013 **Dated:01.10.2014**

To

Dr. N. Usman, M.D., D.V., Ph.D.,
2//6, Bharati Avenue,
Mangammal Nagar,
Koyembedu,
Chennai-107.
Phone: 044-24798864.

Sir/Madam,

Sub:	Academic Wing– The Tamil Nadu Dr. M.G.R. Medical University, Chennai – **Ms. RAJATHI S** - Application for **FULL - TIME** Ph.D. Registration – Provisional Registration-Reg.
Ref:	1. Ph.D. Application dated **21.10.2013**. 2. Minutes of the Meeting in the Screening Committee in the Speciality of '**NURSING**' held **23.04.2014**

****

I am enclosing herewith the Provisional Registration Certificate for doing **FULL-TIME** Research leading to the award of Ph.D. Degree, in respect of the candidate **Ms. RAJATHI S.**

Yours faithfully,

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8)	Broad Topic of Research	:	**Pediatrics-HIV/AIDS**
9)	Provisional Title of Research	:	**"Impact of Nurse initiated HIV interventional package (HIP) ON HIV infected adolescents attending ART clinic: a randomized controlled trial"**
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Review Article

THE ROLE OF *HATHA YOGA* IN HUMAN IMMUNO DEFICIENCY VIRUS (HIV)/ACQUIRED IMMUNO DEFICIENCY SYNDROME (AIDS)

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Keywords: Anti retroviral therapy (ART), *Asana, Hatha yoga, Pranayama* and quality of life.

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ABSTRACT

The Acquired Immuno Deficiency Syndrome (AIDS) considered to be great deal of courage to face the disease that seems to have no cure as yet. Many of the people living with HIV (PLHIV), have the intense feelings of hopelessness, loneliness, fear, anxiety and depression. The Highly Active Anti Retroviral Therapy (HAART) has effectively reduced HIV related morbidity and mortality for PLHIV. Even they are living longer with ART, but significant side-effects like anorexia, nausea, vomiting, fatigue and stress related problems are unavoidable. The National Institute of Health and World Health Organization recommends that, yoga makes to minimize the side effects of ART and stress related problems of PLHIV. Among many branches of yoga, *Hatha yoga* enhances the capacity of the physical body through the use of series body postures, movements (*Asanas*) and breathing techniques (*Pranayama*). It's a form of mind-body fitness that involves the combination of muscular activity and an internally focus on the mind for awareness of the self, breath and energy aids to boost immunity and relax the mind. Many research studies supported that, this behavior modification of yoga is potentially safe, effective and this low-cost management help to 'detoxify' the body, mitigate chronic fatigue, enhance endurance, improve organ and immune functions makes to enhance overall well being and quality of life of PLHIV.

INTRODUCTION

Globally, an estimated 35 million people are living with Human Immunodeficiency Virus *(HIV)* is a hazardous entity to human beings. In the account of 2.5 million people living with HIV and AIDS *(PLHIV)* in India. Only Anti-retro viral therapies have brought renewed hope for many of the people living with HIV.[1] But the ART adherence rate and the life expectancy or quality of life improvement in PLHIV is affected due to the negative lifestyle such as addictions, intake of unhealthy foods and sedentary lifestyle such as behavioral problems like anxiety, phobia etc., By altering the lifestyle and behavioral changes, the life expectancy of PLHIV can be improved.[2] In western world, now yoga regarded as a holistic approach for health. The National Institute of Health is classified Yoga as a form of Complementary and Alternative Medicine *(CAM)* for HIV/AIDS. Recent surveys estimate that 47–74% of HIV infected individuals in the United States have used some form of alternative/complementary therapy to improve general health and well being[3]. *Yoga* has a important role to play in the rehabilitative efforts for many people living with HIV/AIDS[4]

WHAT IS YOGA?

The yoga, is derived from Sanskrit word "*yuj*" means "to control" or "to yoke" and is often termed as "uniting" or a method of discipline. The Indian sage *Patanjali* have ellaborated the practice of yoga into the Yoga Sutra an estimated 2,000 years ago. He outlines the eight limbs of yoga (*Ashtanga Yoga*). They are *Yama* (universal ethics), *Niyama* (individual ethics), *Asana* (physical postures), *Pranayama* (breath control), *Pratyahara* (strengthening senses), *Dharana* (concentration), *Dyana* (meditation), and *Samadhi* (self realization).

Among these eight limbs, today many people practicing third and fourth limb of *Ashtanga yoga*. The word "*asana*" refers to pose or posture, its helps to

increase stamina, physical power and as well as designed to purify the body. The *Asanas* are aids to open the many channels of the body especially the spine, so that energy flow in our body to go freely. Its increase concentration of our breath (*Prana*), which helps us to connect the body-mind.[5]

THE MIND - BODY CONNECTION

Asana and *Prana* are important concepts in the *Hatha Yoga*. The word *Hatha* means wilful or forceful. *Hatha yoga* is a kind of physical exercises, and series of asana, aids to align our skin, muscles, and bones. The word *Hatha* is derived from two roots - *ha* means 'sun' – has masculine aspects of hot, active and *tha* means "moon" – has feminine aspects of cool and receptive. The two energies of '*Ha*' and '*Tha*' make us to get powerful tool for self-transformation. The thoughtful feature of yoga is regularly achieved through an individual's intellectual focus of the asana and *Prana*.[6]

Yoga is unique because it connect the movement of the body and the fluctuations of the mind to the rhythm of our breath. The relation between mind, body, and breath helps us to sharp our concentration inward. Through this process of hidden attention, learn to be aware of our habitual thought patterns without tagging them, judging them, or annoying to change them. The aware of experiences from moment to moment cultivate through a daily practice of yoga, makes a task or a goal to be completed.[7]

HIV AND YOGA

Yoga is an ideal exercise for people with HIV. Yoga consists of three parts: exercise, breathing, and meditation. The yoga exercises are easy movements that extend and toughen the nervous system, main muscle groups, compress on glands and organs to motivate the hormonal system, to progress circulation in body. It's makes our brain and all vital organs receive oxygenated blood and nutrients. A habitual perform of a yoga exercises will increase our energy levels and feelings of happiness. The breathing exercises are most excellent tool for handle with stress and anxiety. By concentrating simply on the movements of the breath, build concentration, willpower, and the ability to reduce the hurtful possessions of a stress reaction. The different methods of breathing exercises increase the system to all the respiratory muscles and improve vital capacity. There's been ample research showing that both yoga and meditation elicit the relaxation response, regulates breath, heart rate and improves immunity power.[8]

Jon Kaiser (1998) said that, "Healing comes from inside". He strongly recommends that PLHIV take time to practice deep relaxation daily. Yoga makes to relieves stress, peace the mind, and regulates breathing and circulation. A regular practice can aid to sustain the immune system in concurrence with a comprehensive HIV management program.[9] Chapel Hill (2008) reported that stress significantly increases the hazard of HIV will progress to AIDS.[10] Steve Cole (2010) said that HIV is an tremendously stressful disease equally during the period of adjusting as well as living with it and because of the medications side effects. HIV spread more rapidly in presence of nor-epinephrine (stress hormone) in the body, make 'T' cells more vulnerable to attack and can increase the HIV rate of the reproduction 10 fold. And also he found that, ARV medications are less effective in people with high levels of nor epinephrine and people with HIV face treatment options that can range from uncomfortable (including sleeplessness and nausea) to dangerous (for example, increased risk of heart attack). "That's why behavioral interventions, like yoga and meditation, are so important," for PLHIV.[11]

