

**EFFECTIVENESS OF NUTRITIONAL INTERVENTION ON  
ANEMIA AMONG ADOLESCENT GIRLS  
WITH IRON DEFICIENCY ANEAMIA IN  
NANCHIYAMPALAYAM AT  
DHARAPURAM**

**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.  
MGR MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL  
FULFILLMENT OF THE REQUIREMENT FOR THE  
DEGREE OF MASTER OF SCIENCE  
IN NURSING  
2009 – 2011**

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NUTRITIONAL INTERVENTION ON ANEMIA AMONG  
ADOLESCENT GIRLS WITH IRON DEFICIENCY  
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AT DHARAPURAM**

APPROVED BY DISSERTATION COMMITTEE ON \_\_\_\_\_

**RESEARCH GUIDE :-**

Prof. Mrs. Vijayarani Prince,  
M.Sc(N), M.A., M.A., M.Phil(N),  
Principal,  
Bishop's College of Nursing,  
Dharapuram.

**CLINICAL GUIDE:-**

Mrs. Sheela Rani , M.Sc (N),  
Department of Community Health Nursing,  
Bishop's College of Nursing,  
Dharapuram.

**MEDICAL EXPERT :-**

Dr. Joseph.S, M.B.B.S., FSHM.,  
Medical Superintendent,  
C.S.I. Dr. Anne Booth Mission Hospital  
Dharapuram.



Dr JOSEPH.S. M B B S  
REG NO:86601  
MEDICAL OFFICER  
C S.I.Dr.ANNE BOOTH  
MISSION HOSPITAL  
DHARAPURAM-638656

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Certified Bonafide Project Work  
Done By

Mrs. NEEBA ANIYAN

M.Sc., Nursing II Year  
Bishop's College of Nursing  
Dharapuram.

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Internal Examiner

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External Examiner

COLLEGE SEAL

**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.  
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## **CONTENT**

CHAPTER	TITLE	PAGE NO
<b>I</b>	<b>(i)INTRODUCTION</b>	1-17
	Background of the Study	1
	➤ Need for the study	4
	➤ Statement of the problem	8
	➤ Objectives of the study	9
	➤ Operational definitions	9
	➤ Hypotheses	11
	➤ Assumptions	11
	➤ Delimitations	12
	➤ Projected outcome	12
	<b>II</b>	<b>(ii) Conceptual framework</b>
<b>REVIEW OF LITERATURE</b>		18-36
<b>PART-I</b>		
➤ Over view of Iron Deficiency Anemia		18
<b>PART-II</b>		
A. Studies related to Iron Deficiency Anemia		26
among adolescent girls		
i) Prevalence of iron deficiency anemia		26
ii) Epidemiological correlation of		29
nutritional anemia		
iii) Pervasiveness of anemia		30
iv) Nutritional status of adolescent girls	31	
from an urban slum		
v) Sign and symptoms of anemia	31	
vi) Source of iron rich foods	32	

<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE NO</b>
	vii) Anemia prophylaxis in adolescents girls	32
	B. Studies related to nutritional intervention in anemia	33
<b>III</b>	<b>METHODOLOGY</b>	37-42
	➤ Research approach	37
	➤ Research design	37
	➤ Setting of the study	37
	➤ Population	38
	➤ Sample	38
	➤ Criteria for sample selection	38
	• Inclusion Criteria	
	• Exclusion Criteria	38
	➤ Sample size	38
	➤ Sampling technique	
	➤ Instrument	38
	▪ Description of the tool	39
	▪ Scoring procedure	40
	➤ Validity and reliability of the tool	40
	➤ Pilot study	41
	➤ Data collection Procedure	42
	➤ Plan for data analysis	42
	➤ Protection of human subjects	
<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE</b>

		<b>NO</b>
<b>IV</b>	<b>DATA ANALYSIS AND INTERPRETATION</b>	43-62
<b>V</b>	<b>DISCUSSION</b>	63-67
<b>VI</b>	<b>SUMMARY , CONCLUSION AND IMPLICATIONS</b>	68-70
	• Nursing practice	70
	• Nursing education	70
	• Nursing administration	71
	• Nursing research	71
	➤ <b>RECOMMENDATIONS</b>	71
	➤ <b>LIMITATIONS</b>	71
<b>VII</b>	<b>BIBLIOGRAPHY</b>	72-75
	• References	
<b>VIII</b>	<b>APPENDICES</b>	i-xx



