

**A STUDY TO EVALUATE THE EFFECTIVENESS OF HEMONUTRI
BALL ON HAEMOGLOBIN LEVEL AMONG ADOLESCENT
GIRLS AT SELECTED GOVERNMENT HIGHER SECONDARY
SCHOOL IN VILLUPURAM DISTRICT.**

BY

30111512



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Date

CERTIFICATE

This is to certify that this work titled," **A STUDY TO EVALUATE THE EFFECTIVENESS OF HEMONUTRI BALL ON HEMOGLOBIN LEVEL AMONG ADOLESCENT GIRLS AT SELECTED GOVERNMENT HIGHER SECONDARY SCHOOL IN VILLUPURAM DISTRICT**" is the bonafide work done by **30111512** of Dhanalakshmi Srinivasan College Of Nursing, Perambalur towards partial fulfilment of the University rules and regulations for the award of the Degree of M.Sc. (Nursing),Branch-II Child Health Nursing during the academic period from 2011-2014.

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*“A Thankful Heart Is Not Only the Greatest Virtue,
But The Parent of All Other Virtues”*

Gratitude is not only the greatest of virtues, but the present of all others. If the only prayer we said was thank you that would be enough to win the whole world.

*Anything under god's control is never out of control. There is but one good; that is god. Everything else is good when it looks to him and bad when it turns from him. So, I praise and thank my **Lord Almighty** for strengthening me throughout my journey.*

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ABSTRACT

Background: Adolescence is a distinct age group (10-19yrs) with complex need because of physical and psychological development during puberty. Iron deficiency is the most nutritional disorders in world, nearly 4.5 billion people of the world population are iron deficit. Anemia continues to be a major public health problem among children in many regions of the world. Hemonutri ball helps to increase the Haemoglobin level among the adolescent girls. **Objectives:** To evaluate the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls in Experimental group and Control group. **Design:** True experimental pre-test and post-test control group design **Setting:** Government Higher Secondary School at Thaiyur and Chenji in Villupuram District. **Participants:** 60 children fulfilling the inclusion criteria. **Selection criteria:** Adolescent girls with experimental group 30, control group 30, age group of 13-17 yrs. were included. **Methods:** 30 adolescent girls in experimental group, 30 adolescent girls in Control group selected by Probability Simple Random Sampling technique. Level of anemia was measured by Sahli's hemoglobinometer. **Results:** The result has shown that out of 60 samples, the level of Haemoglobin in pre-test among adolescent girls in Experimental group majority of the adolescent girls had 0(0%) level of anemia in, normal level, mild level and severe level. and 100% of them had Moderate level of anemia. Whereas in control group, majority of the adolescent girls had 0(0%) level of anemia in, normal level, mild level and severe level. and 100% of them had Moderate level of anemia. In Post-test level of Haemoglobin of adolescent girls in Experimental group 18(60%) of them are in normal, 12(40%) of them are in mild anemia, 0(0%) of them are not in moderate anemia, 0(0%) of them are not in severe anemia. In control group 0(0%) of them are not in normal, 10 (33%) of them are in mild anemia, 20(66.66%) of them are in moderate

anemia, 0 (0%) of them are not in severe anemia. The paired 't' test value of level of Haemoglobin was 59.08 % ($P < 0.05$) in experimental group and 8.8106 wherein control group. The unpaired 'test' value 9.45, table value 2.00 at ($P < 0.05$) level of significance showed the significant effectiveness on Hemonutri ball on Haemoglobin level .It seems that Hemonutri ball improves the Haemoglobin level in experimental group. **Conclusion:** Hemonutri ball administration is effective to improve the Haemoglobin level among the adolescent girls. **Clinical applications:** Hemonutri ball can be given to the adolescent girls those who are having low Haemoglobin level to prevent anemia. Hemonutri ball are considered as the most essential home remedy for anemia, because of its high iron content and Vit-C that regenerates and reactive the red blood cells, supplying fresh oxygen to the body and increasing the blood count regularly.

CHAPTER I

INTRODUCTION

“Adolescence is the conjugator of childhood and adulthood”.

Health is the level of functional or metabolic efficiency of a living organism, **(Sundar Lal, 2007)**.

Adolescence more broadly refers to the phase of human development which encompasses the transition from childhood to adulthood. This period is very crucial, since these are the formative years in the life of an individual, when major physical, psychological and behavioural changes may takes place, **(UNICEF, 2011)**.

The word adolescent is derived from the Latin word “adolescere” meaning ‘to grow’, ‘to mature’. Adolescence begins when the secondary sex characteristics appear and ends when somatic growth is completed and the individual is psychologically mature, capable of becoming a contributing member of society. They constitute over one fifth of India’s population, **(ARUSHA, 2007)**.

The WHO has defined adolescence as the age between 10 to 19 years of age for both the sexes. Girls begin to menstruate at this age, **(Mathur, 2007)**.

Healthy eating during adolescence is important as body changes during this time affect an individual's nutritional and dietary needs. Adolescents are becoming more independent and making many food decisions on their own. Many adolescents experience a growth spurt and an increase in appetite and need healthy foods to meet their growth needs, **(Adolescence for health,2014)**.

Adolescence is a time of increased nutrient needs. During the rapid growth of puberty, the body has increased need for calories and key nutrients including protein, calcium, iron, folate and zinc. Iron and calcium are particularly important nutrients for your body during adolescence, **(Assumabeevi, 2009)**.

Iron helps your blood to carry oxygen to all your muscles. It helps your brain function and helps your immune system to fight against disease. Menstruation increases a girl's need for iron. Choosing iron-rich food sources can help keep your body working optimal, **(Paul .M, 2006)**.

Iron is a mineral that is needed to formulate red blood cells so that they carry oxygen and blood throughout our bodies. Iron aids in the transport and storage of oxygen, energy production, cell diffusion, the formation of haemoglobin, and in proper functioning of the liver, **(Paul.M, 2006)**.

Iron deficiency is lack of sufficient iron in the blood. Iron deficiency is the most common etiological factor in anemia. The decreased haemoglobin level is called as iron deficiency anemia or hypo chromic or microcytic anemia and is typical in pregnant women, growing children and women with excessive bleeding during menstruation,**(K.Park, 2007)**.

According to **World health organization (WHO), 2013** the haemoglobin level should be 12 g/dl for adolescent girls. WHO graded the haemoglobin level ranges from 11-11.9 g/dl is considered as mild anemia, haemoglobin between 8 g/dl to 10.9 g/dl is considered as moderate anemia and haemoglobin less than 8 g/dl is considered as severe iron deficiency anemia.

The decreased dietary iron intake, poor absorption, worm infestation, increased body demand, menstruation are the major causes of iron deficiency anemia among adolescent girls, **(Wong's, 2009)**.

The iron deficiency anemia signs and symptoms are pallor of the eyes, irritability, fatigue, husky voice, loss of appetite, desire to have solid substance (pica), ice (pagophagia) or clay (geophagia), nails are dry, brittle, concave, angular stomatitis, irritation of the tongue, sore mouth, difficulty in swallowing, breathing difficulty due to decreased oxygen carrying capacity of the blood and it affects immune system also. Iron deficiency anemia is a major problem for adolescent girls due to expansion in blood volume and muscle mass, **(Dr U.N.Panda, 2007)**.

The best sources of iron include iron fortified cereals, dried beans and legumes, clams, oysters, leafy greens, nuts and whole grains, **(Jaman Osmanio,2009)**.

Citrus fruits are high in vitamin C, which is a nutrient known to significantly increase iron absorption. Iron-rich food with a food high in vitamin C, it can increase body's absorption of the iron by up to 20 times. Citrus fruits such as grapefruit, lemon and oranges, Guava, Papaya are notably high in vitamin C. Among the vegetables high in vitamin C are broccoli, cauliflower, Brussels sprouts, cabbage, potatoes and tomatoes, **(National institute of nutrition,2011)**.

Papaya is called as "Papita" in India. It is rich in Vit-A, Vit-C and Vit-B Complex, folates, minerals and fibre, calcium, and it is rich in antioxidants, decrease in sodium, and calories high in potassium. It is one of the fruits with higher Vit-C more than in orange (or) lemon. 100 gram of papaya contains calories 39 Kcal, Fat 0.1 gm, Sodium 3 mg, Potassium 257 mg, Carbohydrate 9.81 gm, Fibre 1.8 gm, Sugar 5.9 gm, Protein 0.61 gm, Vit-C 61.8 mg, Calcium 24 mg, Iron 0.10 mg, **(Swaminathan.S,2008)**.

Nowadays the young adolescent faces many problems because of their life style modifications such as eating Junk foods, fast foods, snacking, skipping of the meals which is common in urban adolescent girls, **(Indian academy of paediatrics, 2007)**.

Some are malnourished due to lack of knowledge about dietary iron, poor socio economic status, low income family which is common in rural areas and also in menstrual period the adolescent girls used to lose 45 ml of blood (i.e.) 22 mg of iron, **(Suraj Gupta,2009)**.

Mohite.,RV,(2013) conducted a cross sectional study to determine the correlation between common menstrual problems with nutritional status of the girls. A sample of 237 adolescent girls were taken for the study in KIMS, Karad, Maharashtra. Data was compiled and presented into frequency percentage distribution. The result shown that 237 adolescent girls, 230 (97.04%) had attained menarche of which, 147 girls (63.9%) had regular and 83 (36.08%) had irregular menstrual cycle with mean age at menarche. The study concluded that Menstrual health is fundamental to women's sexual and reproductive health. Poor nutrient status were associated with common menstrual problems among adolescent girls from slum area.

Iron deficiency anemia will be prevented by adequate dietary intake or iron such as green leafy vegetables such as amaranth, spinach, coriander leaves, drumstick leaves, radish leaves, vegetables such as beet root, drumstick, cereals like ragi, barley, Cholam (Sorghum), rice (raw milled), legumes like Bengal gram dhal, Black gram dhal, soya bean, Nuts and oil seeds like dates, cherry, fruits such as chickoo, pomegranate and Jaggery, **(Swaminathan.S,2008)**.

Education about low cost iron rich foods such as drumstick leaves, dates, Jaggery, ragi, green leaves, chickoo to the rural areas, and avoiding the meal skipping to eat junk foods and fast foods will prevent anemia. Regular haemoglobin screening tests will identify the iron deficiency anemia in early stage, **(Dorothy R.Marlow,2007)**.

Weekly Iron supplementation for adolescent girls will prevent the severe iron deficiency anemia and its complications such as myocardial infarction, and angina. Iron supplementation should be given before meals because iron will absorb easily in acidic nature or it may be given along with citrus juice like lime or orange juice,**(NRHM,2013)**.

Prevention of anemia is effective when the strategy is focused right from adolescents for their future reproductive life. To avoid the maternal deaths, the health status of the adolescent girls should be cared at the earliest. Socially the feelings of adolescent group are its maximum and want to shine, and prove themselves. Hence it is in hands of the health professionals to care to adolescent and develop India into healthy and strong nation.

NEED FOR THE STUDY

“Anemia is a silent killer.”

(Kawaljit Kaur,2014)

Adolescence is an age of opportunity for children, and is a pivotal time for us to build on their development in the first decade of life, to help them navigate risk and vulnerabilities and to set them on the path to fulfilling their potential, **(The state of the world’s children 2011)**.

The world’s adolescent population is facing a series of serious nutritional challenges which are not only affecting their growth and development but also their livelihood as adults. Yet, adolescents remain a largely neglected, difficult to measure and hard –to- reach population ,in which the needs of adolescent girls in particular, are often ignored,**(Chatterjee.R,2008)**.

Adolescent boys out number girls in all regions with data available, including the industrialised countries. Population is closest in Africa, with 995 girls aged 10-19 yrs for every 1000 boys in Eastern and Southern Africa and 982 girls per 1,000 boys in West and Central Africa while the gender gap is greatest in both Asian regions,**(The state of the world’s children 2011)**.

In 2011, 26% of the population were less than 18 years compared to 26.6% in 2010 in Mauritius. The corresponding figures for the Island of Mauritius and Island of Rodriguez for 2011 were 25.7% and 36.4% respectively, **(Child Development and Family Welfare 2013)**.

According to UNICEF in 2014 ,there are 27.7%million adolescents aged 10-19 yrs. In Bangladesh,13.7% million girls and 14 million boys making up about one fifth of the total population.

According to **(UNITED NATIONS OF STATISTICS 2010)**, the Asian – Pacific region contain 750 million young persons of 10-19 yrs. In 2010, India alone had 234 million young people the highest number of any country in world, followed

by China with 225 million, Japan only had 12 million population .Bangladesh and Philippines both had 20% of adolescent population.

There are 7.4 million of (10-19) yrs old currently living in U.K, accounting for 12% of the population. In the Great Britain of 2011, the population of adolescents in the age group of (10-19) yrs is 12%,**(Key Data on Adolescence 2013)**.

Anemia is a major killer in India. One in every two Indian women suffer from form of anemia. 4 out of every five children in the age group of 6-35 months suffer from anemia.20% of the maternal deaths are due to anemia and anemia indirectly contributes to another 40% of maternal deaths. Maternal mortality staggeringly high at 454 per every 100,000 live birth, **(UNICEF Statistics, 2010)**.

Adolescent comprise a major part of reproductive age group, they will play a significant role in determining the future size and growth pattern of India's population. According to the census in the year 2011,of age group of 10-14 yrs. In female there were 50 million of adolescent population have been established, and the age group of (15-19)yrs of female there were 58 million population have been established,**(Technical Group on Population Projections 2012)**.

In females, adolescence marks the beginning of the menstrual cycle or reproduction. Adolescents gain 30% of their adult weight and more than 20% of their adult height between 10-19 years, which we call as growth spurt, **(Lal.S.Pankaj,2007)**.

There are about 1.2 billion adolescent in the world ,which is equal to one fifth of the world population and their numbers are increasing out of there 5 million adolescent are living in developing countries.Indias population has reached the 1 billion mark out of which 21% are adolescents,**(Mathur.J.S.S, 2007)**.

Anemia is a global and public health problem affecting both developing and developed countries with major consequences on human health as well as social and economic development. Anemia is the result of a wide variety of causes that can be isolated. But more often they co-exist globally .The Most significant contributor to the onset of Anemia is iron deficiency, **(Anumol gupta,2011)**.

According to WHO 2008,the country for percentage of population with anemia in U.S.A is 5.7%,United Kingdom 15.2%,Germany 12.3%,Russia 20.8%,Ukraine 27.3%,Indonesia 44.3%,Malaysia 38.3%,Nigeria 66.7%,Gambia 75.1%.

Prevalence rate of Anemia in U.S.A is approximately 1 in every 77 or 1.29% or 3.5 million people, (**Statistics by country for anemia 2014**).

Anemia is the most common blood disorder in the world. Globally 41.8% pregnant women and 30.2% of non pregnant are anemic.ie.524 million worldwide. Out of these 524 million anemic women worldwide,200 million women belong to South East Asia and 104.6% millions are in Pacific region,(**Haemoglobin anemia,2010**).

ICMR(2010), revealed that nearly three fourth (75%) of women in India are anemic, with the prevalence of moderate to severe anemia being highest (50%) among adolescent girls.

56% of the adolescent girls (15-19yrs) in India are anemic, as against 30% of adolescent boys National Family Health Survey III,(**Statistics on children in India 2012**).

A study was conducted in Chhattisgarh, and the statistics of anemia was 30% among medical students .Out of total 96 students 29 students were found anemic out of which 11(19%) male students were anemic. And 18(47.4%), female students were found anemic, (**Sachin Pandey,2013**).

According to “Statistics on children in India 2012”, 79% children of the 400 million in India (6-35 months), are anemic, (**National Family Health Survey III-NFHS**).

The anemia estimated are provided by region for all population groups ,based on data collected from 1993-2005.The data coverage is 70%or more of pre-school children, (76.1%),pregnant (69%) and non-pregnant (73.5%).Overall the coverage for the general population is 48.8%, (**World Wide prevalence on anemia 1993-2005**).

A study was conducted in Andhra Pradesh ,India among the primary school girls and the statistics shown that prevalence of anemia was 52.7%, (**Sunil Paul Singh,2014**).

A study was conducted in Ambala District of Haryana, India among the reproductive age group of Women and the statistics shown that prevalence rate of anemia was 96.8%.The majority of anemic women were in the category of mild (75.3%),to moderate (16.9%) and severe anemia was 7.8%, (**Prabhakar Mishra,2012**).

A study was conducted in Kattangulathur, Kanchipuram District. In India among the toddlers and the statistics shown that anemia rate was reported as 75.2%, (**Sudhagandhi,2012**).

A study was conducted in Tamil Nadu, South India, among the adolescent girls and the statistics of anemia was 58%with increasing severity with age, (**Dr.Saravana Kumar, 2014**).

The prevalence of anemia is disproportionately high in the developing countries, due to poverty, inadequate diet, worm infestations, pregnancy/lactation and poor access to health services, (**Kaur.S,2006**).

Shabnam Omnidvar, (2011) conducted a study on menstrual pattern among adolescent girls from South India. A sample of 144 adolescent girls were taken for the study. Data regarding Demographic features, menarche age, and menstrual pattern were obtained. The result shown that prevalence of menstrual irregularity was 11.9 and 78.2%.64% of the girls were aware of the menstruation prior to menarche. The study concluded that menstrual irregularity among youth female is high.

Thakur.A.et.al., (2011) documented that clinically the signs and symptoms associated with anemia were significantly ($p<0.05$) higher among adolescent with anemia as compared to those without anemia. Similar findings were present in this study such as breathlessness,72% were anemic. Correlation was also found with palpitation (80%), conjunctival pallor (88.9%), tongue pallor (90.3%), and nail pallor

(82.5%) with anemia. As the severity of anemia increased the prevalence of symptoms also increased.

Anemia is a common health problem throughout the world, however there has been minimal research on concepts of anemia. The purpose of this study was to examine effectiveness of Hemonutri ball on haemoglobin level among adolescent girls. A True-experimental pre-test, post-test control group design was used. The Hemonutri ball along with Vit-c was given for a period of 30 days and the consumption of Hemonutri ball along with Vit-C was found to be effective in improvement of haemoglobin level.

Hemonutri ball contain a fair amount of iron (10.25gm) and high in other nutrients as well along with Vit-C (46mg).Hemonutri ball strengthens the body immune power, stamina and has proved to be an excellent remedy for anemia, especially for adolescents. By giving the Hemonutri ball it will helps to increase the haemoglobin level and along with Vit-C should be given, thereby Vit-C enhances the iron absorption, (**Healthy info,2012**).

Being an investigator I felt to correct the current dietary habit in a vulnerable group of adolescent girls which may result in dietary changes that can ultimately improve the iron status. Hence this has stimulated me to conduct the study to assess the effectiveness of Hemonutri ball in improving Haemoglobin level among adolescent girls in Villupuram district.

STATEMENT OF THE PROBLEM

A study to evaluate the effectiveness of Hemonutri ball on haemoglobin level among adolescent girls at Selected Government Higher Secondary Schools in Villupuram district.

OBJECTIVES

- 1) To assess the pre-test and post- test level of haemoglobin among the adolescent girls in experimental group and control group.
- 2) To evaluate the effectiveness of Hemonutri ball on haemoglobin level among adolescent girls in experimental group and control group.

- 3) To find out the association between the post-test level of haemoglobin among adolescent girls with their selected demographic variables in experimental and control group.

OPERATIONAL DEFINITIONS

1] EFFECTIVENESS:

It refers to the extent to which the Hemonutri ball improves the haemoglobin level among the adolescent girls.

2] HEMONUTRI BALL:

It refers to nutritional ball. It includes Soya beans 20gm, Cholam 20gm, Green gram 10gm, Jaggery 50gm.

Each 100 gms of Hemonutri ball given to the adolescents twice a day for about 30 days. 100gm of Hemonutri ball provide about 13.28 gm of Protein, 381.3 Kcal of Energy, and 10.25 mg of iron. Each 100 gms Hemonutri ball cost is Rs 7/-

Preparation of Hemonutri ball:

Heat the Kadai in stove. Then dry roast the 3 ingredients such as Soya beans 1(Kg) 200gm, Cholam 1(Kg) 200gm, Green Gram 600 gm, and grind it well to make 60 Hemonutri ball. Then crush the Jaggery powder of 3Kg with the grinded ingredients and blend it well by adding needed amount of hot water. Finally make 100grams of Hemonutri ball for 60 persons.

3] HAEMOGLOBIN:

It refers to adolescents who have moderate level of haemoglobin level (i.e) 8-10.9mg/dl. Haemoglobin is measured by Sahli's haemoglobinometer.

4] ADOLESCENT GIRLS:

Adolescent girls those who are in the age group between 13-17 years.

5] SELECTED GOVT.HR.SEC.SCHOOL:

Adolescent girls those who are studying in Thaiyur and Chenji Government Higher Secondary School in Villupuram District.