Misha Cohen (2010) reported that, Yoga is superb tool for the stress decline when done appropriately," it can help to relieve various symptoms, as well as the ARV medications side effects, including the digestive problems and the joints pain. "A regular yoga practice is a simple way to achieve the good strength, boost the immune system and enhance circulation always".[12] Joseph and Nair (2015) evaluated the effect of naturopathy and yoga intervention on CD4 counts of HIV/AIDS patients. He observed that, an increasing trend in the CD4 count was proportional to the participants following yoga intervention. This indicates the possibility of lifestyle changes can bring positive outcomes in people living with HIV/AIDS.[13]

Naoroibam and Metri (2016) identified through the randomized control trial, One month practice of Integrated Yoga practice (*Asana*, *Pranyama* and relaxation technique) may reduce depression and improve immunity in HIV-1 infected individuals in experimental group when compare to the control group.[14]

HIV/AIDS makes a grand deal to face a disease that seems to have no heal as yet. The most people with HIV experience extreme feelings of despair, loneliness, fear, anxiety, and depression. Yoga cannot replace the professional counselling in connection with major grief, but yoga techniques can help to ease extreme fear and anxiety, gain knowledge of stress-coping skills, and fabricate the internal strength through the relaxation and self-awareness exercise of the meditation. Yoga helps to train the most of the physical capabilities, a slow-paced version that can emphasis for extends of flexibility and breathing techniques that helps in relaxation.[15]

The goal of yoga for HIV/AIDS is to

- Strengthens the immune system.
  Diminish the Opportunistic infections
- Improves nutritional status.
- Provides relief from symptoms and drug side effects.
- Improve quality of life and increase the life span.
- Possibly reduces transmission of HIV to others in future.[16]

RECOMMENAND *ASANA* AND ITS MECHANISM

Yoga has many amazing effects of PLHIV, leading to greater levels of physical fitness, improves immunity, lower levels of stress and a greater sense of inner peace. Worldwide, it is estimated that yoga is regularly practiced by about 30 million people. The Yoga vidya Gurukul University, Washington University and many research institutions recommends that these following

Asanas are beneficial for PLHIV. Depending upon the advice of a doctor, yoga techniques for HIV and AIDS are viable option. [17-22]

1. Yoga keeps the body clean, flexible and well balanced by decreasing the catabolic process of cell deterioration.
2. Asana Safely stretches the muscles, release the lactic acid that builds up the muscle use and increase the range of motion in the joints. Ex- *Vriksasana* (Tree Pose) and Sun Salutations.
3. **Forward pose:** Associated with Chest compression, exhalation and induces relaxation. It redirects the blood, energy flow to thymus its helps to regulate, control the 'T' cells and produces the hormones thymosins. Thymosins regulate white blood cells, particularly T-cells, control other hormones. Ex- *Trikonasana* (Trianglepose), *Vajrasana* (Thunderbolt Pose), *Yoga mudra*, *Paschimottasana* (sitting forward), *Uttanasana* (Standing Forward Bend), *Ardha Uttanasana* (Standing Half Forward).
4. **Back Bend pose:** It stretches abdominal muscles, tone and strengthen the muscles in Controlling spine, open up the chest, improve performance of the thymus gland and increase the immunity. e.g. *Bhujansansa* (Cobrapose), *Ushtrasana* (Camel pose) *Matsyasana* (Fish pose) *Supta Baddha Konasana* (Reclining Bound Angle Pose). *Setu Bandha Sarvangasana* (Supported Bridge Pose), *Supta Virasana* (Reclining Hero Pose) and *Viparita Karani* (Legs-up-the-Wall Pose).
5. **Spinal Twisting *Asana*:** The twist stimulates the spinal nerves and makes the spinal column more flexible. The whole trunk exercises enhance circulation in spine and strongly influence the abdominal muscles. e.g. *Vakrasana*, *Ardha matyendrasana* (Half spinal twist pose).
6. **Inverted *Asana*:** Encourage the rich supply of blood to flow to the brain, nourishing the neurons and rush out toxins. The accumulated blood and lymph, in lower limbs and abdomen are again go back to the heart and then purified by the lungs and re-circulated to whole parts of the body. E.g. *Sirsasana* (Headstand), *Sarvangasana* (Shoulder stand) *Halasana* (Plow Pose) and *Pincha mayurasana* (Feathered Peacock Pose).
7. **Relaxation pose**: Stress suppress levels of the infection fighting cells and immunity boosting gamma interferon in the blood. The yoga inhibits the release of stress hormone (nor-epinephrine, cortisol) and increase the relaxation efforts by stimulation of good chemicals such as serotonin and cytokines. e.g. *Sukhasana* (Simple cross leg pose), *Padmasana* (lotus pose), *Tadagasana* (pond pose), *Makrasana* (Corcodile pose) *Shanthiasana* (corpose pose) includes Instant relaxation technique (IRT), Quick relaxation technique (QRT), and Deep relaxation Technique (DRT).
8. ***Pranayama***: *Prana* begins to store the energy, allowing toxins to be released and removed. It directs the movements of inspiration, expiration and the retention of vital energy. Yogic breathing of Pranayama, is a unique method for balancing the autonomic nervous system and influencing psychological and stress-related disorders. *Sudarshan kriya yoga* (SKY) is a type of cyclical controlled breathing practice that provides relief for depression and favourable effects on the mind-body system. The *Nadi sodhana pranayama* (Alternate nostril breathing) reduces the stress level has soothing result on the nervous system. The absolute yogic respiration of abdominal, thoracic, and clavicular methods, increase the vital capacity of lungs. Fluctuations of mind can be minimized by practices like *Trataka* (concentration on a point or object) When practice *Pranayama* sit in *Sukhasana*, *Padmasana*, or *Vajrasana* posture and better to close the eyes, helps to increase the concentration and relax the mind.

The goals of yoga will be achieved more in adolescent age when compare to other age groups living with HIV/AIDS. Anitha Menon et al., (2013) and many research studies are found that adolescents are the most vulnerable group to get and spread HIV/AIDS in the community. About 31% of HIV prevalence in India is among the adolescent between age group of 10- 24years. The regular practice of yoga will promote the health, to develop positive attitudes and health practices, improve self confidence of adolescents living with HIV /AIDS which prevents HIV transmission in future. [23]

BENEFITS OF *ASANAS* [24,25]

- ✓ ***Physical***
  - ➢ Improves body flexibility and balance
  - ➢ Increase the cardiovascular endurance (stronger heart)
  - ➢ Ease the digestion power
  - ➢ Enhance the overall muscular strength
  - ➢ Relaxation of the muscular strains
  - ➢ Progress the respiratory functions
  - ➢ Increase the energy levels
  - ➢ To develop good sleep patterns
  - ➢ To boost immune system
- ✓ ***Mental***
  - ➢ Relieves the stress resulting from the control of emotions
  - ➢ Prevents and relieves from stress-related disorders
  - ➢ Intellectual enhancement, leading to improved decision-making skills
- ✓ ***Spiritual***
  - ➢ Life with meaning, purpose, and direction
  - ➢ Inner peace and tranquillity
  - ➢ Contentment

CONCLUSION

Anti-retro viral therapies have brought rehabilitated trust for many of the people living with HIV. However, they do not offer cure, and they can cause

many side effects and other non adherence reasons, more than 70% of HIV-positive people have turned to alternative medicine for help along with HARRT regimen. Now Over all yoga, acts both as curative and preventive therapy for the minor ailments in PLHIV. In fact many researchers have reported that, reducing stress appears to be a key asset for supporting people with HIV virus. Today yoga has become popularity in therapeutic practice; nearly stress reduction in people with HIV can contributes longevity and improves health. Regular yoga practices along with adherence to HARRT regimen leads to enhance overall well being with less burden to the society for PLHIV.