## LIST OF TABLES

Table No.	Title	Page No.
1	Frequency and percentage distribution of demographic variables of adolescents girls with iron deficiency anemia	44-45
2	Frequency and percentage levels of anemia among adolescent girls before nutritional intervention	55
3	Frequency and percentage levels of anemia among adolescent girls after nutritional intervention	56
4	Comparison of frequency and percentage distribution of levels of anemia among adolescent girls with iron deficiency anemia before and after nutritional intervention	57
5	Comparison of mean, mean percentage, standard deviation and 't' value score of level of anemia in pretest and posttest	59
6	Association of the level of iron deficiency anemia among adolescent girls with their selected demographic variables	60

## LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
1	Conceptual frame work	17
2	Percentage distribution of adolescent girls with iron deficiency anemia according to age	47
3	Percentage distribution of adolescent girls with iron deficiency anemia according to educational status	48
4	Percentage distribution of adolescent girls with iron deficiency anemia according to total family members	49
5	Percentage distribution of adolescent girls with iron deficiency anemia according to type of family	50
6	Percentage distribution of adolescent girls with iron deficiency anemia according to monthly income of the family	51
7	Percentage distribution of adolescent girls with iron deficiency anemia according to their religion	52
8	Percentage distribution of adolescent girls with iron deficiency anemia according to type of food consumption	53
9	Percentage distribution of adolescents girls with iron deficiency anemia according to the source of health information	54
10	Percentage distribution of level of anemia among adolescent girls with iron deficiency anemia before and after nutritional intervention	58

## LIST OF APPENDICES

APPENDIX	CONTENT	PAGE NO.
<b>A</b>	Letter seeking permission for conducting the study	i
<b>B</b>	Letter seeking experts opinion for content validity	v
<b>C</b>	List of experts of validation	vi
<b>D</b>	Certificate for validity	vii
<b>E</b>	Certificate for English editing	vii
<b>F</b>	Area Map - Nanchiyampalayam	xii
<b>G</b>	Structured Observational Checklist	xiv
<b>H</b>	Nutritional Intervention	xvii
	A) Preparations of nutritional ball	
	B) Cost effectiveness of Nutritional ball	
<b>I</b>	Photos	xix

## **ABSTRACT**

Anemia is a clinical condition that results from an insufficient supply of healthy Red Blood Cells to oxygenate the body's tissue adequately; hypoxia results. Iron deficiency anemia is a chronic hypochromic, microcytic anemia resulting from an insufficient supply of iron in the body, without iron. It is necessary to improve the hemoglobin level for preventing anemia.

This study was aimed to assess the effectiveness of nutritional intervention on anemia among adolescent girls with Iron Deficiency Anemia in Nanchiyampalayam at Dharapuram.

The conceptual framework of the study was based on the modified revised Pender's Health Promotion Model(2002). The design used for the study was one group pretest posttest pre experimental design. Non- Probability Purposive sampling technique was used to select 50 samples for the study. The tool used for the study was observational checklist and Sahli's Hemometer. 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 hemoglobin 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 data gathered was analyzed using descriptive and inferential statistics. There is significant difference between pretest and post test score ('t' value = 8.94). Statistical analysis showed that the nutritional intervention in posttest was highly significant at  $P < 0.05$  level. The study findings revealed that there was a significant improvement in hemoglobin level followed by nutritional intervention among adolescent girls with iron deficiency anemia.

# CHAPTER - I

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# CHAPTER - II

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# CHAPTER - III

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# CHAPTER - IV

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# CHAPTER - V

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# CHAPTER - VI

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# REFERENCE

# APPENDICES

## CHAPTER – I

*“The doctor of the future will no longer treat the human frame with drugs, but rather will cure and prevent disease with nutrition”.*

*Thomas Edison*

### INTRODUCTION

#### BACKGROUND OF THE STUDY

World's interest in adolescent health issues has grown dramatically in the past decade beginning with the International Year of Youth in 1985 and the World Health in 1989, when discussions were focused on the health of the youth.

**Kaur S., (2005)**

The term adolescence is derived from the Latin word 'adolescence' meaning, "to grow, to mature". Traditionally, adolescence is defined as the period from the onset of puberty to the termination of physical growth and attainment of final adulthood and characteristic. Adolescence constituted 22.8% of population in India as on 1<sup>st</sup> March 2000.

**Ghai O.P.,(2004)**

Adolescence is the period between child hood and adult- hood with accelerated physical, bio chemical and emotional development. This period is characterized by the rapid increase in height and weight, hormonal change resulting in sexual maturation and causing wide swings of emotion. During the period 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 the body during adolescence. Increased physical activity, combined with poor eating habits and onset of menstruation contribute to accentuating the potential risk for adolescents of poor nutrition.