HYPOTHESES

H₁: There is a significant difference in the Pre-test and Post-test level of haemoglobin among adolescent girls in experimental and control group.

H₂: There is a significant effectiveness of Hemonutri ball on haemoglobin level among adolescent girls in experimental group and control group.

H₃: There is a significant association between the post-test level of haemoglobin with their selected demographic variables of the adolescent girls among experimental and control group.

ASSUMPTION

- 1) Hemonutri ball will improve the haemoglobin levels among the adolescent girls
- 2) Adolescent girls will have an interest to know their haemoglobin level after prescribed time.

LIMITATIONS

The study is limited to,

- 1) 4 week duration.
- 2) Adolescent girls who are having moderate haemoglobin level i.e. 8-10.9mg/dl.
- 3) The sample is 60
- 4) Adolescent girls who are among the age group of 13-17 yrs.
- 5) The study will be conducted among the adolescent girls in a selected school at Thaiyur and Chenji in Villupuram District.

PROJECTED OUTCOME

- 1) The result of the study will provide information of low cost preparation of Hemonutri ball in school setting for increasing haemoglobin level of adolescent girl
- 2) The findings of the study would help the health professional to gain knowledge on prevention of anemia among adolescent girls.

CONCEPTUAL FRAMEWORK BASED ON NOLA I.J .PENDER’S HEALTH PROMOTION MODEL.

A conceptual framework refers to the framework of preposition assumed for conducting research. Conceptual frame work provides clear description of variables suggesting ways or method to conduct the study and guiding the interpretation, evaluation and integration of study finding,(**Polit &Hungler,2003**).

The conceptual model selected for the present study is based on modification made on “Nola I.J .Pender’s Health Promotion Model (2002-Revised)”

A study to evaluate the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls at Selected Government Higher Secondary School in Villupuram District.

The Health Promotion Model (HPM) proposed by Nola I.J.Pender (1982: revised ,2002) was designed to be a Complementary counterpart to the models of health protection.” It defines health as a positive, dynamic state not merely the absence of disease. Health promotion model describes the multi-dimensional nature of persons as they interact within their environment to pursue health.

The model focuses on the following areas.

- Individual characteristics &experiences
- Behavior specific knowledge and affect
- Behavior outcome

INDIVIDUAL CHARACTERISTICS & EXPERIENCES

1) Prior related behavior

According to the theorist, prior related behavior describes the frequency of similar behavior in the past direct and indirect effects on the likelihood engaging in health promoting behaviors.

In this study the prior related behavior includes the assessment of demographic variables, assessment of Haemoglobin level by Sahli's haemoglobinometer.

2) Personal factors

According to the theorist personal factors are categorized as biological, psychological and socio cultural factors that are predictive of a given behavior and shaped by the nature of the target behavior being considered.

In this study the personal factors include age, religion, educational status of father, educational status of mother, family income per month, menstrual cycle and duration of menstruation.

BEHAVIOR COGNITIONS AND AFFECT

a) Perceived benefits of action

According to the theorist, perceived benefits of action are anticipated positive outcomes that will occur from health behavior.

In this study the perceived benefits of action helps the adolescent girls to improve the Haemoglobin level.

b) Perceived barriers of action

According to the theorist, perceived barriers of actions are anticipated, imagined or real blocks and personal costs of understanding a given behavior.

c) Perceived self-efficacy

According to the theorist, perceived self-efficacy is judgment of personal capability to organize and execute a health promoting behavior. Perceived self-efficacy influences perceived barriers to the action so that higher efficacy results in lowered perceptions of barriers to the performance of barrier

In this study the efficacy is that the adolescent girls realizes the importance of in taking of Hemonutri ball to improve the Haemoglobin level.

d) Activity related affect

According to the theorist activity related effect describes subjective positive or negative feelings which occur before during and following behavior based on the stimuli activity related affect influence perceived self-efficacy ,which means the more positive the subjective feeling ,the greater feeling of efficacy .In turn increased feeling of efficacy can generate further positive affect.

In this study activity related affect improve the haemoglobin level among the adolescent girls.

e) Interpersonal influences

According to this theorist the interpersonal influences includes the cognition concerning, behaviors, beliefs, or attitudes of the others, norms, social support, and modeling .Primary sources of interpersonal influences are families, peers and health care providers.

In this study interpersonal influences is that intervention for improving haemoglobin level by in taking of Hemonutri ball among adolescent girls. In experimental group by in taking of Hemonutri ball along with Vit-C for 30 days twice a day (morning and evening).

f) Situational influences

According to the theorist situational influences are personal perceptions and cognition of any given situation or impede behavior that include perceptions of options available, demand characteristics and aesthetic features of the environment in

which given health promoting is proposed to take place. Situational influences may have direct or indirect influences on health behavior.

In this study situational influences is adolescent girls perceives that in taking of Hemonutri ball will improve the Haemoglobin level.

BEHAVIORAL OUTCOME

1) Immediate competing demands and preferences

According to this theory, competing demands are those alternative behaviors over which individuals have low control because there are environmental contingencies such as work or family care responsibilities. Competing preferences are alternative behavior over which individual exert relatively high control.

In this study in taking of Hemonutri ball may influence the adolescent girls to gain knowledge on taking Hemonutri ball it will help to increase haemoglobin level among the adolescent girls.

2) Commitment to plan of action

According to the theorist commitment of plan of action is the concept of intention and identification of a planned strategy leads to implementation of health.

According to this study in taking of Hemonutri ball is more effective for adolescent girls and they may develop positive attitude and make decision to continue in taking of Hemonutri ball will help to improve the Haemoglobin level.

3) Health promoting Behavior

According to the theorist health promoting behavior is an end point or action outcome directed towards the attainment of health outcome such as optimal well-being, personal fulfillment and productive living.

In this study health promoting behavior of adolescent girls may take the Hemonutri ball at their home itself to improve the Haemoglobin level.

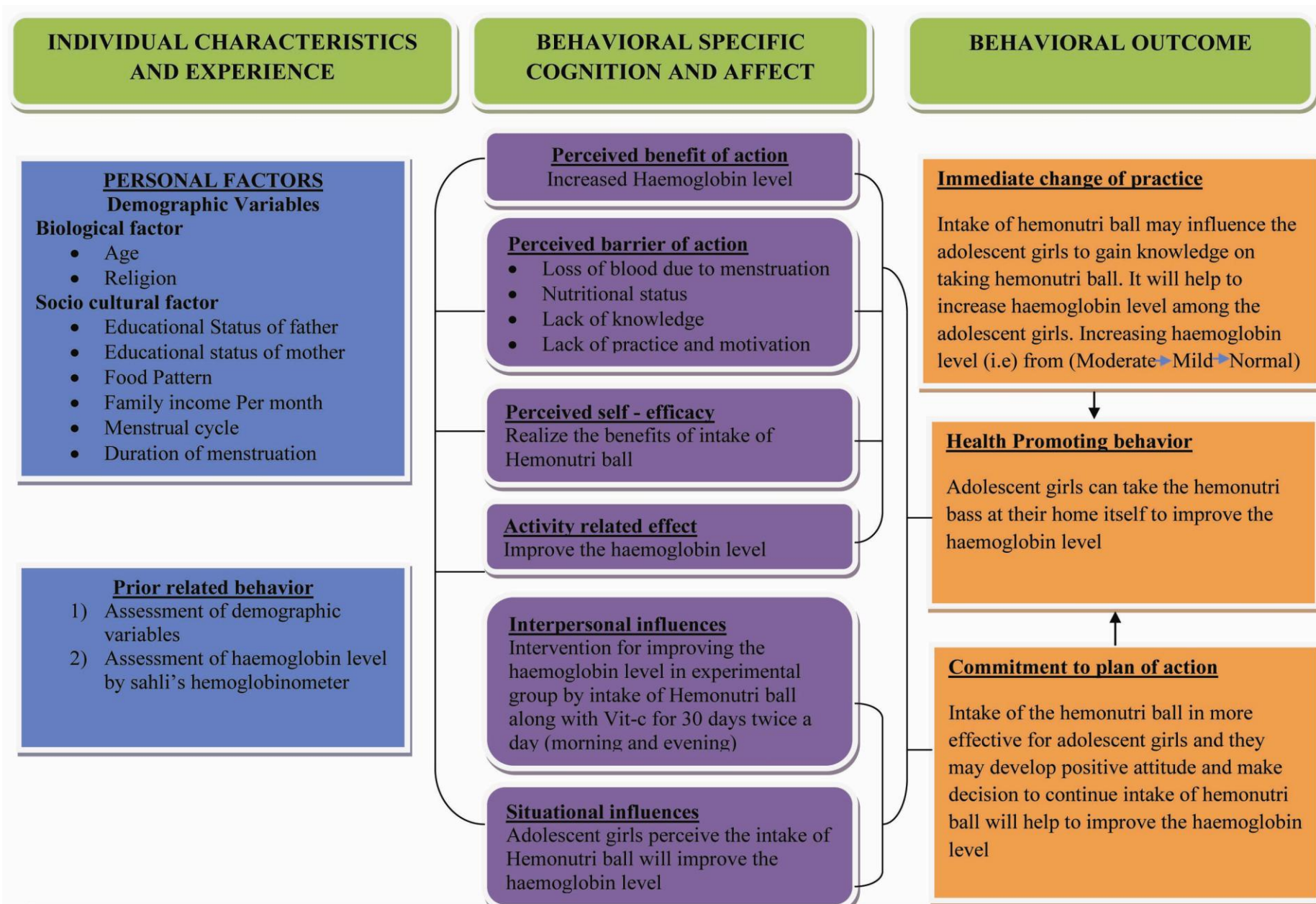


FIG: 1.1 CONCEPTUAL FRAME WORK BASED ON MODIFIED PENDER'S HEALTH PROMOTION MODEL (REVISED 2002)

CHAPTER II

REVIEW OF LITERATURE

Review of literature should be comprehensive and must help in the evaluation. It helps one to plan and conduct a study in a systematic and scientific manner.

(Polit and Hungler,2008)

Related literature which was reviewed is discussed under the following topic:

1. Studies related to prevalence of anemia among adolescent girls
2. Studies related to causes of anemia among adolescent girls
3. Studies related to iron and Vit-C supplementation
4. Studies related to nutritional supplementation in increasing Haemoglobin among adolescent girls
5. Studies related to effectiveness of Hemonutri ball on Haemoglobin among adolescent girls

1] STUDIES RELATED TO PREVALENCE OF ANEMIA AMONG ADOLESCENT GIRLS:

Sarika, (2013) conducted a study to determine the prevalence of anemia among school going adolescent females in the age group of (12-15yrs) in a village school and to know the prevalence of iron deficiency in both anemic and non –anemic school going adolescent females in a village school at Maharashtra. A sample of 100 adolescent girls were taken for the study. The result shown that 63 out of 100 adolescent girl student had Haemoglobin level less than 12 gm%. Anemia less than 12 gm% was present in 63%(63 out of 100 girls)63 girls who were anemic and the prevalence of iron deficiency anemia was 50%.The study concluded that iron deficiency is the major cause of anemia and most common nutritional disorder in our country and remains a formidable health challenge.

Ramachandra kamath.et.al., (2013) conducted a community based cross sectional study to estimate the prevalence of anemia among tribal women (aged 15 to 49 years) at Udupi district, Karnataka .A sample size of 170 was calculated and taking

into consideration as a relative error of 15% and the prevalence of anemia in Karnataka as 51% (as per the NFHS-3). Statistical analysis used: Univariate and multivariate analysis was used to analyse the data using SPSS 15. The result shown that the study sample had a mean Haemoglobin value of 11.3 g/dl with 95% CI of (11 - 11.6), with a standard deviation of 2g/dl. The study reveals that in the sample of tribal women in the age group of 15-49 years, the prevalence of anemia was 55.9%. Among the subjects, 6 (3.5%) were severely anemic, 33 (19.4%) were moderately anemic and 56(32.9%) were mildly anemic. The study concluded that appropriate action and intervention in this tribal population to treat and prevent anemia.

Gupta,A,et.al.,(2012) conducted a cross sectional descriptive survey in selected schools of Shimla district. One thousand five ninety-six (10-19 yrs old) school girls were included in the study. The study was conducted from June 2011 to May 2012(I year) .Data analysis was done using SPSS software version 18 for windows. The result shown that prevalence of anemia was found to be 21.4%.It was seen that among the anemic adolescent girls, 77.3% had mild anemia,21.9% had moderate anemia and 0.5% had severe anemia.

Meenal Vinaykulkarani, (2012)conducted a cross sectional community based study on anemia among 272 adolescent girls in an urban area slum under Urban health training centre, Nagpur. The study was conducted from June 2009 to February 2010.By using simple random sampling method out of five areas one area was selected. Data collection was obtained by asking Questionnaire. Haemoglobin level was recorded by Sahli's haemoglobinometer. The result shown that prevalence of anemia was found to be very high (90.1%) among adolescent girls. Majority of the adolescents were having mild or moderate anemia was (88.6%).The study concluded that there was a significant association was found between adolescents girls education, mothers occupation and anemia.

Richa,et.al.,(2012) conducted a community based cross sectional study to determine the prevalence of anemia in rural adolescents girls and their socio demographic correlated in 2 rural schools of the Chirigaon community development block of Varanasi district sample of 142 adolescent girls were selected by using systemic random sampling. Data collection done by interviewing method. The result

shows that father of 61.97% and mother of 35.92% adolescent girls were literate, 21.83% subjects belong to SC category. The result shown that nearly half (52.82%) were vegetarian. 73(51.4%) adolescent girls had haemoglobin level less than 12 gm/dl. There by the socio demographic correlates of anemia in adolescent girls were identified. The study concluded that anemia is a significant problem in rural adolescent girls of Varanasi.

Shilpa.S.Biradar,et.al, (2012) conducted a cross sectional study to assess the prevalence and severity of anemia among adolescent girls in rural area at Belgaum and to find out the association of anemia with respect to age of participants and their socio economic status. A sample of 840 adolescents was taken for the study. Biophysical method of data collection was done. The results shown that the prevalence of anemia 41.1% with that if severe anemia being 0.6%, moderate anemia being 6.3% and that of mild anemia (34.6%).It was observed that the prevalence of anemia was high in late adolescents (15-19yrs)as compared to that in early adolescents(10-14yrs).A majority of girls had mild anemia .The prevalence of anemia was considerably high among the girls who belongs to low socio economic status. The study concluded that high prevalence was found among late adolescent girls. There was a significant association of anemia with socio economic status and the prevalence of anemia was high in girls who belong to low socio economic status.

Ibrahim, et.al., (2012) conducted a study to evaluate the prevalence and risk factors of anemia among adolescents in Turkey. A sample of 1120 children aged (12-16yrs) were taken for the study. The results shown that over all prevalence of anemia was 5.6%.8.3%of girls and 1.6%of boys were anemic .The study concluded that the socio-economic status of family, traditional eating habits and irregular eating habits are of greater importance in development of adolescent anemia in Turkey.

NirmalaT.Sathya,(2011) conducted descriptive study on prevalence of anemia among adolescent girls in a selected rural community of Coimbatore district, Tamil Nadu. The aim of the study was to identify the prevalence of anemia among adolescent girls through screening for signs of anemia and confirming with haemoglobin estimation. The sample consisted of 93 girls studying in ninth standard in a selected higher secondary school situated in a rural area, Coimbatore district.

After obtaining consent from the parents, students were screened for signs of anemia by using a check list and haemoglobin estimation was done through cyanomethoglobin method. The result shown that among 93 adolescent girls, 44 (47%) girls were having anemia.

Ramzi,et.al.,(2011) conducted cross sectional study to investigate the prevalence of iron deficiency anemia and related risk factors in adolescent school girls in Kavar urban area of southern Iran's sample of 363 adolescent girls were selected for the study by using two stage random sampling design. Interviewed biophysical method of data collection .The results shows that there were 21 cases of anemia (5.8%), 31(8.5%)iron deficiency and 6(1.7%)iron deficiency anemia. Most of anemic girls (85.7%)had mild anemia .The study concluded that the prevalence of anemia were substantially less than what reported in many other regions of Iran as well as other developing countries.

Rakesh kakkar, et.al., (2011) conducted a study on prevalence and the factors contributing to anemia among adolescent school girls at Bhopal. A sample of 317 adolescent girls were taken for the study by using random sampling method. Data were collected by interview method. The results shows that there was no significant relation of anemia with duration of menstrual flow but there was a significant ($P < 0.05$) difference in number of anemic cases with age at menarche, there were more chances of anemia. Level of anemia was higher ($p < 0.05$) in early adolescent (10-13 yrs) and (81%)compared to middle adolescent (58.3%) and late adolescent (17-19 yrs) age group of girls (48.7%).The study concluded that prevalence of anemia was dependent on knowledge about prevention of anemia literacy level of food habits, birth order and also frequency of iron rich green leafy vegetarian and non-vegetarian diet.

Sudhagandhi.B,et.al., (2011) conducted a study to estimate the prevalence of anemia and its correlation to variables such as age, gender and body mass index in school children of Kattangulathur, Tamil Nadu, India. A total of 900 children in the age group of 8-16 years were included in this study. Parental consent was obtained in the written format. Blood was collected by finger prick and the haemoglobin was determined by cyanomethoglobin method. A pre-planned questionnaire was used to

collect the health details of the children. The children were grouped according to the age. Prevalence of anemia as per the World Health Organization (WHO) recommended cut-off value of haemoglobin, among these children was 52.88%. The frequency of the prevalence of anemia was significantly higher amongst girls as compared to the boys. The Results of the study population reveal that 52.88% were anemic, girls (67.77%) were 32.2% higher than the boys (35.55%) and anemic children were underweight. The study concluded that all the school children should be screened periodically and appropriate measures should be taken.

2] STUDIES RELATED TO CAUSES OF ANEMIA AMONG ADOLESCENT GIRLS

Dongre.A.R, (2011) conducted cross sectional study to investigate the risk factors for iron deficiency anemia among adolescent Girl in Brazil who were suffering from mild to moderate intestinal helminthes infection .Data collection were done regarding haemoglobin levels, dietary habits, housing conditions and income of the parents. The result shown that 32.3%were anemic among the adolescent. The study concluded that group at greater risk should increase the consumption of iron rich food and improve socio-environmental conditions.

Gawarika.R, (2006) estimated that the overall prevalence of anemia was 96.5% and 65.18% of severe anemia.11.0% and 2.63% in weaker and middle income group respectively. In both the groups percent prevalence of severe anemia higher in girls of age 14and above as compared with that of age <14 years of age. Low dietary iron, poor bioavailability, high fiber and quantity of Vit-c combined with blood loss with each menstrual cycle may be the cause of higher prevalence in this group.

Verma.A,et.al., (2004) conducted cross sectional study in selected urban. Slums in north zone of Ahmadabad city. A sample of 1295 adolescents were taken randomly in the age group of 16-18 yrs with selected haemoglobin level, age, body mass, parents occupation, green leafy vegetables, knowledge about anemia and status of menstruation. Prevalence of anemia was 81.8% and had significant association with variables such as occupation of father, consumption of green leafy vegetables and body mass index.

3] STUDIES RELATED TO IRON AND VIT-C SUPPLEMENTATION

Singh, (2013) conducted a study to assess the impact of daily food based iron supplementation along with Vitamin-C on physical work capacity and Haemoglobin level of adolescent girls in Banasthali university. A sample of 85 adolescents were taken for the study by randomised controlled trial .The results shown that the data analysis was done by student “t” test. The results shown that out of the 3 groups the supplemented one i.e. Anemic experimental group had shown a significant improvement in the steps taken while compared to group anemic control with higher haemoglobin gain. The study concluded that food based iron supplementation had shown satisfactory results in increasing haemoglobin levels and physical work capacity.

Kalita.M,(2010) conducted an experimental study to identify the impact of iron supplementation on nutritional status and scholastic performance of primary school children of Jorhat. A sample of 60 children were taken for the study by selecting purposively. Haemoglobin level was assessed for the pretest after that I group was supplemented with iron and another group 2 was supplemented with iron and Amla for a period of 60 days. The result shown that supplementation of iron and was effective. The study concluded that supplementation has to provide for overall development of physical status and mental status of school children.

Sangha J.K,(2010) conducted a study on Effect of weekly iron and vitamin C supplementation was conducted on the anemic status of ninety adolescent girls in the age group of 16–18 years. . Dietary and anemic status of the subjects was assessed before and after the study and the subjects were divided into three groups of thirty each. Group I was supplemented with Iron tablets, group II with Iron tablets + glass of lemon water and group III with Iron tablets + synthetic vitamin C tablets, along with nutrition education, at a weekly interval, for three months period. The result shown that improvement in nutrition knowledge of the subjects, there was increase in the consumption of iron and vitamin C rich foods resulting in increased intake of energy, protein, iron and vitamin C attributing to the improved haematological profile of the subjects. Consequently, reduction in the percentage of subjects with the major signs and symptoms of anemia was observed. Significant increase in the haemoglobin level was observed in the group supplemented with Iron + Lemon Water (i.e. from $9.95 \pm$

0.11 to 11.02 ± 0.09 g/dl). They concluded that the weekly iron supplementation along with natural source of vitamin C is more beneficial than synthetic vitamin C, to restore normal levels of red blood cells, haemoglobin, and iron that helps in preventing iron deficiency anemia in the young adolescent girls.