REFERENCE

1. Annual Report. NACO, Department of AIDS Control, Ministry of Health & Family Welfare, Government of India. 2013-14 downloaded on date 07/07/15. Available from http://www.naco.gov.in/upload /2014%20mslns/NACO_English%202013-14.pdf.
2. AIDS info. Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents. 2014. downloaded on date 05/07/15. Available from https://aidsinfo.nih.gov/contentfiles/lvguidelines/glchunk/glchunk_10.pdf
3. Cho M, Ye X, Dobs A, Cofrancesco J. Prevalence of complementary and alternative medicine use among HIV patients for perceived lipodystrophy. J Altern Complement Med 2006;12: 475–482. Available from http://www.ncbi.nlm.nih.gov/pubmed/16813512
4. Sabin CA. Do people with HIV infection have a normal life expectancy in the era of combination antiretroviral therapy? BMC Med. 2013;11: 251. Available from http://www.biomedcentral.com/1741-7015/11/251
5. Shonil A. Bhagwat. Yoga and Sustainability. The journal of yoga.2008: 7;1 Available from http://www.journalofyoga.org/yogaandsustain.pdf
6. Cyndi Lee. Yoga 101: A Beginner's Guide to Practice, Meditation, and the Sutras, yoga journal. Oct 7: 2014. downloaded on 05/07/15 Available from http://www.yogajournal.com/article/beginners/yoga-questions-answered.
7. Catherine woodyard. Exploring the therapeutic effects of yoga and its ability to increase quality of life; International journal of yoga: 2011:Jul-Dec:4(2):49-54. Available from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3193654/
8. Yoga and HIV/AIDS. American yoga Association (Home page in internet) downloaded on 07/07/15. Available from http://www.americanyogaassociation.org/02aids.html
9. Stacie Stukin. Healing HIV: A Holistic Approach. Yoga journal.Aug28, 2007 downloaded on 06.07.15 Available from www.yogajournal.com/article/health/health-hope-and-hiv/
10. Chapel Hill. Psychosomatic Medicine University of North Carolina: 2008 downloaded on 05.07.15 Available from www.yogajournal.com/article/health/health-hope-and-hiv
11. Heather Boerner.HIV/AIDS- protect your immune system. Yoga journal. Oct 2009 downloaded on 06/07/15 Available from http://www.yogajournal.com/article/health/positively-healing-2/
12. Matt McMillen. Yoga for People with HIV, Hemaware. Published in jan 2009.Available on 01.07.2010 downloaded on 06/07/15 Available fromhttp://www.hemaware.org/story/yoga-eople-hiv
13. Michael Solis. Yoga for people living with HIV. 2010.downloaded on 07/07/15 Available from http://www.yogapoint.com/therapy/yoga_for_people _with_HIV.htm#S
14. Stacie Stukin. Healing HIV: A Holistic Approach Yoga Journal Yoga And Health: Aug28. 2007. Downloaded on 07/07/15 Available from www.yogajournal.com/article/health/health-hope-and-hiv/
15. Naoroibam R, Metri KG, Bhargav H, Nagaratna R, Nagendra H R. Effect of Integrated Yoga (IY) on psychological states and CD4 counts of HIV-1 infected Patients: A Randomized controlled pilot study. Int J Yoga [serial online] 2016 [cited 2016 Jan 6];9:57-61. Available from http://www.ijoy.org.in/text.asp?2016/9/1/57/171723
16. Joseph B, Nair PM, Nanda A. Effects of naturopathy and yoga intervention on CD4 count of the individuals receiving antiretroviral therapy-report from a human immunodeficiency virus sanatorium, Pune. Int J Yoga [serial online] 2015 [cited 2016 Jan 6];8:122-7. Available from http://www.ijoy.org.in/text.asp?2015/8/2/122/158475
17. Smt Hansaji Jayadeva Yogendra. Yoga poses for people infected with HIV. 2014 downloaded on 05/07/15 Available from www.thehealthsite.com/diseases.../yoga-poses-for-people-infected-with-hiv
18. Paula Kout. Yoga postures for HIV/AIDS. Iris Yoga downloaded on 06/07/15 Available from http://www.yogagroup.org/kout.html
19. Faye Martins, Yoga Techniques for HIV/AIDS Patients. Aura Wellness Center Aug9, 2011 downloaded from 06/07/15. Available from http://www.aurawellnesscenter.com/2011/08/09/yoga-techniques-for-hivaids patients
20. Holger Cramer, Characteristics of randomized controlled trials of yoga: a bibliometric analysis. BMC Complementary and Alternative Medicine. 2014:14:328 Available from http://www.biomedcentral.com/1472-6882/14/328
21. Emedicine health, Experts for everyday emer - gencies. Home page in the internet. downloaded on 06/07/15 Available from http://www.emedicinehealth.com/yoga-health/ article_em.htm
22. Zope SA, Zope RA. Sudarshan kriya yoga: Breathing for health. Int J Yoga [serial online] 2013

[cited 2016 Jan 6]; 6:4-10. Available from: http://www.ijoy.org.in/text.asp?2013/6/1/4/105935

23. An Anitha Menon and Cristine Glazebrook. Randomized control trial to evaluate Yoga –based peer support group for Human immunodeficiency Virus(HIV) Positive Zambian adolescents. Journal of AIDS and HIV Research; 2013:5(1):12 Available from http://www.academicjournals.org/journal/JAHR/article-full-text pdf/ 90A49234946
24. Timothy Mccall.**38** Health Benefits of Yoga. Yoga journal.Aug28:2007 downloaded on 06/07/15. Available from http://www.yogajournal.com /article/health/count-yoga-38-ways-yoga-keeps-fit/
25. Yoga and its Benefits**.** Home page in the internet. downloaded on 05/06/15 Available from http://www.yogicwayoflife.com/yoga-and-its-benefits/and *pranayama*.

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Role of Anti-oxidants in HIV/AIDS

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ABSTRACT

HIV infection presents one of the most laborious complications to humans worldwide. The one of the co-factors involved in development of AIDS is prominent levels of reactive oxygen species (ROS), as the deferred reaction by the immune system may be due to a primary reduction of antioxidants. The antioxidants are substances that restrain oxidation and sentinel the body from the detrimental effects of free radicals which play a vital role in scavenging excess ROS to sustain normal physiological conditions. The optimization of anti oxidants in diet, including nutrients and other bio-active food components, are needed to contribute to strengthen immune system. The success of antiretroviral therapy has forced reconsideration of alternative therapies, such as antioxidants in diet. People with HIV+/AIDS are needed a nutritional counseling for including antioxidants in their diet, and education about life style changes should be beneficial to the quality and extension of life in AIDS.

Introduction

According to National AIDS Control Organization (2014), India has the third largest HIV epidemic in the world. The prevalence of HIV in India is an estimated 0.31% its equals to 2.1million. The most four high prevalence states of South India account for 57% of all HIV infections, includes Andhra Pradesh, Maharashtra, Karnataka & Tamil Nadu. The estimated age distribution of HIV infection is 4.4% among the children below 15 years, 82.4% among adults aged 15 to 49 years & the remaining 13.2% over 50 years and also by sex approximately 61% for male and 39% in female. After the arrival of HARRT, now India's overall HIV epidemic is slowing down between 2000 to 2013, the 57% decline in new HIV infections, and 29 % in AIDS-related deaths [1].