**Yegammai C., (2004)**

Almost one sixth of India's population comprises of adolescents. An adolescent boy or girl is still a developing child. Among adolescents, girls constitute a vulnerable group, particularly in developing countries where they are married at an early age and exposed to a greater of reproductive morbidity and mortality.

Anemia is established if the hemoglobin is below the cut-off points of World Health Organization. Most frequent cause of nutritional anemia is iron deficiency, and less frequently folate or Vitamin B12. In India iron deficiency anemia is most wide spread micro nutrient deficiency affecting all age groups irrespective of gender, caste, creed and religion.

As per district level health survey (2002-2004), prevalence of anemia in adolescent girls is very high (72.6%). In India, with prevalence of severe anemia among them is much higher (21.1%) than that in pre school children (2.1%)

**Park K.,( 2009)**

Iron is found not only in every cell of the human body but also in all living things, both plants and animals. Iron forms a major component of the protein, hemoglobin in RBC and myoglobin in muscle

cells. The daily requirement of iron by a woman is twice as greater as a man's, but anyone who loses blood loses iron.

**Card J.,(1994 )**

Iron deficiency anemia, one of the most common chronic hemolytic disorders, is found in 10% to 30% of the population in the United States. Regardless of economics or geography, iron deficiency anemia is most common in infants, children, women who are pre- menopausal or pregnant and older adults.

Iron deficiency anemia is the most widespread form of malnutrition. In Tamil Nadu 57% of women have some degree of anemia i.e. 37% of women are mildly anemic, 16% are moderately anemic and 4% are severely anemic. Prevalence of anemia is slightly higher for young women less than age 25 than for older women. It is higher for rural women (59%) than for urban women (52%). The anemic levels for children age 3 to 35 months is 69% including 25% mild anemic, 40% moderately anemic and 7% severely anemic. Children aged 12 to 23 months; children of higher order births, children in rural areas, and children of working women and children with low standard of living have high levels of anemia.

Anemia is estimated to affect 3.5billion individuals in the developing world or over two persons out of three. More than 320million people in India suffer from iron deficiency anemia with the highest prevalence among women and children (40 to 80 percent expectant women,60 to 70 percent children and 50 percent adolescent girls).

**Yegammai C., (2004)**

It is estimated that approximately 1.3 billion individuals in the world, suffer from anemia making it one of the most important public issue on international agenda. In developing countries, iron deficiency afflicts approximately 2 billion people and is the principle cause of anemia.

**Sharma K.K., (2000)**

Daily iron requirements for female adolescents are 2.8mg. According to ICMR recommended dietary intake of iron for 13-15years is 28mg and 16-18years is 30mg. And the daily allowances of vitamin C for adolescents are 30-50mg.

**Park k., (2009)**

Lack of dietary iron is the world's leading nutritional deficiency and the most common cause of anemia. Other vitamins that are needed for the body to make red blood cells include folate (folic acid) and Vitamin B12. A lack of these in the diet can also cause anemia.

**Sharma A.,( 2008)**

### **NEED FOR THE STUDY**

Anemia is the term that indicates a low red cell count and a below normal hemoglobin or a hematocritic level. Among different types of anemia, iron deficiency anemia is the most common nutritional disorder (66-80%) in the world .

**Sujatha T.,(2008)**

Iron deficiency anemia is a global public health problem, as compelling and harmful as the epidemics of infectious diseases. With a global population of 6, 700 million, at least 3, 600 million have iron deficiency and 2000 million out of these suffer from iron deficiency anemia. India continues to be one of the countries with the highest prevalence of anemia. National Family Health Survey (NFHS) 3



estimates reveal the prevalence of anemia to be 70-80% in children, 70% in pregnant women and 24% in adult women.

Anemia may be relatively recent in human evolutionary history but is now the commonest nutritional deficiency in the world. Anemia may be diagnosed with confidence when hemoglobin concentration is lower than the level considered normal for the persons age/sex group.

According to National Family survey (1998), the prevalence of anemia in India is reported that urban and rural is 50% and 60% respectively. The solutions for combating anemia are both inexpensive and effective by providing iron rich diet, increasing iron absorption by inclusion of ascorbic acid in diet.

**Sujatha T.,(2008)**

Adolescence is a crucial phase of growth in the life cycle of an individual. Due to a rapid growth there is an increased iron requirement in both adolescent boys and girls. At least 65-70% adolescent girls in India are estimated to be anaemic. Anaemia not only affects the present health status, but also has deleterious effects in the future. The rates of low birth weight, pre-maturity, neonatal and infant mortality among children born to undernourished adolescent girls is high. 20% of maternal deaths in India are attributed to anaemia in pregnancy and in another 40% anaemia is a contributory factor.