4] STUDIES RELATED TO NUTRITIONAL SUPPLEMENTATION IN INCREASING HAEMOGLOBIN AMONG ADOLESCENT GIRLS

Yogita K. Sanap, (2014) conducted study on effect of supplementation of Pahaladoo in increasing the haemoglobin level of tribal anemic adolescent girls of (13-18yrs) in Gadchiroli district, Maharashtra. A sample of 45 adolescent girls were taken for the study. Hb levels were measured. The result shown that Hb level increased by 0.24 & 70.64 gm/100ml in T1 & T2 groups respectively. The result clearly indicate positive effect of supplementation of locally available of iron rich food source like Poha. Utilisation of easily available food ingredients is needed to combat iron deficiency anemia.

Mini Sheath, (2014) conducted a study on intervention trials with iron based rich Ladoo and Iron folic acid tablets on haemoglobin status of adolescent girls at Bikaner city. A sample of 102 adolescent girls of (16-19yrs) of undergraduate class students taken for the study by random sampling. Data were collected by asking questionnaire. The result shown that intervention showed significant increase in mean Haemoglobin level by 2.24g/dl and 2.28g/dl and 0.54g/dl. Followed by Group A, Group B, and Group C. The study concluded that food based approach using pearl millet ladoo may be effectively used for improving the Haemoglobin status of adolescent girls at par with elemental iron supplementation.

Sindhu S. Mangala, (2013) conducted experimental study to assess the effectiveness of Moringa Olifera supplementation on haemoglobin level of adolescent girls at Bangalore. A total of 30 samples were taken for the study by simple random sampling. Moringa Olifera can be given for 30 days. The results were analysed and based on percentage and proportions. By the students 't' test the post intervention data is highly significant $t' = 4.109 (P < 0.001)$. The study concluded that Moringa Olifera along with Jaggery has significantly improved haemoglobin level of anemia.

Neha Kapoor, (2012) conducted a study on to determine the impact of supplementation of health drink under utilised foods on nutritional status of adolescent girls in Ludhiana. A sample of adolescent girls(16-18yrs) of age were selected for the study. Health drink was prepared by using Whey, pearl millet, broccoli leaf powder, banana and Jaggery at three different levels. The result shown that after supplementation to the experimental group the per cent increase in Haemoglobin and serum retinol level was 7.13 and 4.65 respectively.

Rakee,(2011) conducted experimental study to assess the effectiveness of rajagira leaves supplementation on haemoglobin level of adolescent girls in Raichur. A total of 30 samples were selected. Rajagira leaves was provided as a supplement for the adolescent girls .It was given for 60 days. The result shown that there is increase in haemoglobin level from 53.3%to 70%.The study concluded that rajagira leaves improves the haemoglobin level,

Vanisha.S.Nambiar,(2011) conducted experimental study to determine the effect of drumstick leaves and vitamin–c supplementation from lemon juice in increasing haemoglobin level of adolescent girls at Vadodara.A. A sample of (16-21yrs) of adolescent girls were taken for the study. The result shown that post supplementation data revealed 28.6% reduction of anemia in group A, by followed by 5% in group B, and 4.7%in group C. The study concluded that anemia is still prevalent even in young adult of urban Vadodara. A (54%).It also shows a strong association between Vit-c from lemon juice and drumstick leaves in increasing the haemoglobin level.

Yadav.N.et.al., (2011) conducted a study on impact of dehydrated onion stalk on nutritional and haemoglobin status on adolescent girls .A total of 110 adolescent girls were selected from 2 villages at Allahabad. District. U.P. The data collected at pre and post intervention level in experimental and control group .After supplementation of value added products Chakli for a period of 30 days, weight gain in experimental subjects was significant at 5%whereas there were no significant weight gain in control group. The result shown that supplementations of dehydrated onion stalk based product Chakli can improve the haemoglobin level of adolescent girls.

Josh,(2009) conducted experimental study to identify the leaf mixture supplementation on the haemoglobin level of anemic adolescent girls, Jaipur. A list of girls selected among that 20 selected randomly for period of 4 month, haemoglobin estimated by using cyanomethoglobin technique but a semi automated blood analyser. A green leaf mixture was supplemented for 4 months. Statistical analysis was done by using descriptive and inferential statistics. The result shown that increase in haemoglobin level ($p < 0.001$).The study concluded that leaf mixture has to provide for all adolescent girls to improve the haemoglobin level.

Navas –Carreteros, (2008) conducted a study on the effect of consuming sous vide cooked salmon fish on non-heme iron bioavailability among iron deficient women in Spain. The study shown that sous vide cooked salmon fish increased iron absorption and thereby improving haemoglobin level.

Jaya Mohan and Sujatha.T,(2008) conducted a study to asses the effectiveness of nutritional intervention among women with anemia in a selected village, Thiruvallur District. A sample of 60 anemic women were selected in which 30 anemic women as experimental group and 30 anemic women as control group. The dietary intervention period was 30 days. The results shown that there was a reduction in the percentage level of 7-9gms%in women from 30-33% and increase in the range between 9-11gms were 60% to 86.7%.This shows that the haemoglobin level was improved.

Kowsalya,s,et.al., (2007) conducted experimental study to assess the impact of supplementation of lotus stem on haemoglobin level of adolescent girls in Manipur. A total of 30 moderately anemic subjects were selected. Lotus stem was provided as a supplement as it is a locally available vegetable in Manipur for 90 days .The result shows that there is increase in haemoglobin level from 8.46gms%to 10.48gms. .The study concluded that lotus stem also improve the haemoglobin level.

PurnimaMenon and Cronell, (2007) had quoted that the nutritional supplement cuts anemia in poor children by half .The study had been conducted in rural Haiti. A dry powder containing iron and other vitamins and minerals were added to their food for two months thereby to improve the haemoglobin level. The study

concluded that anemia rate among the children were reduced from 5% to 2%. This shows that there is increase in level of haemoglobin level among the children

5] STUDIES RELATED TO EFFECTIVENESS OF HEMONUTRI BALL ON HAEMOGLOBIN AMONG ADOLESCENT GIRLS

Annie Elizabeth, (2010) conducted Experimental study to determine the effect of consuming nutrition ball and one fresh guava on the haemoglobin level among adolescent girls, Porur, Chennai. Samples were 121 adolescent girls. A list of girls with haemoglobin less than 12gms/dl was obtained. 30 subject were for experimental group was randomly assigned (lottery method). They consume the nutritional ball and one fresh guava. Post haemoglobin was assessed for all study subjects both in experimental and control group. The data was analysed by descriptive and inferential statistics. The result shown that Haemoglobin level 11.1-12gm/dl increased from 53.3% to 70% in the experimental group. The study concluded that preparation have to be taught to adolescent girls for them to practice and bring forth to practice and bring forth longstanding effects in combating iron deficiency anemia.

Rani, (2009) conducted randomized controlled study to find out the efficacy of a Local Vitamin-C Rich Fruit (Guava) in Improving Iron Absorption from Mungbean Based Meals and Its Effect on Iron Status of Rural Indian Children (6-10 Years). Objective of the study was to assess the effect of Mungbean based test meal on iron status (as body iron stores, defined and calculated by the ratio of serum ferritin and serum transferrin receptor) of school age children (6-10 years) with and without the consumption of guava, a vitamin C rich fruit, in a school feeding program for seven months. Study population was three hundred school children aged between 6-10 years will be recruited from two government school of Magalia village situated in Hussar district of Haryana state. This intervention study will be carried out in a randomized controlled design. Main study parameters/endpoints: Primary outcome will be the measurement of body iron stores (mg/kg of body weight) based on the ratio of serum transferrin receptor to serum ferritin. Three weeks before the trial available children (6-10 years) in selected schools will be screened for eligibility of the study on the basis of medical health questionnaire. Deworming will be done at least 20 days before the start the feeding trial with a single dose of Albendazole (400 mg) that will be given again after three months. These 300 children will be assigned

to three groups (100 children each group). Group-1 will be served with the normal school feeding program (SFP) meal (see annexure-1) and this group will also serve as control group for the study. Group-2 will be served with Mungbean test meal and group-3 will be served with guava fruit in addition of Mungbean test meal. Meals to all children will be provided for six days in a week up to seven months. All meals will be served at mid morning (11.00 am to 11.30 am). Effect of intervention will be assessed in terms of iron status of children.

Mohanraja.J.et.al,(2008) conducted experimental study to assess the effectiveness of nutritional intervention among women with anemia in selected village Thiruvallur District. The objective of the study was to assess the pretest and post- test level of haemoglobin among women with anemia and to determine the effect of consuming nutritive balls on Haemoglobin level of women with anemia. Sample size was 60. The result showed there was a reduction in the percentage level of 7-9gms/dl in women from 30% to 3.3% and 60% to 86.7. In experimental group, pretest Haemoglobin level is 9.59gm and post -test Haemoglobin level is 10.18gm. The gain score is 0.59gm whereas in control group, 0.07gmscore is observed. Hence the effect of nutritional ball was proved. This study was concluded that consuming nutritive balls along with vitamin C is an effective method of increasing the Haemoglobin of women.

Thilagam,(2007) conducted pre experimental study to assess the effectiveness of Nutritional intervention on Anemia among adolescent girls with anemia in Nachiyampalayam at Dharapuram, Tamil Nadu. A sample of 50 adolescent girls was selected by using non probability purposive sampling technique. The samples that had less than 11gm of Haemoglobin were selected as study participants. On the first two days demographic variables were collected and the level of anemia for 50 samples was assessed by checking the haemoglobin using Sahli's hemometre, and signs and symptoms was assessed by structured observational checklist. Samples were visited every day in their homes and made to consume nutritional balls and one guava. The intervention was done continuously for 30 days. After 30days haemoglobin level was checked and the anemia signs and symptoms were assessed by using observational checklist to find out the level of iron deficiency anemia. The study result shows that in before nutritional intervention among 50 adolescent girls with iron deficiency anemia

depicts that 8(16%) had mild levels of anemia, 33(66%) had moderate levels of anemia and 9(18%) had severe levels of anemia. In the after nutritional intervention 29(58%) had mild levels of anemia and 21(42%) had moderate levels of anemia. the mean scores of pre- test and post -test level of anemia among adolescent girls 14.828 (SD + 1.16) and 13.54 (SD + 0.55) respectively. Thus the difference in pretest and posttest mean was 1.29. The overall pretest mean percentage was 29.656, whereas the post- test mean percentage was 27.08. Post- test level of anemia mean score is less than the pre- test score. Paired' value is 8.94 which was significant at 0.05 level. The mean and standard deviation findings showed that the nutritional intervention was effective in increasing the haemoglobin level among adolescent girls with anemia.

CHAPTER III

METHODOLOGY

Research methodology is a method to solve research problem systematically. The method used structure a study, to gather and analyse information in a systematic fashion, (**Polit &Beck ,2011**).

This study was designed to see the effectiveness of Hemonutri ball on haemoglobin level among adolescent girls at selected Government Higher Secondary School in Villupuram District. It includes research design, description of setting, variables, population and sample, sample technique and sample size, description of the validity and reliability, data collection procedure and pilot study.

RESEARCH APPROACH

Research approach and research design are the two terms that are frequently used interchangeably. However research design is a broader plan to conduct a study, and research approach is an important element of the research design, which governs it, (**Basavanthappa,BT, 2009**).

In this study Quantitative Evaluative approach is used. It is a method in which the study variables are pre selected and defined by the investigator and the data are collected and quantified, then statistically analysed, often with a view to establishing the cause and effect of relationship among the variables.

RESEARCH DESIGN

The design spells out the basic strategies which the researchers adopt to develop information that is accurate and interpretable, (**Polit and Beck 2011**).

In this study True experimental pre-test, post-test control group research design is used. The study has fulfilled the criteria of manipulation and control group.

Fig 3.1 Diagrammatic presentation of the research design

Randomly Selected Samples	Pre-test	Intervention	Post-test
Experimental group	O₁	X	O₂
Control group	O₃	-	O₄

O₁-Pre-test of Haemoglobin level among Experimental group

O₂-Post-test of Haemoglobin level among Experimental group

X-Administration of Hemonutri ball

O₃-Pre-test of haemoglobin level among Control group

O₄- Post-test of haemoglobin level among Control group

SETTING

- ❖ The setting for Experimental group was Thaiyur Government Higher Secondary School. It is located 140 Km away from the Dhanalakshmi Srinivasan college of nursing The total school strength of Thaiyur is 520 among that 189 adolescents girls were in the age group of 13-17 years .
- ❖ The setting for Control group was Chenji Government Higher Secondary School. It is located 136 Km away from Dhanalakshmi Srinivasan College of nursing. The total school strength of Chenji is 475 among that. In that 159 students are the adolescent girls between the age group of 13-17 yrs.

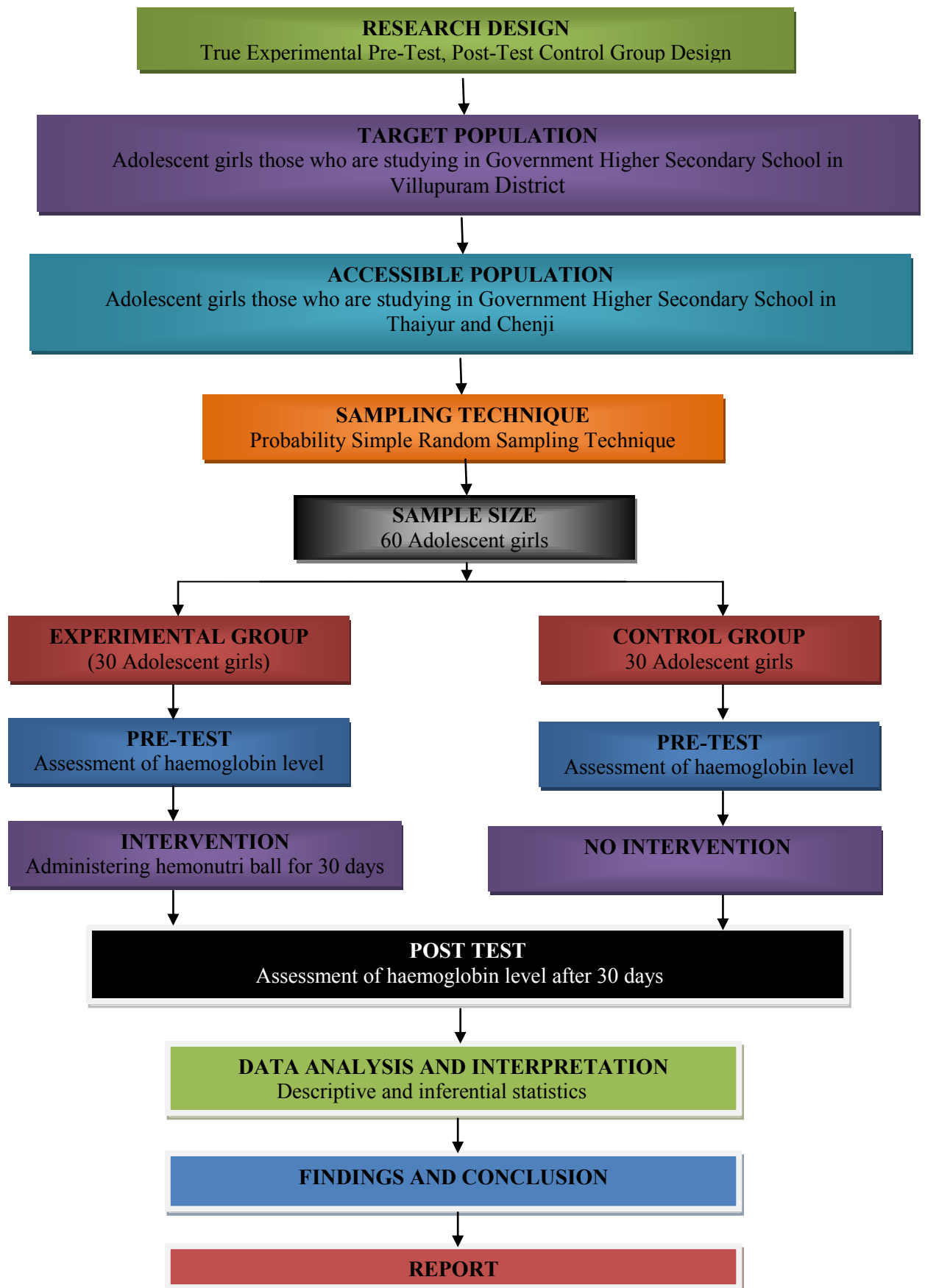


FIG. 3.1. SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY

VARIABLES

An attribute that varies that is, taken on different values, **(Polit and Beck 2011)**.

Independent variable:

The variable that is believed to cause or influence the dependent variable. It is also known as manipulate variable, **(Polit and Beck ,2011)**.

- In this study Hemonutri ball is the independent variable.

Dependent variable:

The variable hypothesised to depend on or be caused by another variable, **(Polit and Beck ,2011)**.

- ❖ In this study Haemoglobin level was the dependent variable

POPULATION

The entire set of individuals or objects having some common characteristics, **(Polit and Beck, 2011)**.

❖ **Target population:**

The target population consist of adolescent girls those who are studying in Government Higher Secondary School in Villupuram district.

❖ **Accessible population:**

The accessible population consist of adolescent girls those who are studying at selected school of Government Higher Secondary School in Thaiyur and Chenji.

SAMPLE

A set of a population selected to participate in a study, **(Polit and Beck 2011)**.

The sample selected for the present study were adolescent girls those who are studying in Government Higher Secondary School in Thaiyur and Chenji who are willing to participate and present during the time of data collection.

SAMPLING TECHNIQUE

Sampling technique refers to the process of selecting the population to represent the entire population, **(Polit and Beck, 2011)**.

The sampling technique used in this study was Probability–Simple Random sampling technique.

Every member of the population has an equal chance of being selected as subject, **(Dr.Suresh.K.Sharma,2012)**.

SAMPLE SIZE

Totally 60 Adolescent girls.

1. Experimental group : 30 adolescent girls
2. Control group : 30 adolescent girls

CRITERIA FOR SAMPLE SELECTION

INCLUSION CRITERIA

Adolescent girls:

1. who are in the age group of 13-17 years
2. who attained menarche
3. who are with the haemoglobin level with moderate level (i.e) 8-10.9mg/dl
4. who are available at the time of data collection
5. who can understand ,read Tamil or English.
6. who are willing to participate in the study.
7. who are studying in Government Higher Secondary School in Villupuram district

EXCLUSION CRITERIA

Adolescent girls:

1. Who are in the age group of below 13 years and above 17 years..
2. Who are with the history of menorrhagia.
3. Who are in normal, mild and severe anemia.
4. Who are under the treatment of anemia.

DEVELOPMENT OF TOOL

The research instrument was developed by doing extensive literature review. The primary and secondary sources of literature were reviewed to develop at the appropriate tool. Content validity was obtained from the 5 experts , 3 experts from paediatric nursing and 2 experts from community health nursing, Statistician, Dietician and Nutrition. Their opinions and valuable suggestion were incorporated in the tool and it was finalised buy the guide.

DESCRIPTION OF THE TOOL

Tool/Instrument is the device used to collect the data, **(Polit and Beck,2011)**. It consists of 2 sections:

Section A:

Demographic variables such as Age, Religion, Educational status of the father, and mother, Food pattern, Family income per month, Duration of menstruation and menstrual cycle.

Section B:

Assessment of haemoglobin level by Sahli's haemoglobinometer

SAHLI'S HAEMOGLOBINOMETER

Hb level on first day	Hb level after 30 days

Table 3.1 Scoring for Anemia:

No	Level of Anemia	Score
1	No anemia	> than 12 mg/dl
2	Mild anemia	11-11.9mg/dl
3	Moderate anemia	8-10.9mg/dl
4	Severe anemia	< than 8mg/dl

VALIDITY

In quantitative research, the ability of a data gathering instrument to measure what it purpose to measure, **(Basavanhappa,BT,2009)**.

Content validity was obtained from the 5 experts ,3 experts from paediatric nursing and 2 experts from community health nursing and Dietician, Statistician . Their opinions and valuable suggestion were incorporated in the tool and it was finalised buy the guide.

RELIABILITY

In Quantitative research, the stability of a measuring instrument over time, **(Polit and Beck 2011)**.