Antioxidants and Free Radicals

Anti oxidants are the vitamins, minerals and enzymes which protect and repair our cells from damage made by free radicals. Free Radicals are unstable molecules that respond with vital molecules of our body, including DNA, fat and proteins. The electron deficient of free radicals (oxidants) are formed by result of all metabolic activity and by environmental stressors, such as pollution, smoking, pesticides and radiation. Generally, free radical production is counter balanced by our own defense mechanism that includes both enzymatic and non-enzymatic antioxidants. When the natural stability between oxidants and antioxidants inside the body is distressed *via* antioxidant deficit or increased ROS (Reactive Oxygen Spices) production result in Oxidative Stress (OS)[2].

HIV: An Oxidative Role

HIV associated with substantial oxidative stress and reactive oxygen species participate in the progression of HIV to AIDS. Oxidative Stress following HIV- infection depletes CD4+ T-cell count through apoptosis, and also enhancing HIV replication and transcription. At earlier

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Table - 1: Role of antioxidants in HIV and its sources [5-8]

Sl. No	Name of Antioxidants	Action	Sources	Benefits
1.	Gluthathione	It interfere's with HIV's entry into CD4 cells.	Asparagus, avocado, grapefruit, squash, potato, cantaloupe, peach, zucchini, spinach, broccoli, watermelon, strawberries, whey proteins Fish, meat,	Compromise T-cell function and decrease the survival of Virus.
2.	N-Acetyl Cysteine	Reinstates gluthathione levels	Animal proteins have higher in sulfur amino acids of cysteine than vegetable proteins.(beans and grains)	Improve T-cell counts, and reduce the viral load
3.	Vitamin C	Increase the production of infection fighting white blood cells, antibodies, and interferon ,	Citrus fruits, green peppers, broccoli, green leafy vegetables, strawberries, raw cabbage, tomatoes and sweet potatoes	Helps the body to use calcium and other nutrients to strengthen bones, blood vessel walls and reduce the risk of cardio vascular diseases.
4.	Vitamin E	Protects vitamin A and other fats from oxidation. Facilitates the resistance of against the diseases especially lungs problems.	Wheat germ, whole grains, nuts, seeds, green leafy vegetables, vegetable oil, and fish-liver oil. Some foods that are rich in vitamin C also supply at least 10 % daily intake of vitamin E, including raspberries, blackberries, sweet peppers, broccoli and tomatoes.	Protects cell membranes, metabolism especially red and white blood cells.
5.	**Phytochemicals** a. Carotenoids	Reduce oxidative stress in the cells prevents atrophy of thymus gland, other lymphoid tissues, maintaining of the epithelial cells in the mucous membranes and skin.	Plant pigment found in colorful fruits and vegetables and is converted into vitamin A in the body. Pumpkin, carrots, tomatoes, sweet potatoes, red peppers oranges, and dark green leafy vegetables.(spinach)	Essential for the immune system function and increase the resistance to infections. Ensures good vision.
	b. Flavonoids	Promotes cellular health and normal tissue growth.	Cranberries, kale, beets, berries, red and black grapes, oranges, lemons, grapefruits, green tea and Dark chocolates	Renewal of Cells throughout the body.
	c. Resveratrol	Helps for the free radical scavenging, anti-tumor, enhance antiviral activity.	Dark blue and purple fruits, including grapes, blackberries and blueberries.	Limit HIV replications and reduce inflammations.

Table - 1continued...

Sl. No	Name of Antioxidants	Action	Sources	Benefits
6.	Selenium	Decreases the effect of inflammatory cytokines, which may reduce the risk of developing neurological damage, Kaposi's sarcoma and wasting syndrome.	Fish, shellfish, red meat, chicken, egg, pork, beef and milk. Nuts (Brazil nuts), grains, garlic can also be a good source if grown in selenium-rich soils	Stabilize viral loads and moderate the CD4 levels.
7	Zinc	Acts as immune modulator, anti-viral agent. It helps to inhibit the cell death and cellular apoptosis and wasting syndrome	Oysters, meats, shellfish, fortified beans, soya beans, pea nuts, wheat gram, squash seeds, spinach and mushroom	The risk of CD4 cell counts falling below the critical to 200 cells/mm^3 and reduce the diarrhea
8.	Magnesium	Important role in enzymatic reactions, muscle relaxation. and aids in the absorption of calcium	Nuts, beans, pineapple, brown rice and sweet potatoes. nuts (especially almonds), whole grains, wheat germ, fish, and green leafy vegetables	Helps to reduce lipo dystrophy symptoms in HIV
9.	Iron	Requires to make hemoglobin for red blood cells and to transport oxygen from lungs to cells throughout the body.	Red meat, liver, fish, poultry, shellfish ,eggs, legumes, peanuts, cereals, and dried fruits	Helps for the utilization of the energy and the metabolism of cells.
10.	Green Tea	Act as immune modulator. Green tea leaves contain compounds called catechins, its helps to block HIV virus to T cells.		It's coupled with other nutrients like vitamin C or lysine, inhibits the replication of HIV virus.

stage, Cellular CD4 immunodeficiency is the hallmark of HIV infection. Yet, as soon as T-lymphocytes become infected, the body is faced with the dilemma of promoting apoptosis to abolish HIV, however consequently decreasing the body's battle to HIV results in decline of antioxidants [3].

HIV, the Body and Antioxidants

The HIV infection increases the free radicals production inside our body. To counteract this, our body increases production of own antioxidants. A number of events work towards hindering this defense, which includes the following:

1. HIV virus harms the intestinal wall, results in decreased power to break down and utilize nutrients from food.

2. The overall nutrients of high-quality protein, vitamins and minerals increases as HIV infection takes hold, and the immune system needs to respond for continuous attack from the virus. It makes many numbers of the immune system's cells to be disabled or destroyed.

3. HIV-infected cells steal vital nutrients from the body that those cells need in order to make many viruses every day. In PHAs, antioxidant production may not get first priority [4]. Moreover, the nutrients may simply is not available because of the following factors

Ø It reduced absorption from the intestine
Ø The poor eating habits
Ø Loss of appetite (sometimes a side effect of medications) and diarrhea

Cells of the immune system need antioxidants to work properly. Anthony et al., (2011) revealed, that PHAs levels of antioxidants inside CD4 and CD8 cells are low because of this deficit the immune cells may impair the ability to fight HIV virus [3,4].

Types of Antioxidants

Antioxidants come in a variety of the forms; it is generated endogenously by the body and exogenously as dietary supplements. It protects the body from the destructive effects of free radicals. The two type's antioxi-dants are:

1. Anti oxidant enzymes and
2. Non enzymatic dietary antioxidants.[2]

Antioxidant Enzymes:

Superoxide dismutase (SOD) is an enzyme used to modify superoxide radicals into the less toxic hydrogen peroxide.

But SOD needs mineral cofactors of either manganese or copper and zinc to function actively. The Other enzymes of catalase and glutathione peroxidase help to convert the hydrogen peroxide into oxygen and water. The heme requiring enzyme of catalase, and selenium-containing enzyme of glutathione peroxidase needs glutamine or glutamate to makes glutathione.

The cofactors of minerals like manganese, selenium, zinc, copper and iron are needed to enhance these enzyme activities. Moreover, the dual role in production and destruction of ROS needs iron and copper.