Iron deficiency anemia is an important public health problem in many developing countries including India. It has been estimated that in India 40-60% of preschool children, 25-30% of women of child bearing age, and almost 30% of pregnant women suffering from anemia. In one

of the survey National Institute of Nutrition (1994) reported that 70 percent of the Indian young girls suffered from anemia.

**Gupta N.,(2009)**

In Tamil Nadu 57% of women have some degree of anemia i.e. 37% of women are mildly anemic, 16% are moderately anemic and 4% are severely anemic. Prevalence of anemia is slightly higher for young women less than age 25 than for older women. It is higher for rural women (59%) than for urban women (52%).

**NFHS 11.,(1998-99)**

Among adolescents, girls constitute a vulnerable group, particularly in developing countries where they are traditionally married at an early age and exposed to a greater risk of reproductive morbidity and mortality. Adolescents represent a real opportunity to make a difference in life long patterns. The prevalence of anemia is disproportionately high in developing countries, due to poverty, inadequate diet, certain diseases, pregnancy /lactation and poor access to health services. The nutritional anemia in this group attributes to high MMR, high perinatal mortality and fetal wastage. This phase of life is also important due to the ever increasing evidence that control of anemia in pregnant women may be more easily achieved if satisfactory iron status can be ensured during adolescence.

**Kaur S., (2006)**

An evaluative survey was conducted in Delhi, the study aimed to determine the occurrence of anemia among adolescent girls in selected Government girls in a secondary schools of South zone of Delhi. Hemoglobin lab test was carried out to determine the occurrence

of anemia along with that a questionnaire was administered to see their knowledge about their food selection ability. The data obtaining were analyzed in terms of both descriptive and inferential statistics. The findings showed that approximately 65% of adolescent girls were anemic, and girls who had higher scores in knowledge about anemia and food selection ability had higher level of hemoglobin.

**Mehta S., (1993)**

Government of India has launched some of the programs for controlling anemia. This program includes Prophylaxis against Nutritional anemia launched by the government of India during 4<sup>th</sup> five year plan. This programme was focused in the distribution of iron and folic acid tablets to pregnant women and young children.

National Institute of Nutrition in Hyderabad has launched iron fortification in salt for reducing the prevalence of anemia.

**Park k.,(2009)**

National Nutritional Anemia Control Program was launched by Government of India. This was implemented through Primary Health centers and its subcentres. Aim of this program was to decrease the incidence and prevalence of anemia in women of reproductive age.

**Kumar A.,(1999)**

With the lower percent of iron, large number of girls are pushed into early marriages , which result in low birth weight babies , prenatal complications results in high maternal mortality rate.

**Yegammai C., (2004)**

Treatment with medicinal iron in tablet form has been around for a very long time, but produces some side effects like constipation. The other alternative is a diet rich in iron. There needs to be an increased awareness about sources of dietary green leafy vegetables and whole grain cereals are known to be rich in iron. Taking iron rich foods with a source of vitamin C enhances absorption of heme in the food. It binds the haem and get absorbed in the blood.

**Mohanraj J.,(2008)**

The Community Health Nurse has a major role in identifying the prevalence of anemia mainly among the adolescent's girls. Most important is to instigate the intake of low cost iron rich diet among the people, by which anemia can be prevented in the community. During the community posting while doing the physical assessment for the adolescent girls, the researcher found most of the adolescent girls were having iron deficiency and unaware about iron rich diet. So the investigator felt the need to improve the hemoglobin level of the adolescents girls, for that the researcher intended to intervene by nutrition supplementation of iron rich nutritional balls with Vitamin C rich food (guava)to the adolescents girls.

#### **STATEMENT OF THE PROBLEM**

A Study to assess the effectiveness of the nutritional intervention on anemia among adolescent girls with iron deficiency anemia in Nanchiyampalayam at Dharapuram.

## **OBJECTIVES**

1. To assess the level of anemia among adolescent girls before nutritional intervention.
2. To assess the level of anemia among adolescent girls after nutritional intervention.
3. To assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia.
4. To find the association between the post test level of iron deficiency anemia with their selected demographic variables.

## **OPERATIONAL DEFINITIONS**

### **Effectiveness**

It means producing an intended result.

**Oxford.,(2006)**

In this study it refers to determine the extent to which the nutritional intervention has brought about the intended result significantly which will be measured in terms of statistical measurements.

### **Nutritional Intervention**

Nutritional intervention can be defined as “purposely - planned actions designed with the intent of changing nutrition - related behavior, risk factor, environmental condition, or aspect of health status for an individual, a target group, or population at large.”