The reliability of the tool is tested by implementing the tool on Government Higher Secondary School in Melsevur, Villupuram District.6 adolescent girls in experimental group and 6 adolescent girls in control group .Test re-test method was used to test the reliability of the tool was found to be reliable, **($r^1=0.9$)**.

PILOT STUDY

A pilot study is the process of carrying out a preliminary study, going through the entire research procedure with a small sample, **(Elakkuvana Bhaskara Raj, 2010)**.

The pilot study was conducted at Government Higher Secondary School, Melsevur, Villupuram District for a period of one week from 2-012-2013 to 18-12-13.A total of 6 adolescent girls were selected using Probability Simple Random sampling technique. Informed consent was obtained and demographic and

haemoglobin levels were collected from the adolescent girls aged between 13-17 years. The purpose of the study is explained to the subjects. Hemonutri ball is given for 6 days ,twice a day as morning and evening and after that haemoglobin level is checked by using Sahli's haemoglobinometer. Then post- test was done. After the pilot study, the feasibility and practicability of the tool was assessed.

DATA COLLECTION PROCEDURE:

Data collection is the gathering of information needed to address the research problem. The word "data" means information that is systematically collected in the course of a study, (**Polit&Hunger,2001**).

The study was conducted from 01-01-2014to 31-01-2014.Adolescent girls (n=60) aged between 13-17 years were selected by Probability Simple Random Sampling Technique at Government Higher Secondary School, Chenji, Villupuram District.

ETHICAL CONSIDERATION:

Informed written consent was obtained from the principal of the school prior to the collection of the data.

Informed oral consent was obtained from the adolescent girls.

Period of data collection:

The data was collected from 01-01-2014 to 31-01-2014.The investigator collected the data from both experimental and control group.

Pre-test:

Adolescent girls aged between 13-17 years were divided into 2 groups as experimental group and control group. Informed consent was obtained from the adolescent girls who fulfilled the criteria. On the 1st day the haemoglobin level was checked for both the schools among the adolescent girls through based on Probability Simple Random Sampling Technique by (Lottery method).I have acquired the sample for experimental and control group with moderate level of anemia (8-10.9mg/dl). By

2nd day the Demographic data were collected from the adolescent girls of both the experimental and control group and Hemonutri ball should be provided to experimental group only.

Implementation:

From 2nd day-31st day, 100 gram of Hemonutri ball With Vit-C was given daily for about 30 days for experimental group in morning and evening time. All 30 adolescent girls were consumed Hemonutri ball in the presence of investigator.

Post-test:

After 30 days, post Haemoglobin level was checked for both the groups and values were recorded.

PLAN FOR DATA ANALYSIS:

S.No	Data analysis	Method	Objectives
1.	Descriptive statistics	Frequency, Percentage	<ul style="list-style-type: none"> To describe about demographic variables, level of Haemoglobin among adolescent girls.
		Mean Standard deviation	<ul style="list-style-type: none"> To assess pre-test and post-test score of Haemoglobin level among adolescent girls in experimental group and control group.
2.	Inferential statistics	Paired' t test	<ul style="list-style-type: none"> To compare pre-test and post-test score on the level of Haemoglobin in experimental group.
		Independent 't' test	<ul style="list-style-type: none"> To compare post-test score on the level of Haemoglobin between experimental group and control group.
		Chi-square test	<ul style="list-style-type: none"> To find out association between post test scores on the level of Haemoglobin level among adolescent girls with their selected demographic variables

SUMMARY:

This chapter deals with the methodology of the study. It consisted of research design, description of setting, variables, population and sample, sample technique and sample size, description of validity and reliability, pilot study, data collection procedure and plan for data analysis.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

The systematic organization and synthesis of research data and in quantitative studies, the testing of hypothesis using those data, (**Polit & Beck, 2011**).

This chapter deals with the analysis and interpretation of data collected from 60 adolescent girls divided into Experimental and Control group at Government Higher Secondary School in Villupuram District, about the effectiveness of Hemonutri ball administration to the adolescent girls between the ages of 13-17 yrs. who had haemoglobin level with moderate level (i.e) 8-10.9mg/dl.

The data were coded and analyzed as per objectives of the study under the following headings

SECTION A:

Distribution of demographic variables of the adolescent girls in experimental group and control group.

SECTION B:

Assess the pre-test and post-test level of Haemoglobin of the adolescent girls in Experimental group and Control group.

SECTION C:

To evaluate the effectiveness of Hemonutri ball administration of the adolescent girls in Experimental group and Control group.

SECTION D:

Find out the association between post-test level of Haemoglobin among adolescent girls with their selected demographic variables in Experimental and Control group.

**SECTION – A: DESCRIPTION OF SAMPLES ACCORDING TO THEIR
DEMOGRAPHIC VARIABLES**

Table 4.1: Frequency and percentage distribution of demographic variables among experimental and control group (n₁=30), (n₂=30)

S. No	Demographic variables	EXPERIMENTAL GROUP		CONTROL GROUP	
		Frequency (n ₁)	Percentage (%)	Frequency (n ₂)	Percentage (%)
1	Age (in years)				
	(a) 13-14	5	16.66	12	40
	(b) 15-16	20	66.66	7	23.33
	(c) 17-18	5	16.66	11	36.66
2	Religion				
	(a) Hindu	29	96.66	26	86.66
	(b) Christian	1	3.33	4	13.33
	(c) Muslim	0	0	0	0
	(d) Others	0	0	0	0
3	Educational status of father				
	(a) Non formal education	14	46.66	22	73.33
	(b) Primary education	14	46.66	6	20
	(c) Secondary education	2	6.66	2	6.66
	(d) Graduate and above	0	0	0	0
4	Educational status of mother				
	(a) Non formal education	17	56.66	24	80
	(b) Primary education	12	40	6	20
	(c) Secondary education	1	3.33	0	0
	(d) Graduate and above	0	0	0	0
5	Food pattern				
	(a) Vegetarian	5	16.66	1	3.33
	(b) Non-vegetarian	25	83.33	29	96.66
6	Family income per month				
	(a) Rs.1001-2000	26	86.66	25	83.33
	(b) Rs. 2001-3000	0	0	2	6.66
	(c) Above Rs.3000	4	13.33	3	10
7	Menstrual cycle				
	(a) Regular	14	46.66	16	53.33
	(b) Irregular	16	53.33	14	46.66
8	Duration of menstruation				
	(a) 3 days/month	17	56.66	7	23.33
	(b) 5 days/month	8	26.66	16	53.33
	(c) 5 days above/month	5	16.66	7	23.33

Table4.1: Reveals frequency and percentage distribution of Experimental group Vs control group according to their demographic variables.

Regarding age in Experimental group, 5(16.66%) of them belonged to the age group of 13-14 years, 20(67%) of them belonged to the age group of 15-16 years, and 5(16.66%) were in the age group of 17-18 years. In Control group 12(40%) of them belonged to the age group of 13-14 years, 7(23%) were in the age group of 15-16 years and 11(37%) were in the age group of 17-18 years, **(fig 4.1)**

Distribution of Experimental group Vs Control group according to their type of religion shows that in experimental group 29(97%) of the adolescent girls were Hindu, 1(3%) of the adolescent girls were Christian, 0(0%), of the adolescent girls were not Muslim, 0(0%), of them are nothing. In Control group 26(87%) of the adolescent girls were Hindu, 4(13%) of the adolescent girls were Christian and 0(0%) of the adolescent girls were not Muslim, 0(0%) of them are nothing, **(fig 4.2).**

Distribution of Experimental group Vs Control group according to their Educational status of father in Experimental group, 14(47%) of them were in Non formal education, 14(47%) of them were in Primary education, 2(7%) of them were in Secondary education, 0(0%) of them are Graduate and above. In Control group 22(73%), of them were in Non formal education, 6(20%) of them were in Primary education, 2(7%), of them were in Secondary education, 0(0%) of them were Graduate and above, **(fig 4.3).**

Distribution of Experimental group Vs Control group according to their Educational status of mother in Experimental group, 17(57%) of them were in Non formal education, 12(40%), of them were in Primary education, 1(3%), of them were in Secondary education, 0(0%) of them are Graduate and above. In Control group 24 (80%), of them were in Non formal education, 6(20%), of them were in Primary education, 0(0%), of them were in Secondary education, 0(0%) of them were Graduate and above, **(fig 4.4).**

Distribution of Experimental group Vs Control group according to their Food Pattern in Experimental group, 5(17%) of them were vegetarian, 25(83%) , of them were Non vegetarian .In Control group 25(83%),of them were vegetarian, 29(97%)of them were Non vegetarian, **(fig 4.5).**

Distribution of Experimental group Vs Control group according to their Family income per month in Experimental group, 26(87%) of them had income of Rs 1001-2000, 0(0%) of them does not have the income of Rs 2001-3000, and 4(13%) of them had income of Above Rs 3000. In Control group 25(83%) of them had income of Rs 1001-2000, 2(7%) of them had income of Rs 2001-3000,3(10%) of them had the income of Above Rs 3000, **(fig 4.6).**

Distribution of Experimental group Vs Control group according to Menstrual cycle in Experimental group, 14(47%) of them had Regular menstrual cycle, 16(53%) of them had irregular menstrual cycle. In Control group 16(53%) of them had Regular menstrual cycle and 14(47%) of them had irregular menstrual cycle, **(fig 4.7).**

Distribution of Experimental group Vs Control group according to the Duration of menstruation in Experimental group, 17(57%) of them were having menstruation pattern as 3days/month, 8(27%) of them had 5 days/month as menstruation pattern and 5(17%) of them had 5 days above/month as menstruation pattern. In Control group 7(23%) of them had 3days/month as menstruation pattern, 16(53%) of them had 5days/month as menstruation pattern, and 7(23%) of them had 5days/month as menstruation pattern.

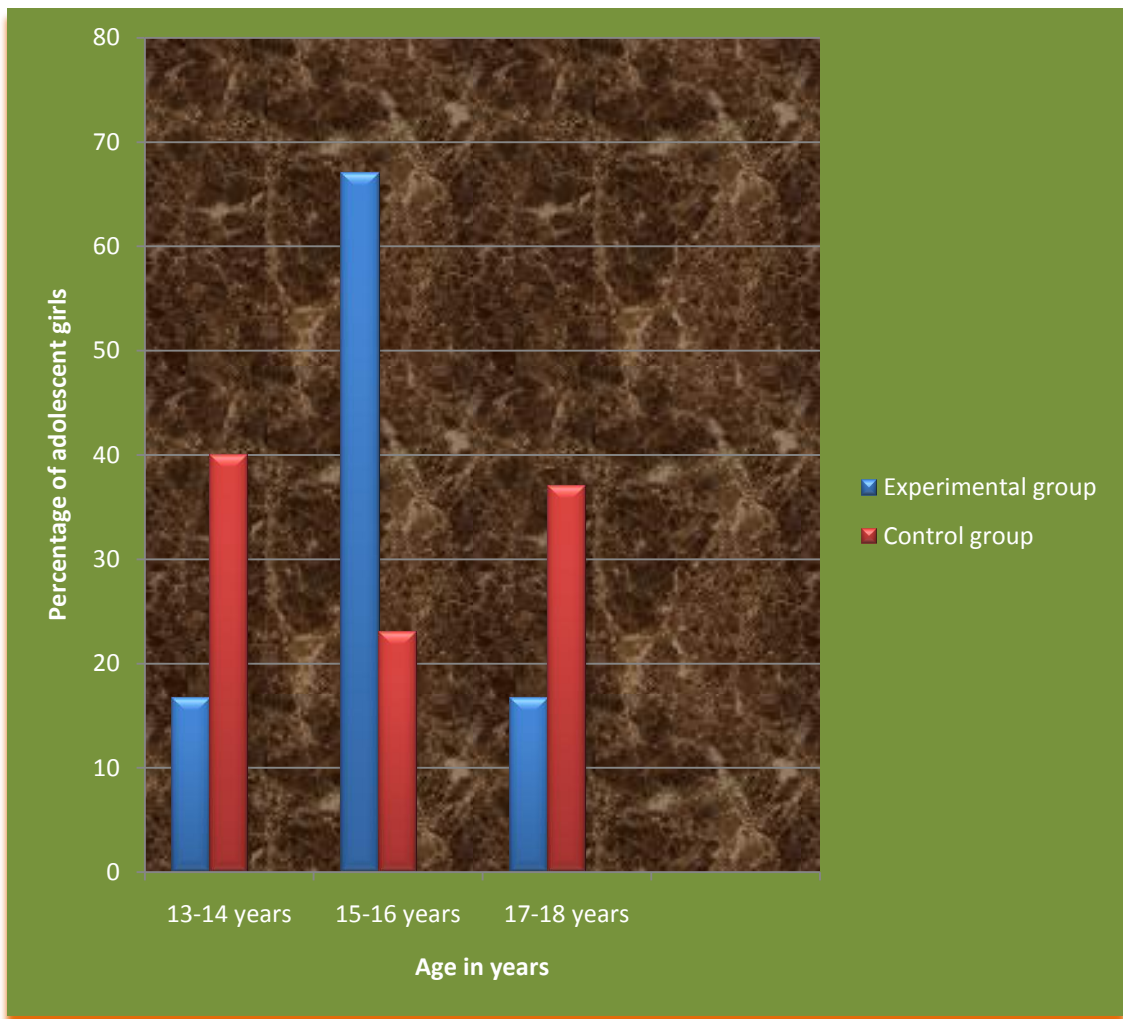


Fig 4.1 Cluster column diagram showing the percentage distribution of Experimental and Control group according to their Age group

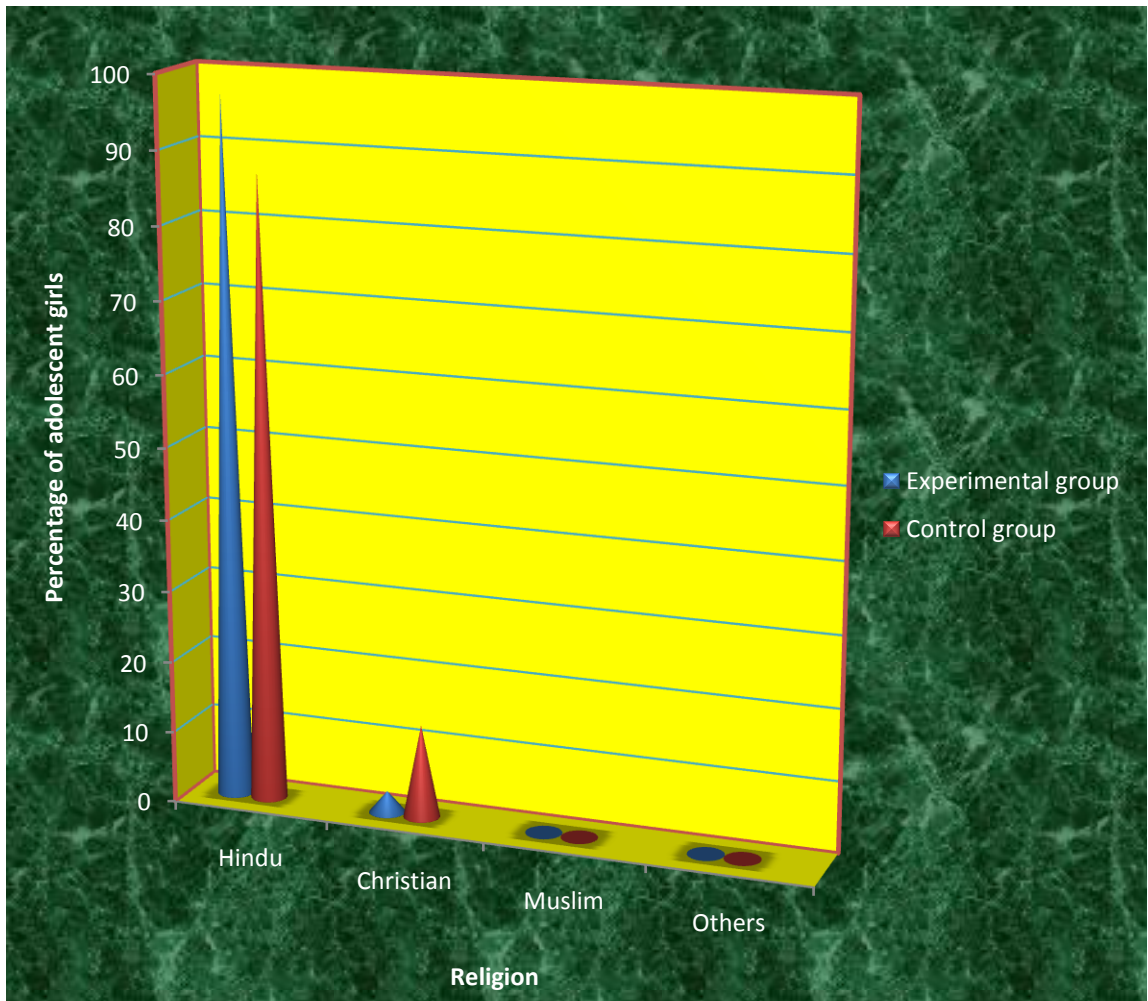


Fig 4.2 Cone diagram showing the percentage distribution of Experimental and Control group according to their Religion

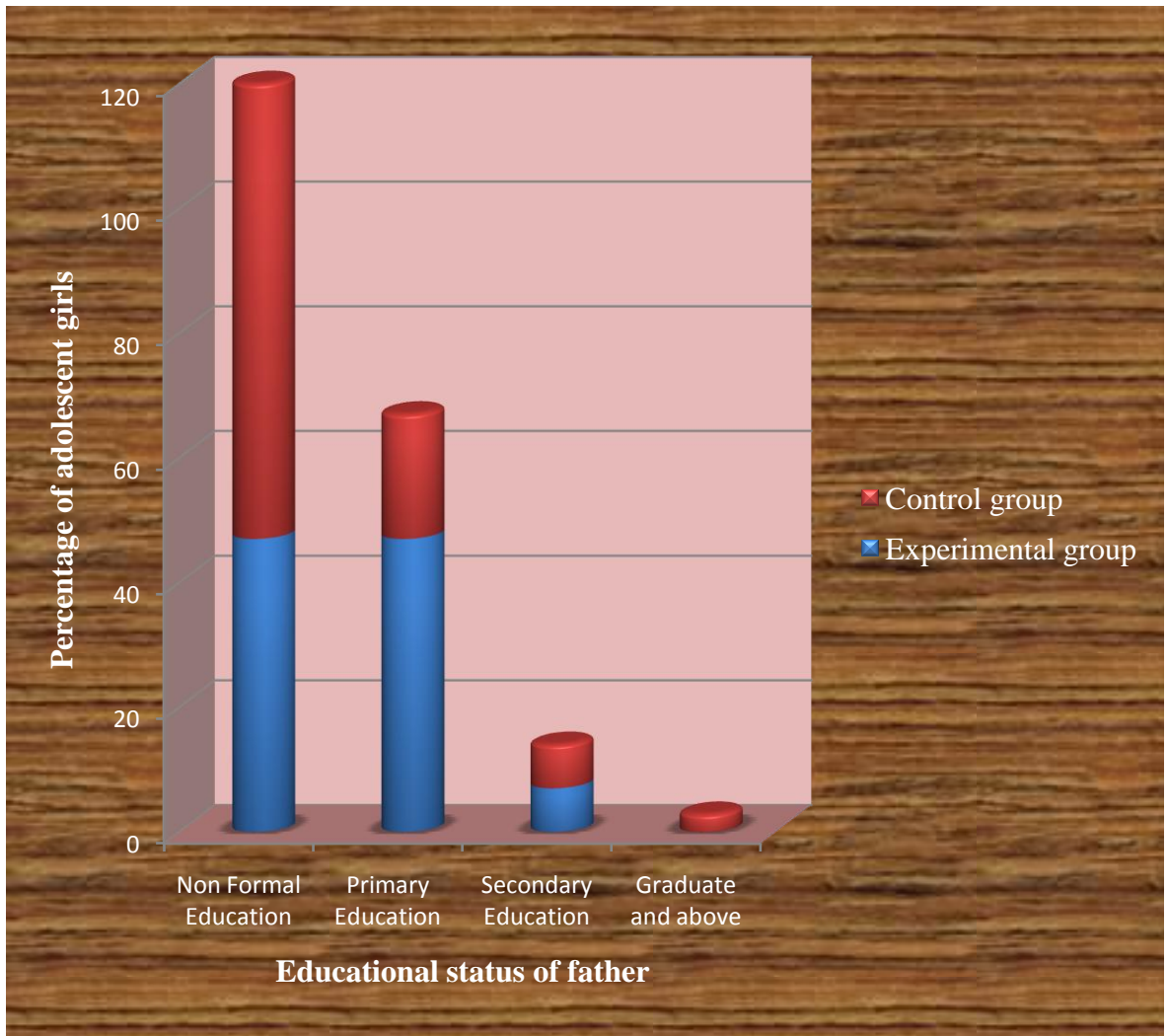


Fig 4.3 Clustered cylinder showing the percentage distribution of Experimental group and Control group according to their Educational status of father