Non enzymatic antioxidants

Non enzymatic antioxidants are vitamins C and E, caro-tenes, glutathione, and phyto chemicals. All these antioxidants are available in food and activate the intercepting and stabilizing of the ROS. This is called as **scavenging**. Elevated levels of reactive oxygen species (ROS) is the onset of infection. To protect from excessive exposure to free radicals, the body can make its own antioxidants by using some of the following nutrients that are found in the food or supplements:

1. The amino acid cysteine
2. Minerals such as copper, manganese, zinc and magnesium
3. B complex vitamins

The body also depends on ready-made antioxidants found in food. For e.g., vitamin C, vitamin E and mixed carotenoids such as alpha-carotene, beta-carotene, lycopene and zinc [2]

Available forms of antioxidants

Many of those defensive free radical scavenging enzymes are based on micronutrients such as Selenium, Zinc and Vitamins C and E, and Beta-Carotene. Those nutrients are not produced by the body, so they must be included by food and/or supplements. Many of the antioxidant supplements are available in pill, powder or liquid form, primarily from health food stores [4]. Here's a list of antioxidants or the compounds used to make them which are taken by some PHAs:

√ Vitamin C 1000 mg once daily
√ Vitamin E -100 – 400 IU alpha tocopherol and 200 mg gamma tocopherol daily
√ R-lipoic acid 210 mg twice daily
√ Mixed Carotenoids especially Beta-carotene: 5000 IU daily
√ Selenium 200 – 400 mcg daily
√ Zinc 30 mg daily
√ NAC (N-acetyl-cysteine) : 600 mg twice daily
√ Co-enzyme Q10: (as Ubiquinol): 200 mg daily.
√ Green tea, standardized extract: 725 – 1450 mg daily.

Even many antioxidant supplements are available, the nurses should note that rich source of antioxidants are in foods. Because it helps for the nutritional counseling of PLHIV and life threatening illness patients in order to improve the immunity, increase nutritional status and enhance the quality of life. The role of Anti-oxidants in HIV and its sources are illustrated in Table 1

Conclusion

The WHO recommends that the antioxidant nutrients as a key part in slowing the progression of HIV infection to the AIDS stage. The combination of antioxidants and HAART lower the viral loads and the generation of ROS from antiretroviral treatment. A rule of thumb when it comes to antioxidants thinks "ACE." Vitamins A, C, and E are best sources of antioxidants and "eat the rainbow" color foods. Moreover, nutritional management, counseling and education should be beneficial for the quality and extension of life in PLHIV. Hence on a global scale, it is presumed that antioxidant management may offer a cost effective therapeutic approach for individuals living with HIV/AIDS.

References:

1. National AIDS Control Organization-India's Voice against AIDS. Department of AIDS Control, Ministry of Health & Family Welfare, Government of India, Annual Report 2013-14. June: 1-9. Available from http://www.naco.gov.in/upload/2014%20mslns/NACO_English%202013-14.pdf.

2. Dale Ames Kline, HIV/AIDS - Immune Function & Nutrition, Nutrition Dimension/Gannett Education.Falls Church, Nov 2011; 1-33.VA 22042:1-800-866-0919. Available from http://www.nutrition411.com/pdf/HIV%20AIDS,%20Immune%20function%20&20Nutrition.pdf

3. Anthony H. Kashou and Ashok Agarwal, Oxidants and Antioxidants in the Pathogenesis of HIV/AIDS, The Open Reproductive Science Journal, 2011;3:154-161 Available from http://benthamopen.com/contents/pdf/TORSJ/TORSJ-3-154.pdf

4. The Canadian AIDS Treatment Information Exchange (CATIE) supplement sheet -Antioxidants spring :2012:1-4. http://www.catie.ca

5. Nutrition and HIV/AIDS: A Training Manual for Nurses and Midwives ECSA-HC, FANTA, and LINKAGES. Aug 2008:54-60. Available from http://www.fantaproject.org/sites/default/files/resources/Training_Manual_Complete.pdf

6. Lizette Borreli , Healing Foods for Your Health: The 10 Best Antioxidant-Rich Foods to Add to Your Diet, Article available from blog link http://www.medicaldaily.com/healing-foods-your-health-10-best-antioxidant-rich-foods-add-your-diet-285370.

7. Life Extension Suggestions, HIV-AIDS - Nutritional Support for HIV, Article available from blog link http://www.lifeextension.com/protocols/infections/hiv-aids/page-03

8. Best Health Magazine, 40 foods high in antioxidants, Article available from blog link http://www.besthealthmag.ca/best-eats/nutrition/40-foods-high-in-antioxidants.

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Review Article

Significance of Optimal Adherence to Anti Retroviral Therapy in Adolescents Living With HIV/AIDS (ALHIV)

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ABSTRACT

Antiretroviral therapy (ART) is a life-long commitment for all the clients living with HIV/AIDS and especially for the perinatally infected adolescents. The optimal adherence to ART is the most significant factor to suppress HIV replication and to shun the emergence of the drug resistance. Globally, all over the two million adolescents aged 10–19 yrs, and the five million young people aged 15–24 yrs are living with HIV. ART adherence in adolescents contributes significantly to shape the future of the HIV epidemic and face different challenges and needs than children and adults. The optimal level of drug adherence (>95%) are associated with improved virological, immunological and clinical outcomes. Adherence rates exceeding 95% are essential to maximize the benefits of ARV medications. The non-adherence (<95%) are finally associated with ART failure includes the development of viral resistance, treatment failure and increased the risk of disease progression. The many factors like pill burden, forgetfulness, regimen fatigue, busy schedule, depression, stigma and disclosure contributes to the poor retention in the care, sub optimal and non adherence to antiretroviral therapy in this population. Hence, a multi disciplinary approach towards ALHIV is an essential and specially needs to focus the optimal adherence to ART helps to achieve the global targets.

Keywords: Adolescents, Anti retro viral therapy, adherence, Non adherence and ART failure.

INTRODUCTION [1-11]

The term "Adolescence" literally means "to emerge" or "to attain identity". It's characterized by myriad of physical, psychological, neurobehavioral, hormonal and socio developmental changes start from the onset of puberty to transiting phase of adult. [1] Adolescents (10-19 yrs) are 'Fulcrum' of key population and centre of the epidemic for HIV/AIDS. Globally 62% of adolescents and young adults only were the adherent to ART and comparable to adults ,there were discrepancy between regions like lower adherence in Europe , South America and North America (50-60%) and higher levels in Africa and Asia (>70%). [2] The distinct group of adolescents in the context of HIV is Perinatally Infected Adolescents (PIA) and Behaviorally Infected Adolescents (BIA). [3] Adherence to the antiretroviral therapy is poorer in both categories of adolescents. The other controversial view of PIA were started on ART early in life with mono or dual therapy regimens resulting in partial viral suppression and an emergence of resistance,

end in ART failure when compare to the adolescents infected in second decade. The infected adolescents adhere to ART treatment and support has misfired throughout to the epidemic results in many non adherence problems. [4]

According to 'WHO', Adherence is defined as "the extent to which a person's behavior of taking medicine, following a diet and /or executing lifestyle changes, corresponds with agreed recommendations/ prescriptions from a health care provider." [5] The adherence measurement is usually based on Paterson's pioneer study; found that up to 95% adherence is mandatorily needed for an effective HIV viral suppression. [6] The ALHIVs are experiencing many hurdles and challenges for optimal adherence when compare to the children and adults due to dependency on caregivers, need of autonomy, attitudes of defiance/ denial, history of loss (parents and home) and delay in the disclosure status. [7] The co-existing group of these adolescents faces many concerns related to the disclosure, treatment fatigue or stigma within their schools, homes and communities /self stigma, loss of parents/caregivers support and financial burden. The adolescents above age of 15yrs have greater risk of non adherence compared to younger adolescents. It is also important to note adolescents can act as a transitional phase towards adulthood in which drug use and sexual experimentation are initiated, thus increasing the risk of invite and as well as transmit HIV. [3,8]