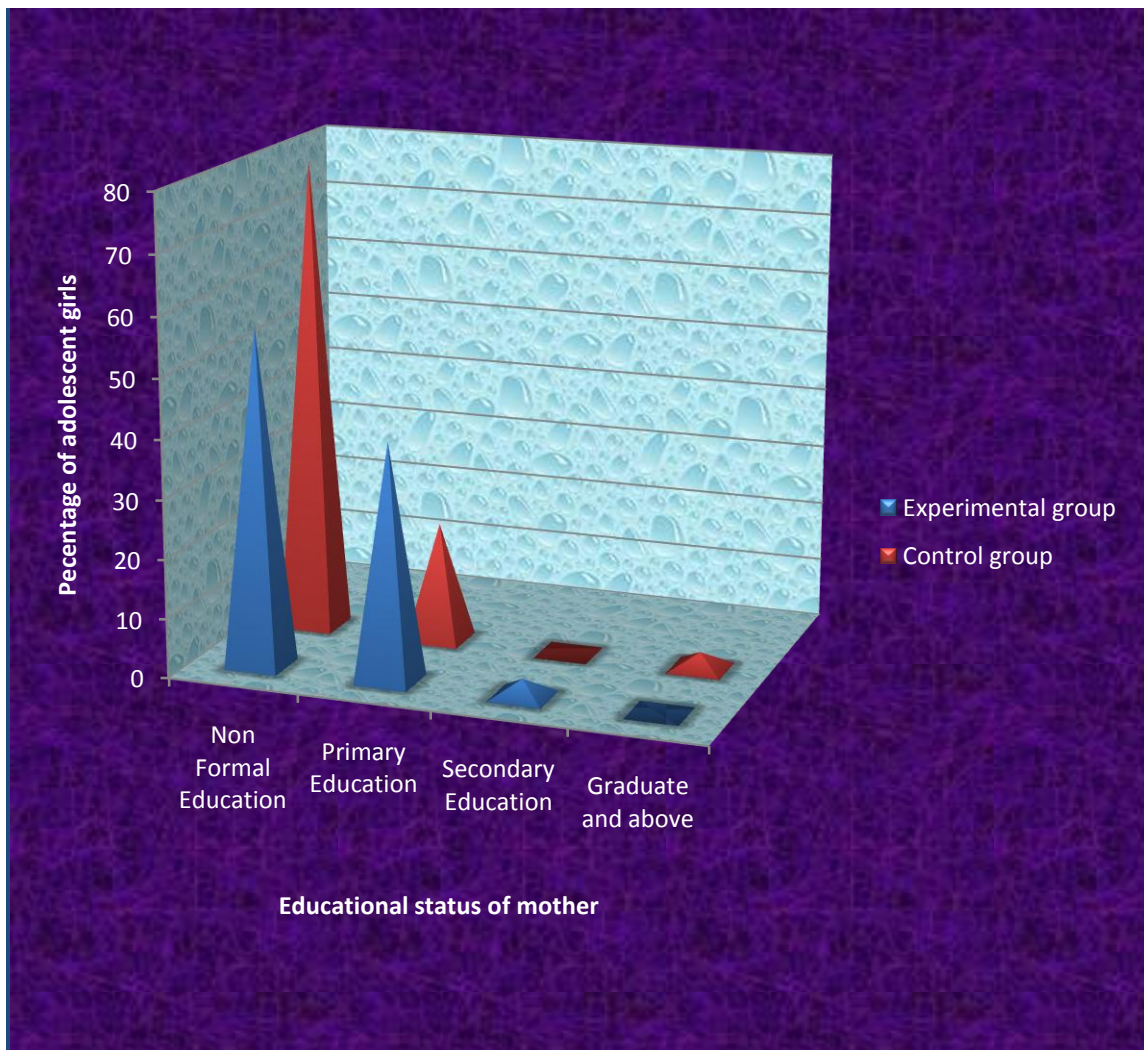


Fig 4.4 Clustered pyramid showing the percentage distribution of Experimental group and Control group according to their Educational status of mother

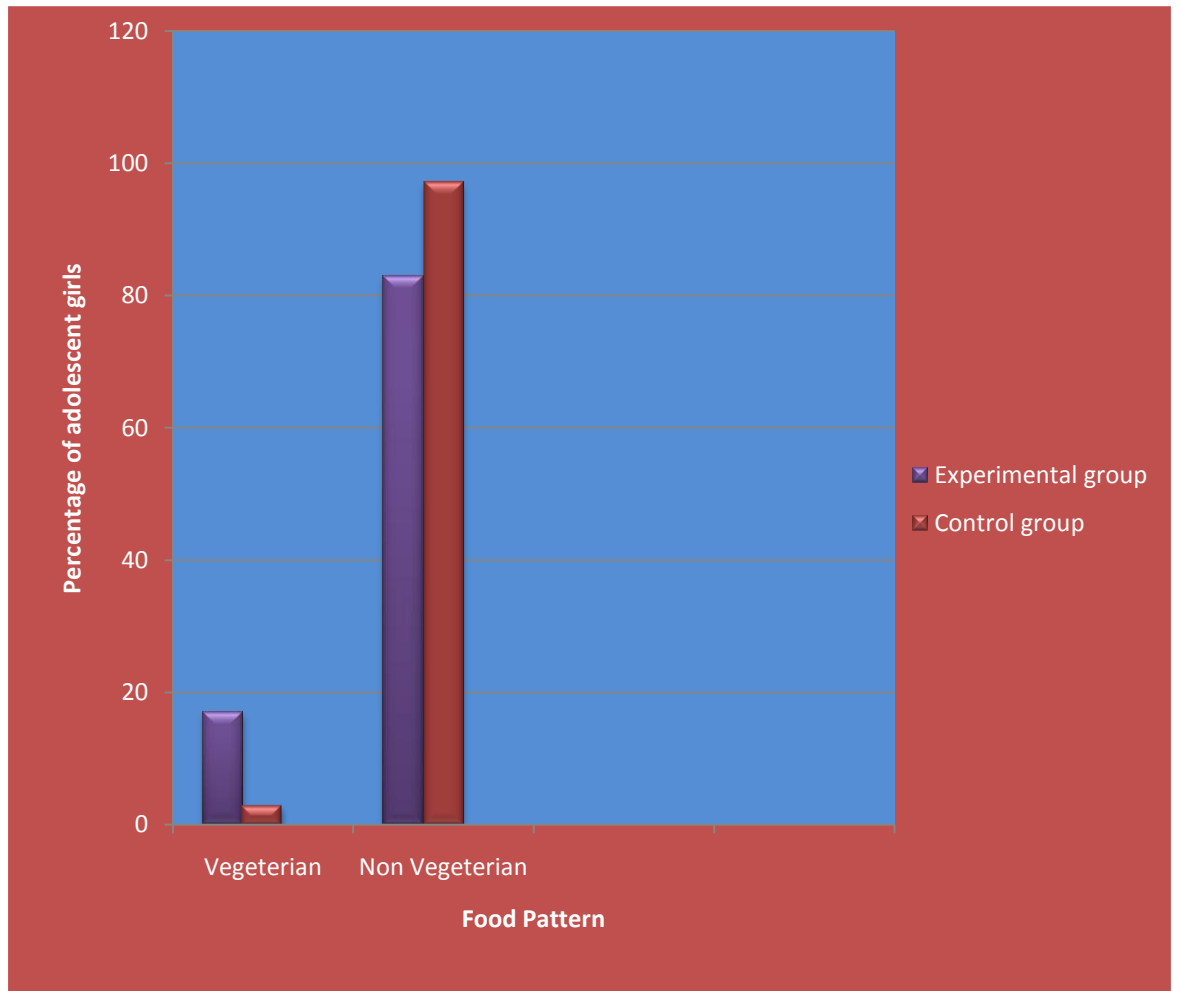


Fig 4.5 Cluster column diagram showing the percentage distribution of Experimental group and Control group according to their Food pattern

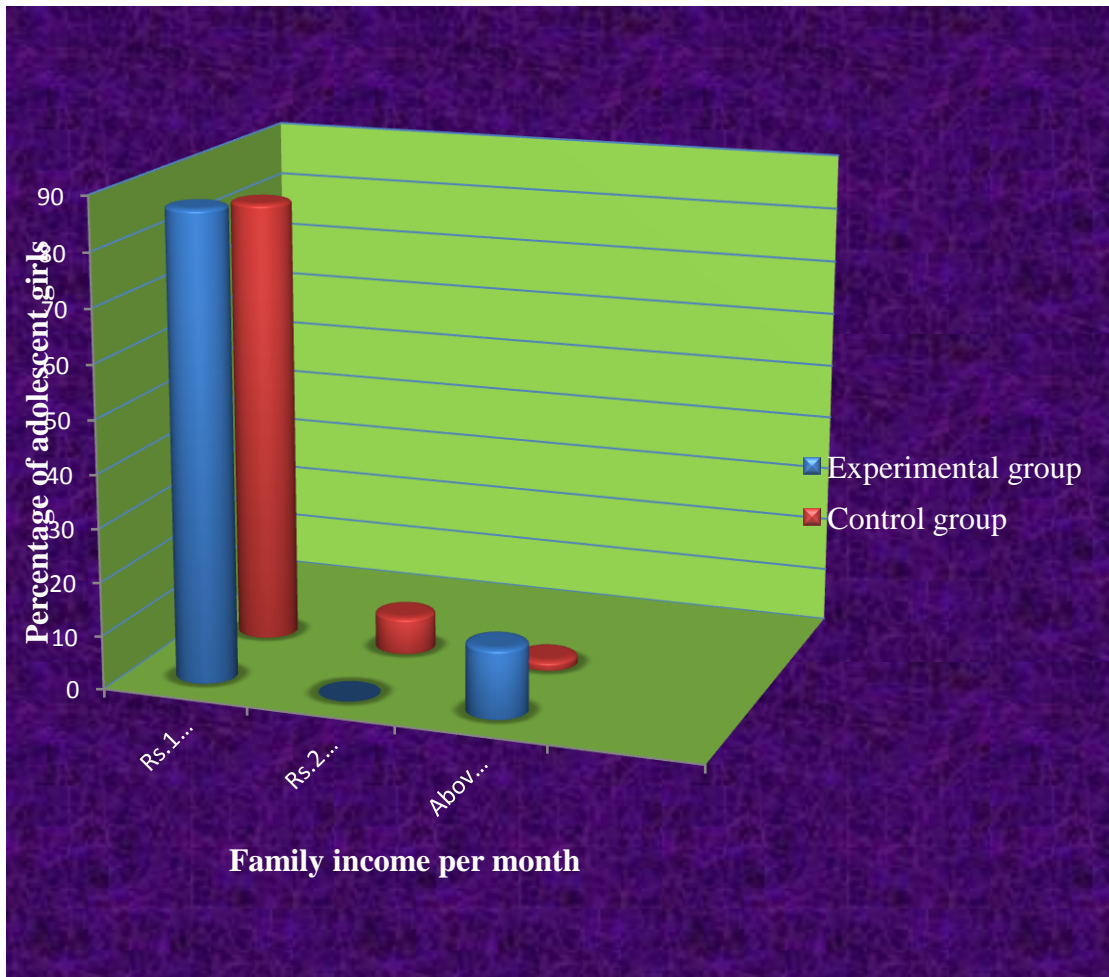


Fig 4.6: 3-D Cylinder diagram showing the percentage distribution of Experimental group and Control group according to their family income per month

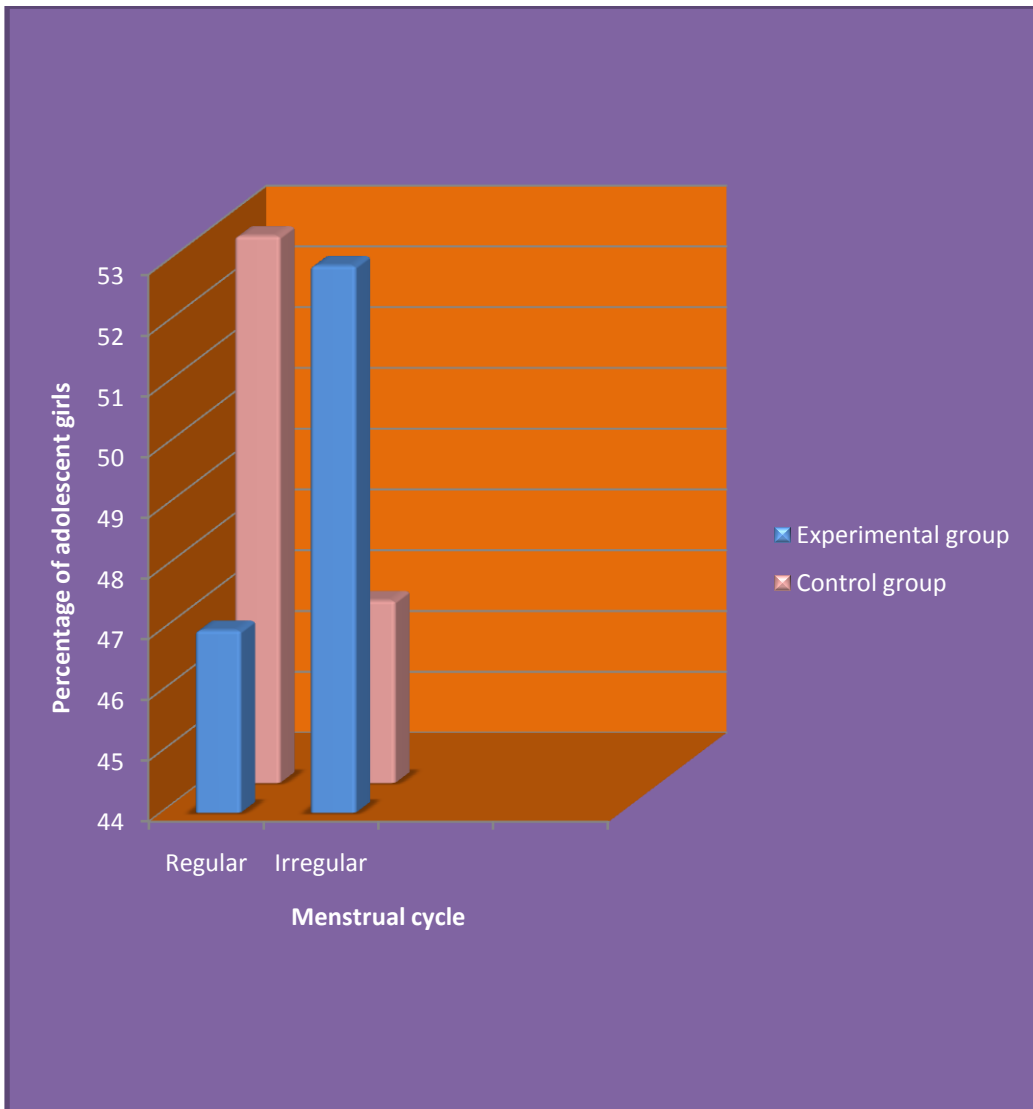


Fig 4.7 Column diagram showing the percentage distribution of Experimental group and Control group according to their menstrual cycle

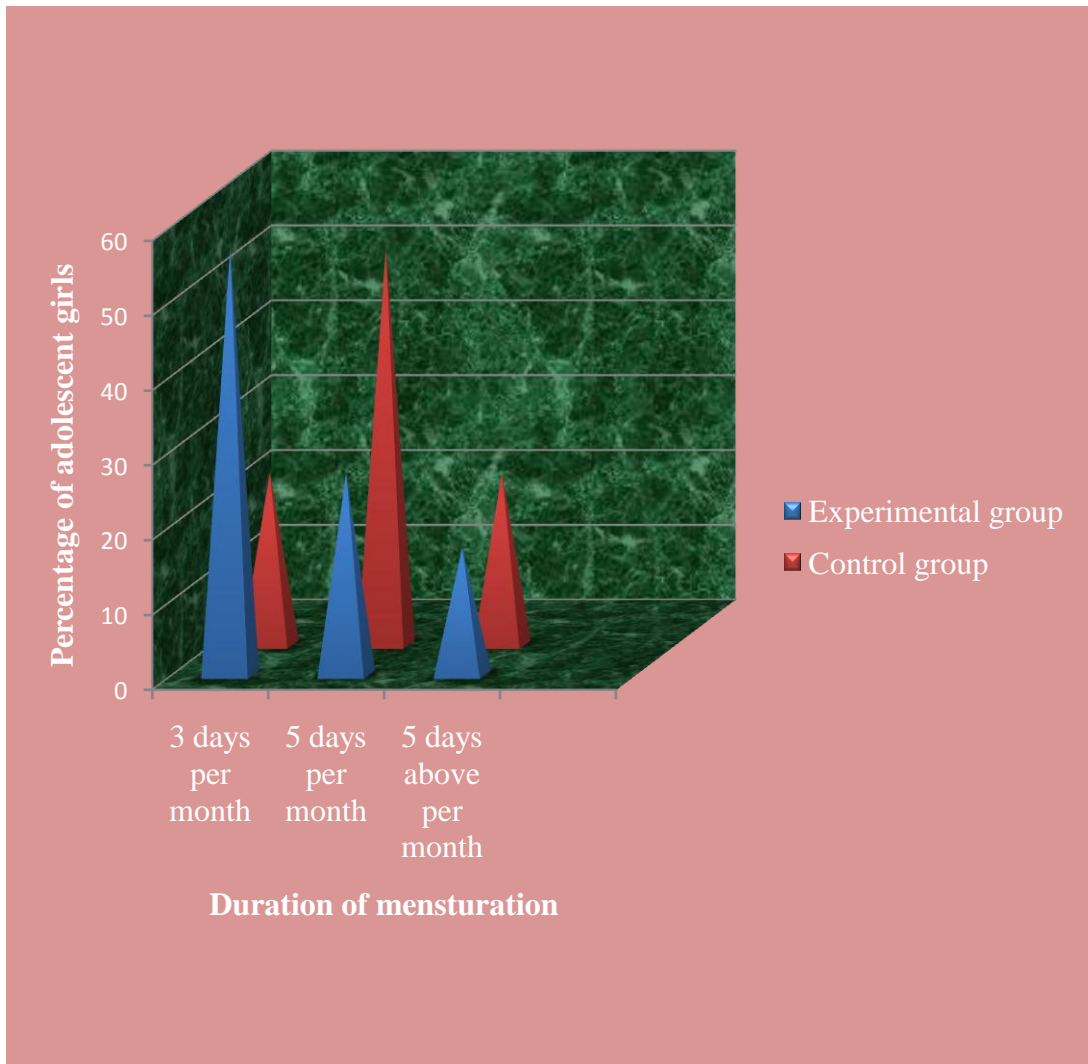


Fig 4.8 Clustered pyramid diagram showing the percentage distribution of Experimental group and Control group according to their duration of menstruation

SECTION-B: ASSESS THE PRE-TEST AND POST-TEST LEVEL OF HAEMOGLOBIN OF THE ADOLESCENT GIRLS IN EXPERIMENTAL GROUP AND CONTROL GROUP.

Table 4.2: Frequency and percentage distribution of the adolescent girls in experimental and control group

(n₁=30,n₂=30)

LEVEL OF ANEMIA (GM/DL)	EXPERIMENTAL GROUP		CONTROL GROUP	
	Frequency (n₁)	Percentage (%)	Frequency (n₂)	Percentage (%)
Normal	0	0	0	0
Mild anemia	0	0	0	0
Moderate anemia	30	100	30	100
Severe anemia	0	0	0	0

Table: 4.2 depicts that Frequency and Percentage distribution of Pre-test level of Haemoglobin of adolescent girls in Experimental group 0(0%) of them are not in normal,0(0%) of them are in mild anemia,30(100%) of them are in moderate anemia,0(0%) of them are not in severe anemia. In control group 0(0%) of them are not in normal,0(0%) of them are in mild anemia,30(100%) of them are in moderate anemia ,0(0%) of them are not in severe anemia.

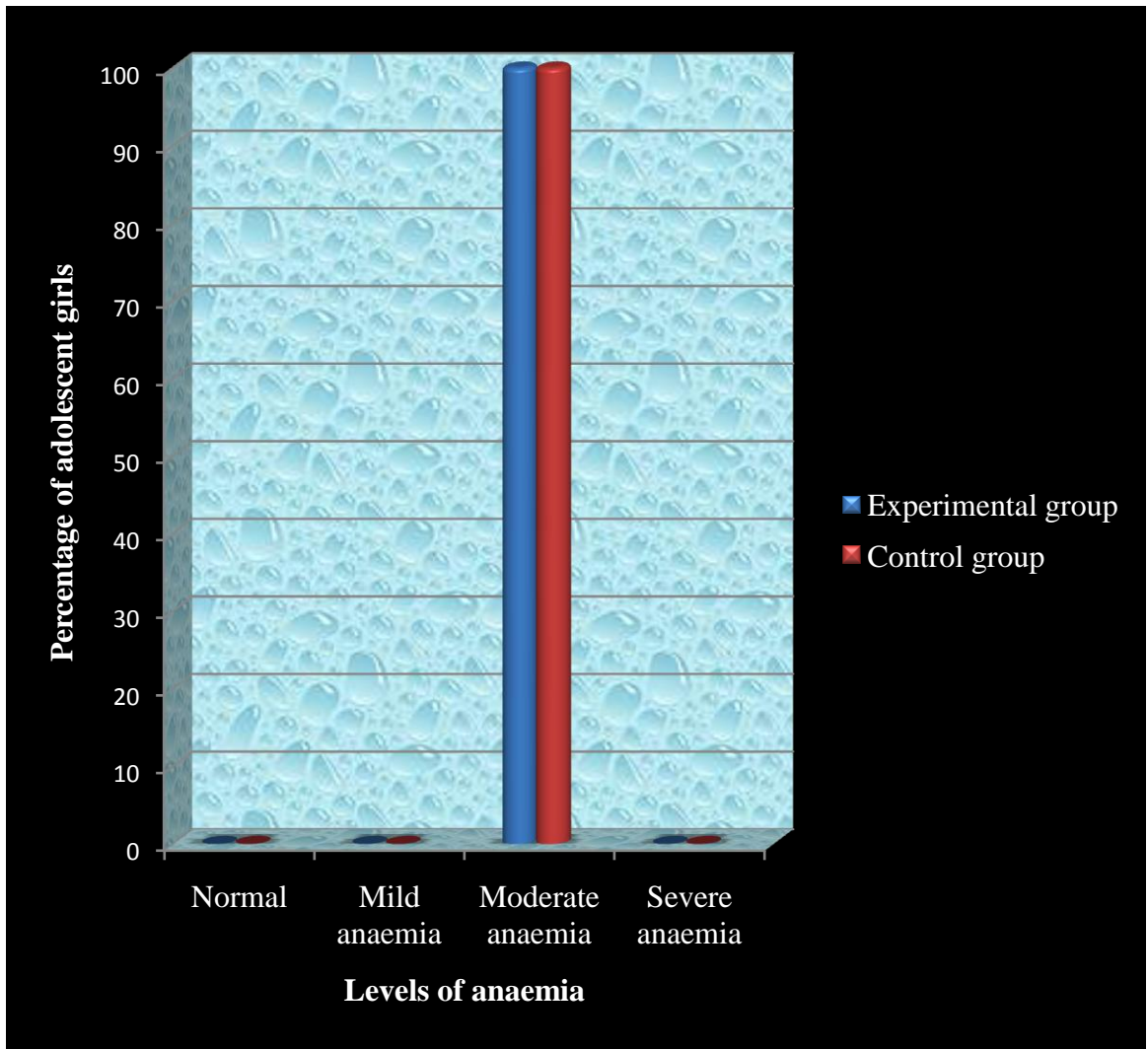


Fig 4.9 Cluster cylinder diagram showing the distribution of pre -test level of haemoglobin of adolescent girls in Experimental group and Control group

Table4.3:Frequency and percentage distribution on post-test level of Haemoglobin of the adolescent girls in experimental and control group

(n₁=30, n₂=30)

LEVEL OF ANEMIA (GM/DL)	EXPERIMENTAL GROUP		CONTROL GROUP	
	Frequency (n ₁)	Percentage (%)	Frequency (n ₂)	Percentage (%)
Normal	18	60	0	0
Mild anemia	12	40	10	33.33
Moderate anemia	0	0	20	66.66
Severe anemia	0	0	0	0

Table:4.3.Frequency and Percentage distribution of Post-test level of Haemoglobin of adolescent girls in Experimental group 18(60%) of them are in normal,12(40%) of them are in mild anemia,0 (0%) of them are not in moderate anemia,0(0%) of them are not in severe anemia. In control group 0(0%) of them are not in normal,10(33%) of them are in mild anemia,20(66.66%) of them are in moderate anemia,0(0%) of them are not in severe anemia.

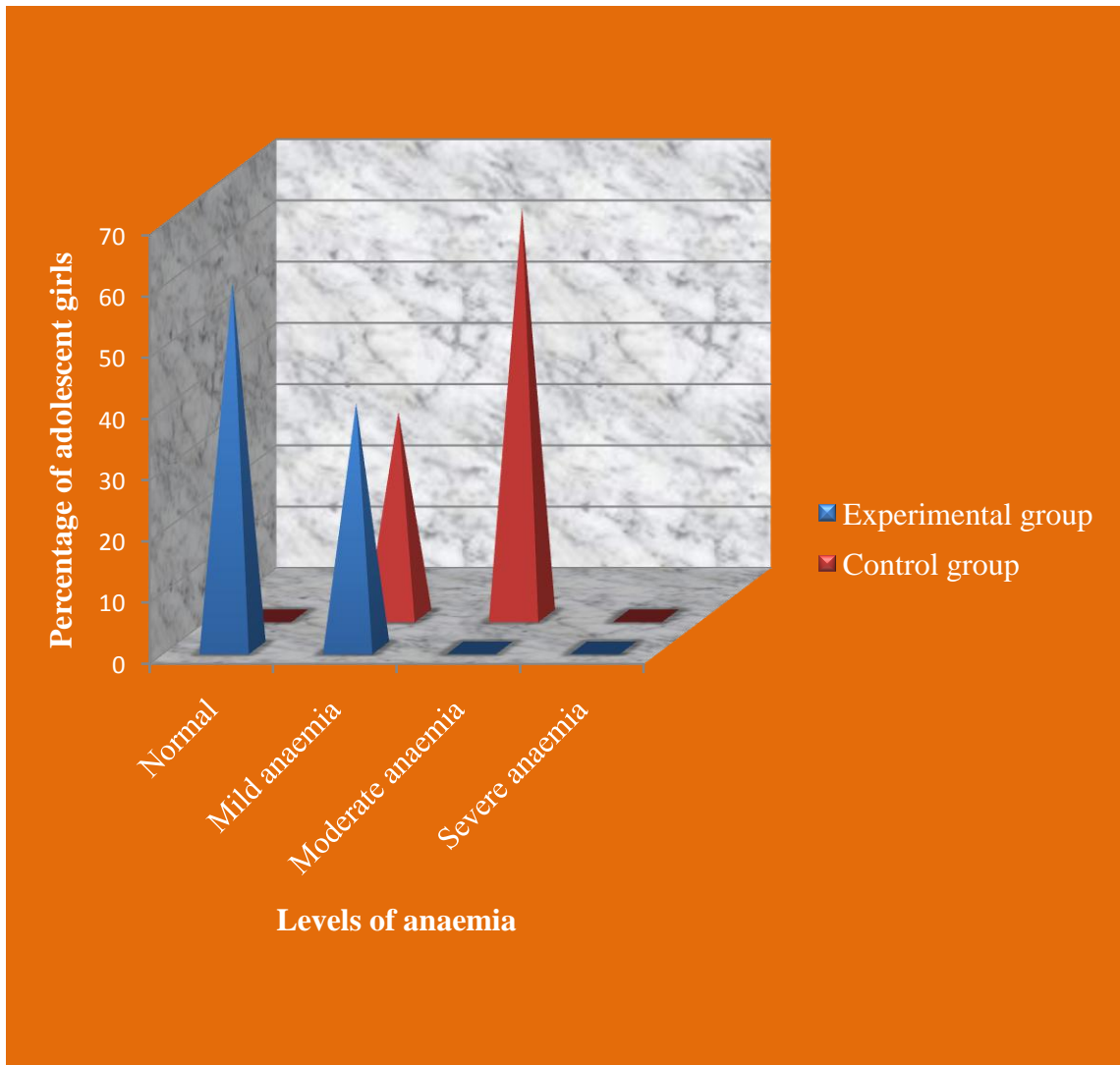


Fig 4.10 Cluster pyramid diagram showing the distribution of post- test level of haemoglobin of the adolescent girls in Experimental group and Control group

SECTION-C: TO EVALUATE THE EFFECTIVENESS OF HEMONUTRI BALL ADMINISTRATION OF THE ADOLESCENT GIRLS IN EXPERIMENTAL GROUP AND CONTROL GROUP.

Table 4.4: Compare the pre-test and post-test scores of haemoglobin of the adolescent girls in experimental group

(n₁=30)

Test	Mean	Standard Deviation	Mean Difference	't' Value	Table Value	Inference
Pre Test	10	0.5343	0.0190	59.08	2.05	Significant
Post Test	12	0.6533				P<0.05

df =29

P<0.05

Table 4.4 shows that the average pre-test scores on the haemoglobin level among adolescent girls in experimental group is 10(SD 0.5343) and the post- test mean score is 12 (SD 0.6533).The paired 't' value was 59.08when compared to the table value (2.05) it was high. This shows that there is significant (at P<0.05 level) relationship between pre-test and post-test scores on haemoglobin level among adolescent girls in experimental group. It shows that Hemonutri ball on Haemoglobin level among adolescent girls in the experimental group was effective.

Table 4.5: COMPARE THE PRE-TEST AND POST-TEST SCORES OF HAEMOGLOBIN OF THE ADOLESCENT GIRLS IN CONTROL GROUP

(n₂= 30)

Test	Mean	Standard Deviation	Mean Difference	't' Value	Table Value	Inference
Pre Test	10	0.9343	0.0528	8.06	2.05	Significant
Post Test	10	1.0871				P<0.05

df=29

p<0.05

Table 4.5 shows that the average pre- test scores on Haemoglobin level among adolescent girls in control group is 10(SD 0.9343) and the post-test mean score is 10(SD1.0871). The paired't' value was 8.06 when compared to the table value (2.05) it was high. This shows that there is significant (at p<0.05 level) relationship between pre-test and post-test scores of Haemoglobin level among adolescent girls in control group.

Table 4.6: COMPARE THE POST -TEST SCORE OF HAEMOGLOBIN OF THE ADOLESCENT GIRLS IN EXPERIMENTAL AND CONTROL GROUP

(n₁=30, n₂=30)

Group	Mean	SD	Mean difference	't' value	Table value	Inference
Post- test Experimental group	12	0.6533	0.4338	9.45	2.00	Significant (P<0.05)
Post-test Control group	10	1.0871				

Unpaired' test was calculated to analyze the effectiveness between experimental and control group post- test scores on the level of Haemoglobin among the adolescent girls in both the groups. The 't' value is 9.45 when compared to the table value (2.00) it is high.

It shows that there is a significant difference found in the post- test scores on the level of Haemoglobin level among experimental group of adolescent girls and revealed that, Hemonutri ball was helpful to improve the level of Haemoglobin among adolescent girls in the experimental group.

SECTION D: FIND OUT THE ASSOCIATION BETWEEN POST- TEST LEVEL OF HAEMOGLOBIN OF EXPERIMENTAL GROUP WITH THEIR SELECTED DEMOGRAPHIC VARIABLES

Table 4.7: Association between post-test level of haemoglobin of experimental group with their selected demographic variables

(n₁=30)

S. No	Demographic variables	Frequency				Table value	Chi square value
		Normal	Mild	Moderate	Severe		
1	Age (in years)						
	(a)13-14	0	5	0	0	3.84	6.06 (S)
	(b)15-16	14	6	0	0		
	(c)17-18	3	2	0	0		
2	Religion						
	(a)Hindu	18	11	0	0	3.84	0.0083 (NS)
	(b)Christian	0	1	0	0		
	(c)Muslim	0	0	0	0		
	(d)Others	0	0	0	0		
3	Educational status of father						
	(a)Non formal education	5	9	0	0	3.84	3.1339 (NS)
	(b)Primary education	11	3	0	0		
	(c)Secondary education	2	0	0	0		
	(d)Graduate and above	0	0	0	0		
4	Educational status of mother						
	(a)Non formal education	10	7	0	0	3.84	2.258 (NS)
	(b)Primary education	7	5	0	0		
	(c)Secondary education	1	0	0	0		
	(d)Graduate and above	0	0	0	0		
5	Food pattern						
	(a)Vegetarian	2	3	0	0	3.84	31.058 (S)
	(b)Non-vegetarian	16	9	0	0		
6	Family income per month						
	Rs.1001-2000	17	9	0	0	3.84	5.0625 (S)
	Rs.2001-3000	0	0	0	0		
	Above Rs.3000	1	3	0	0		
7	Menstrual cycle						
	(a)Regular	9	5	0	0	3.84	6.06 (S)
	(b)Irregular	9	7	0	0		
8	Duration of menstruation						
	(a)3days/month	7	10	0	0	3.84	17.0334 (S)
	(b)5days/month	6	2	0	0		
	(c)5days above/month	5	0	0	0		

Chi- square values were calculated to find out the association between post test scores on the levels of Haemoglobin in experimental group among adolescent girls with their demographic variables. It reveals that there was a significant association between post- test level of haemoglobin of Experimental group when associated with demographic variables of Age, Food pattern, Family income per month, Menstrual cycle and Duration of menstruation ($P < 0.05$). Whereas there was no significant association was found between post- test level of Haemoglobin with the demographic variables such as Religion, Educational status of father and Educational status of mother ($P > 0.05$). It seems that Hemonutri ball on Haemoglobin level was effective to the experimental group irrespective of their demographic variables.

Table 4.8 : Association between post-test levels of haemoglobin of control group with their selected demographic variables (n₂=30)

S. No	Demographic variables	Frequency				Table Value	Chi square value
		Normal	Mild	Moderate	Severe		
1	Age (in years)					3.84	12.035 (S)
	(a)13-14	0	4	8	0		
	(b)15-16	0	1	6	0		
	(c)17-18	0	5	6	0		
2	Religion					3.84	0.008 (NS)
	(a)Hindu	0	8	18	0		
	(b)Christian	0	2	2	0		
	(c)Muslim	0	0	0	0		
	(d)Others	0	0	0	0		
3	Educational status of father					3.84	3.1339 (NS)
	(a)Non formal education	0	7	15	0		
	(b)Primary education	0	3	3	0		
	(c)Secondary education	0	0	2	0		
	(d)Graduate and above	0	0	0	0		
4	Educational status of mother					3.84	0.008 (NS)
	(a)Non formal education	0	9	15	0		
	(b)Primary education	0	1	5	0		
	(c)Secondary education	0	0	0	0		
	(d)Graduate and above	0	0	0	0		
5	Food pattern					3.84	29.25 (S)
	(a)Vegetarian	0	0	1	0		
	(b)Non-vegetarian	0	10	19	0		
6	Family income per month					3.84	4.0856 (S)
	Rs.1001-2000	0	9	16	0		
	Rs.2001-3000	0	1	1	0		
	Above Rs.3000	0	0	3	0		
7	Menstrual cycle					3.84	8.0465 (S)
	(a)Regular	0	3	13	0		
	(b)Irregular	0	7	7	0		
8	Duration of menstruation					3.84	15.033 (S)
	(a)3days/month	0	0	7	0		
	(b)5days/month	0	7	9	0		
	(c)5days above/month	0	3	4	0		

Chi- square values were calculated to find out the association between post test scores on the levels of Haemoglobin in control group among adolescent girls with their demographic variables. It reveals that there was a significant association between post-test level of haemoglobin of Control group when associated with demographic variables of Age, Food pattern, ,Menstrual cycle and Duration of menstruation ($P < 0.05$). Whereas there was no significant association was found between post-test level of Haemoglobin with the demographic variables such as Religion, Educational status of father and Educational status of mother, family income per month ($P > 0.05$). It seems that Hemonutri ball on Haemoglobin level was effective to the control group irrespective of their demographic variables.

SUMMARY

This chapter dealt with analysis, interpretation of data collected to assess the effectiveness of Hemonutri ball on Haemoglobin level among the adolescent girls. The paired 't' test value (experimental group 't' value 59.08 and control group 't' value 8.06, table value 2.05, $P < 0.05$ level of significance) showed that the significant difference in the scores of Hemonutri ball on Haemoglobin level.. The unpaired 't' test value ('t' value 9.45 table value 2.00 at $P < 0.05$ level of significance) showed the significance of effectiveness on Hemonutri ball on Haemoglobin level in experimental group among adolescent girls. Chi square test showed that, there is significant association was found between experimental group With Their Demographic Variables of Age, Food pattern, Family income per month, Menstrual cycle and Duration of menstruation ($P < 0.05$). In Control group there was significant association was found with demographic variables of Age, Food pattern, Family income per month, Menstrual cycle and Duration of menstruation ($P < 0.05$)

CHAPTER V

DISCUSSION

This chapter deals with the discussion which was based on the findings obtained from the statistical analysis and its relation to the objectives of the study, the theoretical framework and the literature review.

A study to assess the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls in Selected Government Higher Secondary School in Villupuram district.

Objectives of the study were

- To assess the pre-test level and post-test level of Haemoglobin among the adolescent girls in experimental group and control group.
- To evaluate the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls in experimental group and control group.
- To find out the association between the post-test level of Haemoglobin among adolescent girls with their selected demographic variables in experimental and control group.

Objective 1: To assess the pre-test level and post-test level of Haemoglobin among the adolescent girls in experimental group and control group.

a) Frequency and percentage distribution of pre-test level of the adolescent girls in experimental and control group

Experimental group:

✓ Pre-test

- 100% of them are having moderate anemia
- None of them are not having mild, severe, and normal anemia.

✓ Post-test

- 60% of them are not having no anemia
- 40% of them are having mild anemia
- None of them are not having moderate and severe anemia.

Control group:

✓ Pre-Test

- 100% of them are having moderate anemia
- None of them are not having mild, severe, and normal anemia.

✓ Post-test

- 33.33% of them are in mild anemia
- 66.66% of them are in moderate anemia
- None of them are not having no anemia and severe anemia

Hypothesis1: There is a significant difference in the level of Haemoglobin among adolescent girls between experimental and control group. **So hypothesis H₁ is accepted.**

Objective 2: To evaluate the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls in experimental group

a) Paired ‘t’ value of pre-test and post-test scores of haemoglobin of the adolescent girls in experimental group and control group

Paired “t” test value calculated to analyze the difference in pre-test and post-test of haemoglobin.

- The paired “t” test value was 59.08 in experimental group for level of haemoglobin.
- The paired “t” test value was 8.06 in control group for level of haemoglobin.

b) Unpaired ‘t’ value of post test scores of haemoglobin of the adolescent girls in experimental group and control group

Unpaired ‘t’ test value calculated to analyze the difference in post-test of haemoglobin.

- The unpaired ‘t’ test value was 9.45 in post- test levels of pain in experimental and control group.

When compared to table value ($P < 0.05$) it was high. Hence it can be concluded that there is a significant difference between post-test levels of haemoglobin. It seems that Hemonutri ball was effective for experimental group.

c) Comparison of mean, standard deviation and percentage of pre and post-test level of haemoglobin.

➤ **Pretest Mean, Standard Deviation for Level Of Haemoglobin In Experimental Group And Control Group.**

- In experimental group the level of haemoglobin mean was 10, Standard deviation was 0.5343.
- In control group the level of haemoglobin mean was 10, Standard deviation was 0.9343.

➤ **Post-test Mean, Standard Deviation for Level Of Haemoglobin In Experimental Group And Control Group.**

- In experimental group the level of haemoglobin mean was 12, Standard deviation was 0.6533
- In control group the level of haemoglobin mean was 10, Standard deviation was 1.0871

d) Mean difference of pre-test and post-test levels of haemoglobin among experimental and control group

- In Experimental group the level of haemoglobin, the difference in mean was 0.0528.
- In Control group the level of haemoglobin, the difference in mean was 0.4338.

Hypothesis2: There is a significant difference between the effectiveness of Hemonutri ball on haemoglobin level among adolescent girls in experimental group than control group. **So the hypothesis H_2 is accepted.**

Objective 3: To find out the association between the post-test level of Haemoglobin among adolescent girls with their selected demographic variables in experimental and control group.

a) Association between the post-test level of Haemoglobin among adolescent girls with their selected demographic variables in experimental group

Chi- square values that there was a significant association between post-test level of haemoglobin of Experimental group when associated with demographic variables of Age, Food pattern, Family income per month, Menstrual cycle and Duration of menstruation ($P < 0.05$). Thus it can be interpreted that the difference in mean scores related to Age, Food pattern, Family income per month, menstrual cycle and Duration of menstruation were true difference.

However there was no significant association was found between post-test level of Haemoglobin with the demographic variables such as Religion, Educational status of father and Educational status of mother ($P > 0.05$). Hence it can interpret the difference in mean scores related to demographic variables were only by chance and not true difference.

b) Association between the post-test level of Haemoglobin among adolescent girls with their selected demographic variables in control group

Chi- square values that there was a significant association between post-test level of haemoglobin of control group when associated with demographic variables of Age, Food pattern, , Menstrual cycle and Duration of menstruation ($P < 0.05$). Thus it can be interpreted that the difference in mean scores related to Age, Food pattern, Family income per month, menstrual cycle and Duration of menstruation were true difference.