Current Scenario of Adolescents Living with HIV/AIDS (ALHIV)

Global scenario

At 2014, globally an estimated 36.9 million people were living with HIV; of these 2.1 million adolescents aged 10–19 yrs it's comprise almost one fifth of the world's population. The majority of 80% adolescent HIV infections are in sub-Saharan Africa. The new HIV infections among adolescents in this region 440 per day, nearly one sixth in this age group and especially 64% were girls (15-19 yrs). AIDS remains the number one killer of adolescents in Africa and the second most common cause of death among adolescents globally. The ART coverage at the end of 2013 was 37 % for adults but only 23% in children/adolescents. Even with the dawn of HARRT, globally 13.3 million children (0–17 years) have lost one or both parents due to AIDS. [9]

Indian scenario

In 2014, India had the third largest number of persons living with HIV in the world around 2.3 million, almost one in seven new infections occurred in 15-19 year olds. In Asia, AIDS-related deaths were increased; nearly 110 % in 10-19 yrs in contrast it's reduced to 28% in adults. Almost in South Asia, death among adolescents was quadrupled, around 1,500 in 2001 to 5,300 in 2014. [10] The second largest number of people (> 700,000) in India was on anti retroviral therapy and also its home to the second largest numbers of HIV/AIDS orphans in the world after South Africa. It is also estimated that 13% of HIV infection through sexual contact and 20-30% of female sex workers are less than 18yrs. [11]

Rationale to hub on Adolescent Living with HIV/AIDS (ALHIV) [3, 8, 10, 12,13]

In the modern era, with the introduction of HAART and the evolution in the diagnosis and treatment of AIDS, many of the children are infected through the vertical transmission of HIV survive, crossed the stage of childhood and entering "Adolescence with AIDS". [3,8]

Adolescence is a typical period of experimentation, vulnerability makes usually attempt to break parental bonds increase the high risk behaviors.

Worldwide, adolescents HIV related deaths were increased up to 50%. (71,000 in 2005,110, 00 in 2012) whereas in contrast 32% decrease among all the other age groups during the same period. [10,12]

ALHIV are very likely to face many challenges to lead a big question mark in their future and the successful treatment for PIA is complex, since they face additional

physical challenges makes difficult to reach the transition phase of adult.

Adolescents have a life time potential of transmitting HIV as risk behavior. So the hidden epidemic of ALHIV needs more attention and a tailored approach in order to reduce the risk of spreading the virus to others. [13]

To address this serious gaps, the UNAIDS and UNICEF launched 'All In' movement in 2015. The objectives are, to reduce new HIV infections among adolescents by at least 75 %, to reducing the AIDS-related deaths by at least 65%, and eliminating stigma and discrimination by 2020. Overall, the goal of optimal adherence to ART is reduced HIV/AIDS morbidity and mortality to 60%-90% and to prolong the quality and the survival life of all ALHIV. [10]

Anti retroviral therapy and its Significance

Antiretroviral therapy means not only for the adherence to ARV medications (right drug, dose, route, frequency and time) and also it includes in the complete treatment and care. The optimal level of (95 %) adherence to ART inhibits the HIV replication which has resulted in the steady decline in AIDS related to morbidity and mortality. ART adherence below 95% associated with the treatment failure and even 80-90 % have the risk of resistance to ARV medications. Non-adherence to ART results in inadequate suppression of viral replication in the body and allows the disease to progress at a faster rate and it's one of the main reasons for the failure of first line ART .The poor adherence to ART showed that patient's adherence levels were below 75% were three times more likely to die compared to those adherence levels were above 75%. [14]

Specific Adherence Barriers of ALHIV [4, 5, 8, 14, 18,19]

Adolescents often have less disciplined or structured lives than adults. Outreach is more intricate with adolescents because they are scattered and it is harder to bring them into care. As the scenario of HIV prevention has shifted to the treatment as prevention strategies, it is necessary to identify barriers and promote adherence to ART among adolescents are essential. [4] The specific adherence barriers are listed below,

1. Physical barriers

The behavioral and cognitive issues may directly influence on adherence related to lifestyle. Feeling well or worsening of diseases, high risk behaviors, less knowledge regarding treatment benefits leads to ignore the ARV medications. [8]

2. Medication related barriers

The PIA usually have treatment fatigue ,complexity of regimens including pill burden , palatability of ARV medications particularly drugs such as nelfinavir and ritonavir, adverse the drug effects and long-term toxicities like lipodystrophy may also cause non-adherence. [8,14]

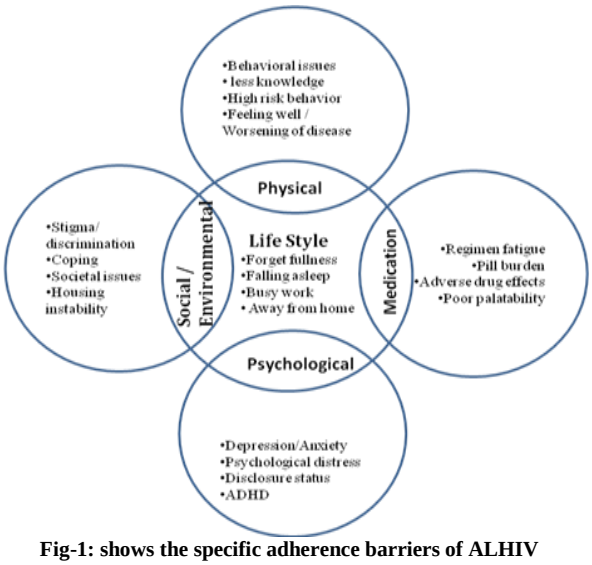

Fig-1: shows the specific adherence barriers of ALHIV

3. Psychological barriers

The many PIAs have an experienced history of depression and psychological distress. The disclosure usually associated with denial, anger, anxiety and end in depressions are directly influence their adherence. The disclosure stressors ranked second to medication stressors for the adolescents and disclosing to more than one friend makes hidden of medications. [8] The psychiatric illness which includes the mood disorders, Attention Deficit Hyperactivity

Disorder (ADHD) and disruptive behavior disorders were significantly associated with suboptimal adherence. [15]

4. Social/Environmental barriers

The stigma and discrimination usually associated with abandonment from the peer group, societal issues and coping strategies. The high levels of HIV stigma are three times as likely to be non adherent with their medications compared to those with low stigma. The common structural barriers includes, lack of medical insurance, stigma in work or school, housing instability, unemployment, financial burden, lack of transportation to the clinic visits or to obtain medication are also influence on adherence to ART.