However there was no significant association was found between post -test level of Haemoglobin with the demographic variables such as Religion, Educational status of father and Educational status of mother ($P > 0.05$). Hence it can interpret the difference in mean scores related to demographic variables were only by chance and not true difference.

Hypothesis3: There is a significant association between post -test scores on the level of haemoglobin among adolescent girls with their selected demographic variables in experimental and control group. **So the hypothesis H₃ is accepted.**

SUMMARY

Discussion was made in this chapter based on objectives of the study and its relation with similar studies conducted by the other investigators; all the three objectives have been obtained. The 1st and 2nd, 3rd hypotheses has been accepted.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with the summary of the study, its findings, conclusion and the implications for Nursing administration, Nursing practice, Nursing education and Nursing research and with suggestions and recommendations for research in future.

SUMMARY

The primary aim of the study to assess the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls in Selected Government Higher Secondary Schools at Villupuram district.

The objectives of the study are

- To assess the pre-test level and post- test of Haemoglobin among the adolescent girls in experimental group and control group..
- To evaluate the effectiveness of Hemonutri ball on Haemoglobin level among adolescent girls in experimental group and control group.
- To find out the association between the post-test level of Haemoglobin among adolescent girls with their selected demographic variables in experimental and control group

HYPOTHESES

Researcher formulated and tested the following research hypothesis,

H₁: There is a significant difference in the post-test scores on level of Haemoglobin Among experimental and control groups of Adolescent girls.

H₂: There is a significant effectiveness on Hemonutri ball on Haemoglobin level in experimental group than control group among the adolescent girls.

H₃: There is a significant association between post-test scores on the level of Haemoglobin level among experimental group and control group among adolescent girls with their demographic variables.

The review of literature on related studies helped the investigator to design the methodology, conceptual framework and find out the tool. The literature reviews for the present study were presented under the following heading.

- The studies related to prevalence on anemia
- Studies related to causes of anemia among adolescent girls
- Studies related to iron and Vit-C supplementation
- Studies related to nutritional supplementation in increasing Haemoglobin among adolescent girls
- Studies related to effectiveness of Hemonutri ball on Haemoglobin among adolescent girls

The investigator developed J.Penders Health Promotion Model. The research design adopted for the study was True experimental pre-test, Post-test control group design. Setting chosen to conduct the study is Selected Government Higher Secondary School in Villupuram District. In this study the samples were Adolescent girls and the sample size was 30 in each experimental and control group. In this study probability Simple random sampling technique was used in this study.

The reliability of the tool is tested by implementing the tool on Government Higher Secondary School in Melsevur, Villupuram District. 6 adolescent girls in experimental group and 6 adolescent girls in control group. Test re-test method was used to test the reliability of the tool was found to be reliable, ($r^1=0.9$).

The Adolescent girls who fulfilled the inclusion criteria were selected as the samples and were given Hemonutri ball for 30 days. Data were gathered on Haemoglobin level using Sahli's Haemoglobinometer for the adolescent girls. The data gathered are analyzed by using descriptive and inferential statistical method and interpretation is made on the objectives of the study.

Major findings of the study

The major findings of the study were presented under the following headings

- Findings related to distribution of experimental and control group according to their demographic variables.
- Findings related to the level of Haemoglobin among adolescent girls in both groups.
- Findings related to the effectiveness of Hemonutri ball on Haemoglobin level in experimental and control group.
- Findings related to the association of the post test scores on the Haemoglobin level among adolescent girls in experimental group and control group with their selected demographic variables.

1. Findings related to distribution of experimental and control group according to their demographic variables.

Experimental group adolescent girls,

- Most of the adolescent girls 67% were in the age group of 15-16 years
- Most of the adolescent girls 97% were in Hindu religion
- Majority 47% of adolescent girls' educational status of the father was Non formal education and Primary education.
- Most of the adolescent girls 57% of Educational status of the mother were in Primary education
- Majority of the adolescent girls 83% of them had Non –vegetarian food pattern.
- Most of adolescent girls 87% % had Rs.1001-2000 of family income per month.
- Most of the adolescent girls 53% of them are having Irregular Menstrual cycle.
- Most of the adolescent girls 57% of Duration of Menstruation is 3days/month.

Control group adolescent girls,

- Most of the adolescent girls 40% were in the age group of 13-14 years
- Most of the adolescent girls 87% were in Hindu religion
- Majority 73% of adolescent girls educational status of the father were Non formal education.
- Most of the adolescent girls 80% of Educational status of the mother were in Primary education
- Majority of the adolescent girls 97% of them had Non –vegetarian food pattern.
- Most of adolescent girls 83% had Rs.1001-2000 of family income per month.
- Most of the adolescent girls 53% of them are having regular menstrual cycle.
- Most of the adolescent girls 53% of Duration of Menstruation are 5days/month.

2. Findings related to the level of Haemoglobin among adolescent girls in both group.

a) Experimental group for level of haemoglobin

✓ Pre-test

- 100% of them are having moderate anemia
- None of them are not having mild, severe, and normal anemia.

✓ Post-test

- 60% of them are not having no anemia
- 40% of them are having mild anemia
- None of them are not having moderate and severe anemia.

b) Control group for level of haemoglobin

✓ Pre-Test

- 100% of them are having moderate anemia
- None of them are not having mild, severe, and normal anemia.

✓ **Post-test**

- 33.33% of them are in mild anemia
- 66.66% of them are in moderate anemia
- None of them are not having no anemia and severe anemia

3. Findings related to the effectiveness of Hemonutri ball on Haemoglobin level in experimental and control group.

a) Paired “t” test value calculated to analyze the difference in pre-test and post - test of haemoglobin.

- The experimental group paired‘t’ test value was 59.08, $P < 0.05$).
- The control group paired‘t’ test value was 8.06, ($P < 0.05$).

b) Unpaired “t” test value calculated to analyze the difference in post- test of haemoglobin

- In the level of haemoglobin unpaired‘t’ test value was 9.45. ($P < 0.05$).

c) Comparison of mean, standard deviation and percentage of pre and post-test level of haemoglobin.

➤ **Pretest Mean, Standard Deviation for Level Of Haemoglobin In Experimental Group And Control Group.**

- In experimental group the level of haemoglobin mean was 10, Standard deviation was 0.5343.
- In control group the level of haemoglobin mean was 10, Standard deviation was 0.9343.

➤ **Post-test Mean, Standard Deviation for Level Of Haemoglobin In Experimental Group And Control Group.**

- In experimental group the level of haemoglobin mean was 12, Standard deviation was 0.6533

- In control group the level of haemoglobin mean was 10, Standard deviation was 1.0871

d) Mean difference of pre-test and post-test levels of haemoglobin among experimental and control group

- In Experimental group the level of haemoglobin, the difference in mean was 0.0528.
- In Control group the level of haemoglobin ,the difference in mean was 0.4338

4. Findings related to the association of the post- test scores on the level of Haemoglobin among adolescent girls in experimental group and control group with their selected demographic variables.

- Chi-square was calculated to find out the association between the post-test levels of haemoglobin among experimental and control group with their demographic variables.

Experimental group

- Chi-square value for age in year was 6.06 (P<0.05)
- Chi-square value for Religion was 0.0083(P>0.05)
- Chi-square value for educational status of father was 3.1339 (P>0.05)
- Chi-square value for educational status of mother was 2.258 (P>0.05)
- Chi-square value for food pattern was 31.058 (P<0.05)
- Chi-square value for family income per month was 5.0625 (P<0.05)
- Chi-square value for duration for menstruation was 6.06 (P<0.05)
- Chi-square value for menstrual cycle was 17.0334 (P<0.05)

Control group

- Chi-square value for age in year was 12.035 (P<0.05)
- Chi-square value for Religion was 0.008 (P>0.05)
- Chi-square value for educational status of father was 3.1339 (P>0.05)
- Chi-square value for educational status of mother was 0.008 (P>0.05)
- Chi-square value for food pattern was 29.25 (P<0.05)
- Chi-square value for family income per month was 4.0856 (P<0.05)

- Chi-square value for duration for menstruation was 8.0465 ($P < 0.05$)
- Chi-square value for menstrual cycle was 15.033 ($P < 0.05$)

CONCLUSION

From the findings of the study it can be concluded that,

- Most of the adolescent girls in experimental group were in the age group of 15-16 years, are in Hindu religion and the Educational status of the father and mother is in Non formal education, had the food pattern as non-vegetarian, and the family income per month is Rs 1001-2000 and they have irregular menstrual cycle had menstruation duration is 3 days/month.
- Most of the adolescent girls in control group were in the age group of 13-14 years, are in Hindu religion and the Educational status of the father and mother is in Non formal education, had the food pattern as non-vegetarian, and the family income per month is Rs 1001-2000, and they have regular menstrual cycle. And had menstruation duration is 5 days/month.
- The administration of Hemonutri ball was effective on the level of Haemoglobin among adolescent girls in experimental group.
- There was a significant association between the post-test scores of Haemoglobin level with their demographic variables in experimental group and control group.

IMPLICATIONS FOR NURSING

The findings of the present study have implications in the field of nursing education, nursing service, nursing administration and nursing research.

Nursing service

- Nurses working in the pediatric wards play a major role in promoting and supporting the health of the adolescent girls those who are having low level of Haemoglobin value.. Nurses should be equipped with adequate knowledge about the benefits of administration of Hemonutri ball to improve the level of Haemoglobin.

- Adolescent girls should be given adequate information about the effectiveness of Hemonutri ball administration in improving Haemoglobin level.
- This can be used in the community set up for reducing anemia.

Nursing Education

- Nursing curriculum needs to be update to identify the aspect of nursing care that the lacking to provide supportive education to alternative complementary therapy in nursing profession
- Nurse educators should educate the students regarding the benefits of taking of Hemonutri ball and importance of its implementation.
- Nurse educator should educate the Nursing personnel about the therapy among adolescent and find out the effectiveness.
- Nurse educator should educate the Nursing personnel about how to reduce the anemia.

Nursing Administration

- Nurse administrators can support the nurses for conducting the research on adolescent girls on improving Haemoglobin level and its recovery administration of Hemonutri ball.

Nursing research

- The study may be issued for further reference
- Further large scale study can be done in different settings.

RECOMMENDATIONS

Based on the findings of the study the following recommendations have been made for the study

- The study can be conducted with large samples to generalize the findings
- A study can be conducted to study the effectiveness of teaching in reducing the anemia by taking Iron rich diet.
- A similar study can be conducted in different settings (Community settings).

- A comparative study can be done between the Hemonutri ball and Rajagira leaves in improving Haemoglobin level.
- A different study can be conduct on Hemonutri ball on improving haemoglobin level among adolescent girls.

SUMMARY

This chapter deals with the summary of the study, major findings, conclusions, implications of the study in nursing field and recommendation for future.

BIBLIOGRAPHY

- ❖ Adolescence an age of opportunity, *“The state of world’s children 2011”*;
Pg no:1-3
- ❖ Annie Elizabeth,(2010),The effect of nutritive bolus on haemoglobin level,
Unpublished Dissertation, Sri Ramachandra Medical College Library.
- ❖ Assuma Beevi (2009), *Text book of paediatrics*, 1st edition, Noida,
Pg no: 197-199.
- ❖ Basavanthappa, BT, (2009), *“Nursing Research”* (2nd Edition), Jaypee brother
medical publisher.Pg.No:43.
- ❖ Brahman,“(2011), National institute of nutrition, Hyderabad, *“Food Science and
Nutrition”* MIN: Pg no: 66.
- ❖ Chatterjee.R (2008), Nutritional needs of adolescents, *“Paediatrics today”*, (3),
Pg. no; 110-114.
- ❖ Dongree,A.R., Deshmukh, P.R,Garg,B.S,(2011), Cross sectional study to
investigate risk factors for Iron Deficiency Anemia,*“ Food Nutrition Bull, ”*Dec,
32(4)Pg. no:315-323.”,
- ❖ Dorothy.R.Marlow, (2007), *“Text book of paediatrics”* (6thedition), Elsevier
publishers, published in New Delhi.Pg no: 1133-1136.
- ❖ Gawarika. R, Gawarika. S., Mishra, A.K, (2006), “Estimation of overall
prevalence of anemia, *“Indian Journal of Pediatrics”*, 31(4), 23.
- ❖ Gupta,A,. Parashar,A, Thakur.A, Sharma,D,(2012),“Cross sectional Descriptive
survey in selected school of Shimla District”, *Indian Journal Of Medical
Science*, May-Jun 66(5),Pg. no:126-130.
- ❖ Indian Academy of Paediatrics,(2007),*“Text book of Paediatrics”*,(4th edition),
Jaypee brothers, NewDelhi. Pg no;101-103.
- ❖ Indian Council of Medical Research, (2010), “Nutrient requirement and
prevalence of anemia”, *A report of the Expert group of the Indian Council of
Medical Research*, New Delhi.
- ❖ Jaman Osmanio,(2009),*“Nursing Manual of Nutrition and Therapeutic Diet”*,
Jaypee, New Delhi.Pg no:14-16.
- ❖ Jaya Mohan raj and Sujatha.T, (2008), “Effectiveness of Nutritional intervention
among women with anemia, *Nursing Times*, (9, 2).

- ❖ Josh .P, (2009), “Effect of Leaf Mixture Supplement on Haemoglobin level of adolescent girls school children, *International Journal Food Science and Nutrition*, Pg no:114-115.
- ❖ Kalita.M, (2010), “Impact of Iron Supplementation and scholastic performance of school children, *“Department of Food and Nutrition”* ..,
- ❖ Kaur,S, Deshmukh, P.R.Garg,B.S,(2006),“Epidemiological correlates of Nutritional Anemia in adolescent girls of Rural Wardha”, *Indian Journal of Community Medicine*,(31).Pg. no:255-258.
- ❖ Key data on Adolescence, (2013), “Published by Association for young people health.”
- ❖ Kowsalya. S,et,al.,(2007),“Impact of supplementation of Lotus stem on the iron nutritive of adolescent girls in Manipur, *”Indian Journal Of Nutrition and Dietetics*,(45),(47).
- ❖ Lal.S.Pankaj. (2007), “Prevalence of Iron Deficiency Anemia among adolescent school girls,” *Journal of Hematology*, 13, Pg no: 352-355.
- ❖ Lokeshwar, M.R, Nitin Shah, (2006), “Approach to a child with Iron Deficiency Anemia, *Community Medicine*, July, 13(4); Pg. no: 36-38.
- ❖ Mathur.J.S.S, (2007), *“Preventive and social Medicine, A Comprehensive Text Book (1st edition)*, CBS publishers and Distributors, Pg no: 382-389.
- ❖ Meenal Vinay Kulkarani, Durge, P.MKalishwar, N.B,(2012),“Cross sectional community based study on anemia among adolescent girls in an urban slum,” *National Journal of Community Medicine*,Jan-Mar,3(1),Pg. no:108.
- ❖ Mini sheath, Tance Shree Singh, Goyal ,(2014),“Intervention Trial with Pearl Millet Based Iron Rich Ladoo on Haemoglobin female in Bikand,” *Ethno, Med,Sci*,Pg no:77-82.
- ❖ Mohan Raj., J, et al, (2008), “Nature cure for anemia,” *Herald of Health*, Pg no: 8-10.
- ❖ Mohite R.V.,Kumbhar, S,M,Common menstrual problems among slum adolescent girls of Western Maharashtra India ,*“JKIMSU*,Vol,2;No:1, Jan –May 2011.
- ❖ National anemia Action council,(Jan14,2009,)“Anemia in adolescent: The teen Scene,*NAAC Article published*.
- ❖ Navas Carretas, (2008), “Oily fish increased iron bioavailability, *“American Journal of Nutrition*,(27)(1).

- ❖ Neha Kapoor, Madhu, (2012), “Impact of supplementation of Health Drink on hematologic profile and Serum retinol level of adolescent girls, “*International Journal of Food and Nutrition Sciences*, Vol-1, Issue-2. Oct-Dec 2012.www.ijfans.com.
- ❖ NirmalaT.Sathya, (2011), Prevalence of anemia among adolescent girls in Coimbatore, TamilNadu, “*Nightingale Nursing Times*, May; 7(2), Pg. no: 12-16.
- ❖ ParkK.,(2007).,“*Text book of preventive and Social Medicine.*,”(1st edition), Bhanot publishers, Jabalpur, Pg no:449-450.
- ❖ Paul.M,(2006),“Discovering Nutrition Iron Benefits and information. www.health.vitamin Guide.
- ❖ Polit &Beck, (2011). “*Nursing Research*”, (8th edition), Lippincott Publishers.
- ❖ Polit &Hungler., (2008), “*Nursing Research*”, Lippincott Publishers.
- ❖ Population Division, “*USN-DESA*,” World population prospectus (2010).
- ❖ Prabhakar Mishra.,(2012),“Prevalence of anemia among reproductive age group (15-45 yrs.’) of women in PHC of rural field practice area of Medical college, Ambala, India,“*Journal of women’s health care*”,*Vol-4*,Issue-2 Pg. no:152-156.
- ❖ Purnima Menon and Cronell. (2007), “Nutrition supplements cuts anemia in poor children by half.” Nutritional Science with the International food policy Research Institute, Eureka alert.www.yahoo.com.
- ❖ Rachana Boite.,(2011),“Magnitude of malnutrition on Iron Deficiency Anemia among Rural school children”., *An appraisal Asian “J.Exp.Biol.Sci.*,Vol-2(2),2011.”
- ❖ Rajaratnam.,J,Abel.,R,Asokan.,J.S,Janathan.P,(2007),“Prevalence of Anemia among adolescent girls of rural, TamilNadu, *Indian Paediatrics*,(37),Pg. no:532-536.
- ❖ Rajna Dhingra., (2011),“An assessment of the Health Status of adolescent girls in Tribal Girls of Jammu District, ”*Kamala Raj(2011),Stud Tribes*,9(2),Pg. no:133-138.
- ❖ Raj Sinh,V,Mobite Kumbhar ,S,M,Common menstrual problems among slum adolescent girls of Western Maharashtra India, “*JKIMSU*, Vol,2;No:1, Jan-June(2013).
- ❖ Rakee. (2011), “Effectiveness of Rajagira leaves Supplementation on haemoglobin level of adolescent girls in Raichur.A”, Pg.no:61-65. www.rguhs.com.

- ❖ Rakesh Kakkar, Monia Kakkar, S.D.Kandapal, Sumit Jethani, (2011), “Study of anemia in adolescent girls of Bhopal”, *Indian Journal of Community health*”, Uttar hand, Vol 22, No2, (2010-2011). www.iapsmupuk.org.
- ❖ Ramachandra Shatty, et, al, (2013), “Prevalence of anemia among Tribal women of Reproductive age in Udupi Taluk, Karnataka, “*J.Farm, Med, Primary Care*.
- ❖ Ramesh Verma., (2013).,“Prevalence of anemia among adolescent under IBSY in Rural block of Northern India.,*Vol-2,Issue-9*, Pg no:56-60.
- ❖ Ramzi.,M., and Zare.,N(2011).,“Anemia and Iron Deficiency in adolescent school girls in Kavar Urban Area, Southern Iran, *Iran Red Crescent Medicine*,13(2), Pg no:128-133.
- ❖ Rani.V.,Brower, Khetarpaul, Zimmerman M.B, (2009),“Iron status and associated factors in Rural school going children, in Haryana State”, *Indian European Journal of Clinical Nutrition*,Pg: no:18-20.
- ❖ Richa. C.P.Mishra Amit Kawashit, S. Ahamad Mango. et,al., (2012), “Prevalence of anemia in rural adolescent girls of Varanasi District”, “*Indian .Preventive Social Medicine* .Vol-43,No;1:Pg no:56-58.
- ❖ Report of technical group on, “*Population project constitution,*”: by National Commission Population May 2006.
- ❖ Sachin Randey,(2013),“A cross sectional study of Nutritional Anemia among Medical Students in a Medical College, Chattisgarh”., *National Journal of Medical Research*,Vol-3,Issue-2,April-June.
- ❖ Sangh.J.K,Kaur Suk deep,(2010),“Effect of weekly Iron and With Vit-C supplementation on anemic status of adolescent girls ,Vol-4,Issue-1&2,*Dept of food & (3),Nutrition*,Pg no:92-97.
- ❖ Sarika More, Sumeet Shende.,(2013),“Prevalence of anemia ,*Journal of evolution Medical &Dental Services*, Jan 65(2),Pg no:56-59.
- ❖ Shabnam Omnidvar,Khyrunnisa Begum (2011),“Menstrual pattern among unmarried women from South India”,” *Journal of Natural Science Biology and Medicine*,Vol-(2),(2),July 2011,:Pg no:174-179.
- ❖ Shilpa. S.Biradar.,et,al.,(“2012),Prevalence of anemia among adolescent girls .*Journal of Clinical And Diagnostic Research*,May6(3),Pg no:372-377.
- ❖ Siddharam,S.M,Venkatesh,G.M and Thyiishwari,H.L(2010),“A study of anemia among adolescent girls in Rural area of Hassan District,Karnataka,South India. *International Journal of Bio Medical Research*,2(4),Pg no:922-924.