5. Lifestyle barriers

The above mentioned all the barriers are influencing with lifestyle of ALHIV. Along with, the forgetfulness, falling asleep, busy work schedule, and being away from home and frequent travelling makes to get precise non adherence to this group. [8] The forgetting, changes in daily routine and being away from home were the most common causes of missing pills. [5] While another study reports that, financial constraints and forgetting as the most common reason for omitted drugs. [16]

Monitoring and Assessing Antiretroviral Therapy Adherence [4,5,14,15,17-22]

There is no 'gold standard' for the assessing and monitoring the adherence therefore, multiple approaches are often used. A routine adherence assessment should be included into every clinic visit by the all health professionals in the ART centre. They are,

A. Indirect / Subjective methods:

1. Self / Care giver's Report of Adherence (Behavior assessment questionnaire)

Globally, self/caregiver's report is a main indicator of adherence, usually monitored by the standardized questionnaire developed from Adult AIDS clinical trial Group (ACTG) and adapted by pediatric AIDS clinical trial group. The another method of visual analogue scale (VAS) indicates, how many of each drug they have taken in the past 3or 4 weeks in the range 0-100.This method was highly correlated, and to be equivalent to 3 day recall or self report. [4] The major snag is over estimation of adherence due to the desirability bias. The self-report of any missed dose history have a strong association with development of viral failure. [17]

2. Pill Count Method

Pill count to be calculated as, dividing number of pills actually taken by the number of pills prescribed in one month multiplied by 100. [5] But its major drawback is manipulation of pills or pill dumping prior to the hospital visits will result in overestimation of adherence. [14] This method is economical and correlates well with viral load. [18]

3. Pharmacy Based-Records

Pharmacy record is a simple and valuable tool for measuring adherence; correlated with CD4 count and weight gain. The necessary record keeping is essential for pharmacy refill tracking. The major setback is, believe of that adherence based on their empty pill boxes and the regular collection of their medication, it does not measure the actual medication intake. [14] The number of adolescents achieving 100% estimated by pharmacy refills, was lower than the adults. [15]

B. Direct/objective methods.

4. Electronic Monitoring Devices (EMD)

The Micro electronic monitoring systems (MEMS) on bottle caps use to calculate by dividing the number of time of appropriate bottle openings by the number of expected dose over the period. This technique assumes that opening of the bottle by the patient coincides with actual intake of the drug. The major hitch is quiet expensive and non-reliable device because it underestimates or over estimate the adherence. [14] The compared methods of adherence monitoring is found that no correlation between electronic device monitor, pill count and self-report methods. [19]

5. Biological Markers Monitoring

Low viral loads and improved CD4 counts are indication of good adherence. Although some clients may have a high viral load in spite of taking the ART regularly, suggests alternative or second line regimens. The major hurdle in this method is cost and unavailability in all the health care settings. [14] The viral load and CD4 is a good measure of adherence when correlated with weight gain compared to self-report and pharmacy records. [20]

6. Therapeutic Drug Monitoring (TDM)

It involves measuring the drug levels in the blood. This process is not used regularly, as most ARV medications have less circulating times in the body. [14] A comparative study depicts that, nevirapine plasma concentration monitoring provides an accurate measurement of adherence compared to self-report, [21] but it is very expensive and not feasible to do in all health care settings. Drug concentrations in the hair are being studied as another method to measure adherence. [5,22]

Strategies and Tools for Enhancing Adherence to ART [4,14,23-28]

Adherence to ART is central to therapeutic success, since it is very complex and unpredictable among adolescents. The several methods of enhancing adherence, to be tailored according to the individual needs or depends on barriers to adherence. [4] They are,

1. Antiretroviral Therapy Strategies

It involves the simplification of regimen characteristics, reduction of pill burden, management of side effects, and adjusting dietary restrictions if needed in daily activities. The research studies have demonstrated that, enhanced adherence with once or twice dose of ART. The fixed-dose combinations (FDC) of ARVs are currently available and have been revealed to improve adherence in adolescents. [14]

2. Information, Education, Counseling (IEC) and collaborative planning

This is the core of ART program in any settings; IEC enrich the adolescent's knowledge but still regarding the reproductive health, high level education and career training is needed in this population. [23] During the counseling, potential barriers to adherence are addressed. The peer group and safe sex counseling regarding 'ABC' approach are necessarily to be insisted according to their age limit of adolescents. [4] The motivational counseling greatly assists the adolescents in developing positive beliefs, and helps to increases the self-efficacy and adherence level. [14] Collaborative planning with multi disciplinary team is essential to meet their needs, emphasize the benefits of optimal adherence in the follow up session. [24]

3. Adherence Tools

The 'Reminder tools' are, one of the facilitators for adherence enhancement of people living with HIV/AIDS. The research has shown that the tools are more benefit when it's combined with education or counseling to clients. In USA, a randomized controlled trial reported that reminder tools alone do not improve adherence and recommends that it should be pooled with counseling as the part of comprehensive support for clients on ART. They are

1. Pill boxes are the containers use to store the ARV for regular use and facilitate to take their medications correctly. The Electronic version of pill boxes with reminders are also available but major problem is the lack of confidentiality, privacy associated with it. The drawback is the unskilled adolescents may not be able to fill the boxes properly.

2. Pill charts involve visual display of the pills in expressions of their shape, color, dosage and name of the medications during counseling. This is very useful primarily for non formal trained adolescents. [4,14]

3. Medication diaries are used to document the date, time of taking the medications, missed doses and the reasons for it. Mainly it is used to identify side effects or other problems may encounter in the course of taking ART. The home based nursing program and medication diaries had a positive effect on knowledge, medication refills (p=0.002) and no missed dose in

intervention group but in control group no change and viral load increased from 30-80%. [25]

4. **Buddy system** has been widely used where relatives or friends agree to assist the clients to remind and encourage to taking their medications, adhering to the hospital visits, medical care and social support. The psycho-social support is not only that assists the patient in adhering to ART but also provides moral support to cope with the disease and enhance the quality of life. [4]

5. Electronic devices such as beepers, alarms and watches, remind patients to take their medication as prescribed in schedule. In addition, telephonic calls and mobile phone text messages have shown to improve medication adherence in HIV infected individuals. Electronic pagers connected to the internet may be used to send reminders to the patients to take their drugs. The major snag is the lack of privacy, cost required to set up this kind of services. [4, 14,26]

The other strategies includes, Direct Observed Therapy (DOT) and positive reinforcement techniques like incentives (financial) and rewards (meal tickets, grocery bags, lotto ticket) can also facilitates adherence. [27] A meta-analysis report was found that, participants receiving adherence interventions were 1.5 times as likely to report 95% adherence and 1.25 times more likely to achieve undetectable VL than controls. [28]

CONCLUSION

The Optimal adherence to antiretroviral therapy (ART) is essential to maintain HIV suppression, lower the risk of drug resistance, and improves overall health, quality of life and survival.. A multi disciplinary team should be able to address the barriers, reinforce importance of ARV medications, information, education and communication (IEC) towards the HIV/AIDS in each counseling section will facilitates adherence and prevention of HIV in future. Moreover, the fixed dose combinations (FDCs), reminders, peer group counseling, adolescent centered service are essential to achieve the optimal adherence to ART in adolescents and transition to adult care. The Recent Millennium Development Goals (MDGs) for 2015 'Getting to Zero' and UNAIDS goal of "AIDS free generation - within reach by 2030" can't be achieved without imparting the significance of adherence to ART to the HIV infected adolescents in order to develop healthy adults in future forever.

REFERENCES

1. Mothi S N, Swamy V H T & Lala M M et al., Adolescents living with HIV in India - the clock is ticking. Indian Journal of Pediatrics. 2012; 79(12): 1642-7.doi:10.1007/s12098-012-0902.
2. Sung H K, Gerver M S, Fidler S et al., Adherence to antiretroviral therapy in adolescents living with HIV: Systematic review and meta-analysis. AIDS.2014; 28: 1945-1956.
3. Lall P, Lim SH, Khairuddin N et al., Review: An urgent need for research on factors impacting adherence to and retention in care among HIV - positive youth and adolescents from key populations. J Int AIDS Soc. 2015; 18(Suppl 1):19393
4. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Department of Health and Human Services. Accessed on18.2.16Available athttp://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL. pdf.
5. Gokarn A, Narkhede MG, Pardeshi GS, Doibale MK. Adherence to antiretroviral therapy. J Assoc Physicians India. 2012; 60:16-20. PMID: 23781665.
6. Paterson D L, Swindells S, Mohr J et al., Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. Annals of Internal Medicine. 2000; 133 (1):21-30.
7. Cruz M L, Cardoso C A, Darmont M Q et al., Viral suppression and adherence among HIV-infected children and adolescents on antiretroviral therapy: results of a multicenter study. J Pediatr (Rio J). 2014; 90(6):563-71.

8. Agwu A L and Fairlie L. Antiretroviral treatment, management challenges and outcomes in perinatally HIV-infected adolescents. J Int AIDS Soc. 2013; 16:18579.
9. UNICEF- Children, Adolescents and AIDS Statistical updates 2015. Accessed on 27.2.16. Available in http://data.unicef.org/corecode/uploads/ document6/uploaded_pdfs/ corecode/ 2015-Children-Adolescents-and-AIDS-Statistical-Update-ExecutiveSummary _244. p
10. UNICEF. Adolescents under the Radar in the Asia-Pacific Aids Response. Dec 2015 Accessed on 7.2.16. Available in http://www.unicef.org/eapro/Adolescents_Under_the_Radar_final.pdf
11. National AIDS Control Organization. Annual Report 2013-14.Available in http://www.naco.gov.in/upload/2014%20mslns/NACO_English%202013-14.pdf
12. Idele P, Gillespie A , Porth T et al., Epidemiology of HIV/AIDS Among adolescents : Current status ,Inequities and data gaps . J Acquir immune defic syndrome.2014; 66: (2):144-52.
13. Naswa S, Marfatia Y S, Adolescent HIV/AIDS: Issues and challenges. Indian Journal of sexually transmitted diseases.2010; 31: 1-10. doi: 10.4103/0253-7184.68993.
14. Adefolalu O A, Nkosi Z Z et al., The complex Nature of adherence in the management of HIV/AIDS as a chronic Medical Condition. Diseases. 2013; 11: 8-35.doi: 10.3390/diseases1010018.
15. Nachega J B, Hislop M, Nguyen H et al., Antiretroviral therapy adherence, virologic and immunologic outcomes in adolescents compared with adults in southern Africa. J Acquir Immune Defic Syndr. 2009; 51:65-71.
16. Wanchu A, Kaur R, Bamberry P et al., Adherence to generic reverse transcriptase inhibitor - based antiretroviral medication at a tertiary centre in North India. AIDS Behav. 2007; 11: 99-102.
17. Usitalo A , Leister E, Tassiopoulos K et al., Relationship between viral load and self report measures of medication adherence among youth with Perinatal HIV infection. AIDS Care: 2014; 26(1)107-115. doi:10.1080/09540121.2013.802280.
18. San Lio M M , Riccardo Carbini R , Germano P et al., Evaluating Adherence to Highly Active Antiretroviral Therapy with Use of Pill Counts and Viral Load Measurement in the Drug Resources Enhancement against AIDS and Malnutrition Program in Mozambiqu. Clinical Infectious Diseases 2008; 46: 10:1609-1616. DOI: 10.1086/587659
19. Bell, D J, Kapitao Y, Sikwese R et al., Adherence to antiretroviral therapy in patients receiving free treatment from a government hospital in Blantyre, Malawi. J. Acq. Immun. Def. Synd. 2007; 45:560-563.
20. Chalker J C, Andualem T, Gitau L N et al., Measuring adherence to antiretroviral treatment in resource poor settings: the clinical validity of key indicators. BMC Health Serv. Res. 2010; 10 :43.DOI: 10.1186/1472-6963-10-43
21. Kouanfack C, Laurent C, Peytavin et al., Adherence to antiretroviral therapy assessed by drug level monitoring and self-reports in Cameroon. J. Acq. Immun. Def. Synd. 2008; 48: 216-219.
22. Olds P K, Kiwanuka J P ,Nansera D et al., Assessment of HIV antiretroviral therapy adherence by measuring drug concentrations in hair among children in rural Uganda. AIDS Care. 2015 March; 27(3): 327-332. doi:10.1080/ 09540121.2014.983452
23. Sohn A H, Hazra R. The changing epidemiology of the global paediatric HIV epidemic: keeping track of perinatally HIV-infected adolescents. J Inter AIDS Soc. 2013:16.18555.
24. Garcia R , Schootey R T, Badaro R et al., An Adherence trilogy is essential for long term HARRT success. The brazillian journal of infectious Disease.2003; 7(5):307-314.
25. Brickly D B, Burler LM, kennedy GE et al., Interventions to improve adherence to antiretroviral theraphy in children with HIV infection .Cochrane database of systematic reviews. 2011; 12. doi:10.1002/14651858.CD009513.
26. Saberi. P, Johnson, M.O. Technology-based self-care methods of improving antiretroviral adherence: A systematic

review. Plos One. 2011; *6*, e27533. DOI: 10.1371/journal.pone.0027533
27. Aids info, limitations to treatment safety and efficacy Last updated May 1, 2014; last reviewed May 1 2014. Available in https://aidsinfo.nih.gov/guidelines/html/1/adult-and-adolescent-arv-guidelines/30/adherence-to-art 45.
28. Simoni J M, Amico K R, Smith L et al., Ant iretroviral Adherence Interventions: Translating research findings to the real World. Curr HIV/AIDS Rep.2010; 7(1): 44-51. doi: 10.1007/s11904-0090037-5.

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Queen Margaret University

This is to certify that ~~Mr~~./Ms./~~Dr~~ S. Rajathi - Second Prize
has presented a paper / poster on Assess the anxiety / depression among cardiac Patients
in the 4th **INTERNATIONAL CONFERENCE ON "NURSE FACILITATED RESEARCH - BUILDING CAPACITY FOR EXCELLENCE"** organized by INTERNATIONAL CENTRE FOR COLLABORATIVE RESEARCH (ICCR), Omayal Achi College of Nursing on 28th, 29th & 30th January 2016. We thank him/her for his/her valuable contribution in making the conference a success. The Credit hours awarded by Tamilnadu Nurses and Midwives Council is 14+6=20

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Omayal Achi College of Nursing
Chennai, India

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Apollo College of Nursing

National Nursing Conference

This is to certify that

~~Dr.~~/~~Mr.~~/Ms. RAJATHI

has been a Delegate / ~~Moderator~~ at the

National Nursing Conference on

"Quality Assurance in Nursing – Synergizing towards Excellence"

Organized at Apollo College of Nursing, Chennai,

1st & 2nd July 2016 and presented a paper on

"The Caregiver's Quality Of life of Cancer Survivors"

TNMMC awarded credit hours 14

Mr. V. Satyanarayana Reddy
Chief Operating Trustee

Dr. Latha Venkatesan
Principal & Organizing Chairperson

Annexure – viii

Photo documentation

1.Collecting demographic details

3. Getting Assent form

2. Getting Informed consent

4. Adherence Counseling Session

5. Nutritional Assessment and Counseling Session

6.Counseling Regarding Quality of life and Demonstration of the Asana (Padmaasana)

Photo documentation (continuation)

Pranayama in Vajrasana pose

Trikonasana

Ardha mayenthrasana

Bhujangasana

Ushtrasana

Shanthiasana