- ❖ Sindhu.S.Mangala, Sherry,(2013),“Efficacy of Moringa Olifera “in treating Iron Deficiency Anemia in women of reproductive age group”, *International Journal of Phototherapy Research* ,Vol-3,Issue-4,Pg no:201.
- ❖ Singh Ekta Pantaj Kumar,Swapnil,“(2013).,“Effect of food based iron supplementation on Physical work performance of adolescent girls in Banasthali Campus, *International Journal of Pharmacy*,Apr-Jun,Vol-1,Issue1&2,Pg no:107-110.
- ❖ Statistics Portal, (2010), “*Adolescent Population World Wide 2010*” by region.
- ❖ Sudhangandhi, Sivapatham Sundreasan, Ebenzil. A Prema,(2011),“Prevalence of anemia in school children of Kattangaluthur,Tamil Nadu,*India,Vol-1,Issue2*:Pg no:184-185.
- ❖ Sundar Lal, “*Text book of Community Medicine*”, CBSpublisher, Pg no: 115-130.
- ❖ Sunil Pal Singh, (2014) “Prevalence of Nutritional Anemia in primary school children in urban slum area of Hyderabad. *British bio Medic it bulletin*, Pg no: 45-49.
- ❖ Suraj Gupta,(2009),“*Text book of paediatrics*”,(11th edition),Jaypee brothers, NewDelhi.Pg no:212-214.
- ❖ Technical group on Population Projection .,(2012),“By region”.
- ❖ Thakur.A.et.al.,(2011).,“Epidemiological correlates of Nutritional Anemia among adolescent girls of a Hilly region”., *Indian Journal of Maternal child health*:13(3),Pg no:1-7.
- ❖ Thilagam,(2007).,“Effectiveness of Nutritional Intervention on Dietary management on anemia among adolescent girls.” *Indian Journal of Clinical Nutrition*, Pg no; 24-28.
- ❖ Dr U.N Panda, “*Hand book of paediatrics* “published by CBS publishers, Published in New Delhi, (2007), Pg no; 115-120.
- ❖ Vanisha, S, Nambai.,(2011),“Effect of Drumstick leaves supplementation on haematological indices of young girls”, *International Journal of Pharmaceutical and biological Achieves 2020*,”Pg no:261-266.
- ❖ Verma .M, Rawa,V.S,Kedia,G.Kumar.D,Chauhan.J, (2004),“Factors influencing anemia among girls of school going age from the slums of Ahmadabad city, “*Indian Journal of Community Medicine*,24(1).

- ❖ World Wide Prevalence of anemia 1993-2005,“**WHO Global Data Base on anemia Geneva, Switzerland.**
- ❖ WHO, Global Data Base on anemia Geneva, **WHO (2007).**
- ❖ WHO, Global Data Base on anemia Geneva, **WHO (2013).**
- ❖ Wong’s,“**Essentials of Paediatric Nursing**”,(8th edition),published by Mosby publisher, published in India 2009.Pg no;915-917.
- ❖ Yadav and Sehaga, (2000), Effect of domestic processing on iron”, **Nutrition Health**, (10), (2).
- ❖ Yalini, V.S.Balrajan, (2013), “Changing pattern of social inequalities in anemia among women in India. Cross sectional study on nationally representative survey. **MI open, Vol-3, Issue-3.**
- ❖ Yasmin Isik bal ,(2012),“M.D.Aysun Karabulut,M.D Dolunary Ibrahim Ethem, “**Iranian Journal of paediatrics**Vol-22,No-1,Mar(2012),Pg no:77-81.
- ❖ Yogitak.Sanab,Kalpana Jadhav,“(2014),“Effect of supplementation of poha ladoo on haemoglobin level in Tribal anemic adolescent girls, Jan-Mar 2014,Vol-1,Issue-1,“**Journal of Ready to Eat foods**” ,Pg no:18-21.

Net references

- <http://www.indianjournals.com/ijor.aspx>
- <http://www.scribd.com/doc/>
- www.omicsonline.org
- www.pubmed.com
- www.wrongdiagnosis.com
- www.indianpaediatrics.net
- www.nutrition.com
- [www.soyabeans/nutritional-values-of-soya beans](http://www.soyabeans/nutritional-values-of-soya-beans)
- www.nutritionandyou.com/papaya-fruit.html.
- [Family.wikinut.com/benefits of millets/3-rajan jolly.hubpages.com/hub/benefits of Jaggery](http://Family.wikinut.com/benefits-of-millet/3-rajan-jolly.hubpages.com/hub/benefits-of-Jaggery)
- [www.livestrong.com/article/505486-green gram-dal-health benefits.](http://www.livestrong.com/article/505486-green-gram-dal-health-benefits)

APPENDIX-1

PERMISSION SEEKING LETTER TO CONDUCT THE STUDY

From

Ms .C.GOMATHI
M.SC (NURSING) IIEAR
DHANALAKSHMI SRINIVASAN COLLEGE OF NURSING
PERAMBALUR

To

THE HEADMASTER
GOVT.HIGHER.SECONDARY.SCHOOL
THAIYUR
VILLUPURAM DISTRICT

Through proper channel: By Principal,DhanalakshmiSrinivasan College Of Nursing,

Perambalur

Respected Madam/Sir,

Sub: Letter for seeking permission to conduct main study-Reg

Ms.C.Gomathi.M.SC Nursing Programme in our college.As part of our educational requirement ,we need to conduct a study ,"A STUDY TO ASSESS THE EFFECTIVENESS OF HEMONUTRI BALL ON HEMOGLOBIN AMONG ADOLESCENT GIRLS IN SELECTED GOVT.HR.SEC.SCHOOL ,THAIYUR,VILLUPURAM DISTRICT.."

This is for dissertation to be submitted to the TamilnaduDr.MGR.Medical University in partial fulfilment of the university requirement for the award of M.SC Nursing degree and will be beneficial.We will not cause any inconvenience to the routine schedule.Permission may be granted to conduct the study at your esteemed institution.

Further study details will be furnished by the student personally .We shall adhere to the institutional policy and regulations.

Thanking you,

Your's faithfully,

C.Gomathi
C.GOMATHI

J. J. J.
For PRINCIPAL
DHANALAKSHMI SRINIVASAN
COLLEGE OF NURSING,
PERAMBALUR - 621 212

J. J. J.
தலைமையாசிரியர் (பொ)
அரசினர் மேல்நிலைப்பள்ளி,
தையூர்-604805.

APPENDIX-1

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Thanking you,

Your's faithfully,

C.Gomathi
C.GOMATHI


D. S. S.
For
PRINCIPAL
DHANALAKSHMI SRINIVASAN
COLLEGE OF NURSING
PERAMBALUR - 621 212

K. P. Mofe
HEAD MASTER
Govt.Hr.Sec.School
Chenji-604 202
Villupuram District.

APPENDIX II

CONTENT VALIDITY CERTIFICATE

This is to certify that Ms Gomathi.C,2ndyear M.SC Nursing, College of Nursing, The Tamil Nadu Dr.M.G.R.Medical University, Chennai. has obtained content validity for demographic data and assessment of tool on hemoglobin level for a study to assess the “EFFECTIVENESS OF HEMONUTRI BALL ON HEMOGLOBIN LEVEL AMONG ADOLESCENT GIRLS AT SELECTED GOVERNMENT HIGHER SECONDARY SCHOOL IN VILLUPURAM DISTRICT.”


DR. P.N. RAMESH BAABU,
M.B.B.S., D.C.H., M.H.Sc. (PREV. CARDIO)
Regd. No. 48558,
SPECIAL GRADE MEDICAL OFFICER,
PANCHAYAT UNION DISPENSARY,
AVIYUR-604 202, VILLUPURAM DT.

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **30111512**, M.Sc. (Nursing) Final year of Dhanalakshmi Srinivasan College of Nursing, Perambalur (Affiliated to the Tamil Nadu Dr. M.G.R. Medical University, Guindy, Chennai) is validated and can proceed with this tool and content for the main study entitled **“A Study To Evaluate The Effectiveness Of Hemonutri Ball On Haemoglobin Level Among Adolescent Girls At Selected Government Higher Secondary School In Villupuram District.”**

Name of the institution

Signature with date

FORMAT FOR TOOL VALIDATION

EVALUATION CRITERIA CHECKLIST FOR VALIDATION

INTRODUCTION

The expert is requested to go through the following criteria for evaluation. Three columns are given for responses and a column for remarks. Kindly place tick mark in the appropriate column and given marks.

INTERPRETATION OF COLUMN

Column I :Meets the criteria

Column II :Partially meets the criteria

Column III :Does not meet the criteria.

S.No	Criteria	1	2	3	Remarks
1	Scoring <ul style="list-style-type: none">• Adequacy• Clarity• Simplicity				
2	Content <ul style="list-style-type: none">• Logical sequence• Adequacy• Relevance				
3	Language <ul style="list-style-type: none">• Appropriate• Clarity• Simplicity				
4	Practicability <ul style="list-style-type: none">• It is easy to score• Does it precisely• Utility				

Signature :

Any other suggestion

Name :

Designation :

Address :

APPENDIX –III

INFORMED CONSENT

I am giving my consent to participate in the research. I understand that I will be assessed for my level of haemoglobin. I have been informed that my participation is convenient and after the study begins, I can refuse to answer or participate at any point of the time during the study. I have been fully informed about the nature of the study, the researcher responsibilities and likely benefits that would be used.

Signature of the participant

Date:

Place:

APPENDIX IV

SECTION A

DEMOGRAPHIC VARIABLES

INSTRUCTION TO THE PARTICIPANTS

The following statement is related to your personal data. Read each item and put tick () mark in the corresponding boxes which is suitable to you.

1. Age (in years)
 - a) 13-14 years ()
 - b) 15-16 years ()
 - c) 17-18 years ()
2. Religion
 - a) Hindu ()
 - b) Christian ()
 - c) Muslim ()
 - d) Others ()
3. Educational status of father:
 - a) Non formal education ()
 - b) Primary education ()
 - c) Higher secondary education ()
 - d) Graduate above ()

4. Educational status of mother:
- a) Non formal education ()
 - b) Primary education ()
 - c) Higher secondary education ()
 - d) Graduate above ()
5. Food pattern
- a) Vegetarian ()
 - b) Non vegetarian ()
6. Family income per month
- a) Rs1001-2000 ()
 - b) Rs 2001-3000 ()
 - c) Above Rs 3000 ()
7. Duration of menstruation
- a) 3 days / month ()
 - b) 5 days / month ()
 - c) 5 days above /month ()
8. Menstrual cycle
- a) Regular ()
 - b) Irregular ()

ASSESSMENT TOOL:

SAHLI'S HAEMOGLOBINOMETER

Hb level on first day	Hb level after 30 days.

SCORING:

NO ANEMIA	:	> 12mg/dl
MILD ANEMIA	:	11-11.9mg/dl
MODERATE ANEMIA	:	8-10.9mg/dl
SEVERE ANEMIA	:	< 8mg/dl

APPENDIX V

TAMIL TRANSLATION OF THE TOOLS

Xg;Gjy; gbtK;

vd;Dila gq;F Ra tpUg;gk; vd;gJk; ve;jNeuj;jpYk; ehd; gq;F
ngw kWf;fyhkÊ my;yJ jfty; njhptpf;fhky; ,Uf;fyhk; vd;gJ vdf;F
vLj;Jiuf;fg;gl;Ls;sJ.

,e;j Muha;r;rpád; jd;ik Fwpj;Jk; Ma;thshpd; nghWg;Gfs;
Fwpj;Jk; kw;Wk; ,jdhy; Vw;gl \$ba ed;ikfs; Fwpj;Jk; ed;F
mwpNtd;.

,g;gbf;F

gq;F ngWgthpd; ifnahg;gk;

Njpp :

,lk; :

jdpeguÊ águkÊ

1)taJ (tUlq;fspyÊ)

m) 13-14 ()

M) 15-16 ()

,) 17-18 ()

2) kjk;

m) ,e;J ()

M) fpwp];Jtk; ()

,) K];ypk; ()

<) kw;wit ()

3) jeÊÊijádÊfy;tpj;jFjp:

m) gbf;fhjtH ()

M) mbg;gFjpapy; fy;tp ()

,) caHepiyfy;tp ()

<) fy;Yhupf;fy;tp ()

4) jhádÊfy;tpj;jFjp:

m) gbf;fhjtH ()

M) mbg;gFjpapy; fy;tp ()

,) caHepiyfy;tp ()

<) fy;Yhupf;fy;tp ()

5) FLk;gj;jpd; czTgof;ftof;fq;fs;
 m) irtk; ()
 M) mirtkÊ ()

6) khj FLkÊg tUkhdkÊ
 m) &ghaÊÊ (1001-2000) ()
)
 M) &ghaÊÊ (2001-3000) ()
)
 ,) &ghaÊ Ê3000jÊšwÊÊFkÊ NkyÊ ()

7) khjtplha; Row;rp
 m) njhlHr;rpahd ()
 M) njhlHr;rpaw;w ()

8) khjtplha; Row;rpapd; msT
 m) %d;Wehs;Ækhjk; ()
 M) le;Jehs;Ækhjk; ()
 ,) le;Jehl;fSf;FNky;Ækhjk; ()

APPENDIX VI
BLUE PRINT OF HEMONUTRI BALL
NUTRIENTS OF HEMONUTRI BALL AND VIT-C

Soya beans:

Soya beans are having very high protein content, a lot of fibre rich in calcium and magnesium. It is supposed to be very nutritive in value as there are 3 major classes of macronutrients namely carbohydrate, fat and protein is high. They also rich in mineral like iron, folic acid and Vit-b complex. The highest protein of any grain (or) legume, substantial amount of vit-k, riboflavin, thiamine and Vit-c.

Cholam:

Cholam (or) sorghum is rich in potassium and phosphorous .It has good amount of calcium with small amount of iron and sodium. It has good amount of thiamine and niacin with small amount of riboflavin.

Green gram:

Green gram is otherwise known as “vigna radiate”. Green gram are rich in other minerals like calcium, sodium, magnesium, zinc, phosphorous and potassium. The seeds are rich in other minerals like folate and appreciable amount of Vit-c.

Jaggery:

Jaggery is a natural source of sugar, vitamins and minerals, thiamine, niacin, zinc, chromium and copper. The plus point with consumption of Jaggery is low fat and low sodium content.

Papaya:

Papaya is rich in Vit-A, Vit-C, Vit-B complex, folate, minerals and fibre, calcium (i.e) rich in antioxidants , decrease in sodium and calories, high in potassium and no cholesterol. It is one of the fruits with higher Vit-c content more than in orange or lemons.

Nutritive value of Hemonutri ball and Vit-c:

Energy : 381.3 kcal

Iron : 10.25mg

Carbohydrate: 61.76gm

Protein : 13.28gm

Fat : 4.54 gm

Vit-C : 23mg

Health benefits of soya beans:

1. It helps to include alleviation of menstrual symptoms and lowering cholesterol and decrease risk of osteoporosis.
2. It helps to reduce malnutrition, cancer and heart disease.
3. It helps to increase weight gain.
4. Diabetic patient are also seems to get benefit a lot from soya beans.
5. It helps to improve digestive health, and promotes bone health, protect against birth defects and increase in circulation.

Health benefits of Cholam:

1. It is good in treatment of celiac disease and allergies.
2. It helps to improve cardiovascular health.

3. It helps to keep bone and teeth healthy giving energy to body. It also maintains health of heart, control diabetes, arthritis and weight of the body.
4. It can also decrease the risk of certain type of cancer in humans.
5. It is known to be heart healthy.

Health benefits of green gram:

1. It helps to lower blood pressure
2. It act as an lean source of protein
3. It helps to clear toxins from the body
4. It helps to reduce the cholesterol level
5. It helps to prevent breast cancer
6. It has a skin anti-aging effect.

Health benefits of Jaggery:

1. It improves digestion
2. It regulates blood pressure
3. It helps to cure bile disorder
4. It helps to cure asthma.
5. It helps to prevent anaemia.
6. It helps to relieve muscle cramps
7. It helps to relieve menstrual pain.

Health benefits of papaya:

1. It helps to improve digestion, prevent constipation, control diarrhoea and decrease risk of colon cancer.
2. It is benefit in heart disease especially in people with diabetes.
3. It helps in preventing prostate cancer.
4. It is good for eye sight in general but has excellent protective action against muscular degeneration.

5. It controls dandruff and it is good for hair benefits in irregular menses.
6. Eating papaya benefit in jaundice.
7. It helps in protection against rheumatoid arthritis.
8. It helps to improves the immunity due to Vit-C, E, A in it and benefit in throat infection like tonsil.

Preparation of Hemonutri ball and Vit-C (papaya):

Ingredients :

Soya beans 20 gm, Cholam 20 gm, Green gram ,10 gm, Jaggery 50 gm, Hot water 30 ml, Papaya 23 mg,

S.No	Ingredient	Amount(gms)	Iron(mg)	Vit-c(mg)
1.	Soya beans	20 gms	2.3 mg	-
2.	Cholam	20 gms	1.2 mg	-
3.	Green gram	10 gms	1.0 mg	-
4.	Jaggery	50 gms	5.75 mg	-
5.	Papaya	-	-	46 mg
	Total	100 gms	10.25 mg	46 mg

The Hemonutri ball should be given to the adolescent girls twice a day because the iron requirement for adolescent girls 12-28 mg/day. The papaya should be given twice a day because normal intake of Vit-c per day is 30-50 mg/day.

Procedure:

Preparation of Hemonutri ball:

Heat the Kadai in stove. Then dry roast the 3 ingredients such as Soya beans 1Kg 200gm, Cholam 1Kg 200gm, Green Gram 600 gm, and grind it well to make 60 Hemonutri ball. Then crush the 3 Kg of Jaggery powder of 3Kg. mix the 3 kg of

Jaggery with grinded ingredients and blend it well by adding needed amount of hot water. Finally make 100 gm of hemonutri ball for 60 persons.

Hemonutri ball along with Vit-C into your everyday diet to cure and prevent many ailment and illness and also to improve overall health of a person. Hemonutri ball are considered as the most essential home remedy for anaemia, because of its high iron content and Vit-c that regenerates and reactive the red blood cells, supplying fresh oxygen to the body and increasing the blood count regularly.

APPENDIX - VII

LIST OF EXPERTS

- Mrs.Prema.P, M.Sc.(N),Ph.D.,
Principal,
Department Of Community Health Nursing,
Navodaya College Of Nursing,
Raichur.
Karnataka State.

- Mrs.Shameem, M.Sc.(N),
Vice Principal,
Department Of Child Health Nursing,
Navodaya College Of Nursing,
Raichur,
Karnataka State.

- Mr. Praveen Prakash, M.Sc(N),
Assistant Professor,
Department Of Pediatric Nursing,
Swift Institute Of Nursing Vill,

Rajpura,
Patiala District,
Punjab.

- Mr.U.N.Dhandargi,
Assistant Professor,
Department Of Community Health Nursing,
Shri B.V.V.S,Sajjala Shree Institute Of Nursing Services,
Bagalkot, Karnataka State.

- Mrs.G.P.Revathy, M.Sc(N),
Reader,
Department Of Pediatrics Nursing,
Kongunadu College Of Nursing,
Coimbatore.

- Dr.P.N.Ramesh Babu,M.B.B.S.,D.C.H.,M.H.Sc.,(Prev.Cardic)
Department Of Child Health Nursing,
Special Grade Medical Officer,
Aviyur,
Villupuram District.

- Ms. Sakthi Uma Maheshwari,M.Sc (Nutrition and Dietician),
Rangapoopathi College Of Nursing,
Alampoondi,

Villupuram District.

- Mr.Senthil Kumar, M.Sc.,M.Phil.,
Department Of Statistics,
Dhanalakshmi College Of Nursing,
Perambalur.

- Mrs.V.Shalini,M.A,B.ed.,
Graduate Teacher in English
Government Higher Secondary School,
Rajampuliyur,Villupuram District.

- Mrs. S.kokila,M.A,B.ed.,
Graduate Teacher in Tamil,
Government Higher Secondary School,
Thaiyur,
Villupuram District.

APPENDIX-VIII
PHOTOGRAPHS



- 1. SOYABEANS (20 gm)**
- 2. JAGGERY (50gm)**
- 3. CHOLAM (20gm)**
- 4. PAPAYA (50gm)**
- 5. GREEN GRAM (10gm)**