**Pritchett. L.,(2003)**

In this study nutritional intervention is preparing and giving the nutritional balls and guava for the improvement of hemoglobin level among the adolescents girls.

Roasted Ragi 20 gram (10.8 mg iron) ie, 2 tablespoon  
Roasted Groundnut 10 gram(3.2 mg iron) 20 piece  
Jaggery 20 gram(22.8 mg iron) 50ml  
Total weight of nutritional ball is 50 grams (36.8mg iron).  
And one fresh guava weighing 100gram.(Vitamin C 300mg)

### **Anemia**

Anemia is condition in which the hemoglobin concentration is lower than normal, reflects the presence of fewer than normal RBCs within the circulation

**SmettzerC.S.,(2004)**

### **Adolescence**

Adolescence has been defined by the world health organization as the period of life spanning the ages between 10- 19 years.

Early Adolescence : 12-13yrs

Middle Adolescence : 14-16yrs

Late Adolescence :17-21yrs

**Marlow D.R.,(2004)**

In this study the age group of adolescence is 13 to 19 years.

### **Iron Deficiency Anemia**

Iron Deficiency Anemia is a condition in which the total body iron content is decreased below a normal level and iron stores are depleted. It results from either an inadequate absorption or an excessive loss of iron.

**Caroline B.R.,(1999)**

In this study the iron deficiency anemia is those who have <11gm/dl of hemoglobin and it is measured by checking hemoglobin level by using Sahli's technique and symptoms by using observational checklist.

The classification of anemia as recommended by NIN (1986) was followed for categorization of the subjects.

Standard	Category	Hb level gm/ dl
National institute of Nutrition (NIN)	Severe anemia	<7.0
	Moderate anemia	8.0-9.9
	Mild anemia	10.0-10.9
	No anemia	11.0-11.9

### **HYPOTHESES**

H<sub>1</sub>- There is significant difference on the level of iron deficiency anemia before and after nutritional intervention among adolescent girls.

H<sub>2</sub>- There will be significant association between the levels of anemia after nutritional intervention among adolescent girls with their selected demographic variables.

### **ASSUMPTION**

- The adolescent girls may consume fewer amounts of iron and vitamin C in their daily dietary intake.
- Community health nurse has the role in educating the adolescent girls about the importance of consuming iron rich diet.

## **DELIMITATIONS**

The study was delimited to

- Sample size was 50
- Data collection period was 5 weeks.

## **PROJECTED OUTCOME**

The findings of this study will help the health personnel to know the prevalence and management of anemia in adolescence girls. It will increase the knowledge of adolescent girls about iron deficiency anemia. Making the adolescent girls to consume the nutritional ball along with guava will increase the hemoglobin level, which will alleviate the iron deficiency anemia among the adolescent girls and also prevent further complications in their adulthood.



## CONCEPTUAL FRAME WORK

Nola I J. Pender's Health Promotion Model (2002-Revised)

The Health promotion (HPM) proposed by Nola J. Pender (1982; revised, 2002) was designed to be a "Complementary counterpart to models of health protection". It defines health as a positive, dynamic state not merely the absence of disease. Health promotion is directed at increasing a client's level of well being. The health promotion model describes the multi dimensional nature of persons as they interact with in their environment to pursue health.

The Model focuses on the following areas.

- ❖ Individual characteristics & experiences
- ❖ Behaviour specific knowledge & affect
- ❖ Behaviour out come

### INDIVIDUAL CHARACTERISTICS / EXPERIENCES

#### **i) Prior related behaviour**

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

In this study the prior related behavior includes the assessment of demographic variables, assessment of hemoglobin level and assessment of symptoms of iron deficiency anemia.

#### **ii) Personal factor**

According to the theory, personal factors are categorized as biological, psychological and socio-cultural. These factors are predictive of a given behaviour being considered.

In this study the personal factors include age, education, total family members, type of family, monthly income, religion, type of food consumption, source of health information.

## **BEHAVIOUR SPECIFIC COGNITIONS AND AFFECT**

### **a) Perceived benefit**

According to the theory, anticipated positive outcomes that will occur from health behavior.

In this study this includes prevention of iron deficiency anemia and healthy living.

### **b) Perceived barriers**

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

In this study this includes ignorance, lack of knowledge, lack of practice and lack of motivation.

### **c) Perceived self efficacy**

According to the theory, Judgement of personal capability to organize and execute a health promoting behaviour. Perceived self efficacy influences barriers to action so higher efficacy results in lowered perceptions of barriers to the performance of the behaviour.

In this study the adolescent's girls with iron deficiency anemia realize the importance of conception of iron rich food and to prevent the iron deficiency anemia.

#### **d) Activity related affect**

According to the theory, activity related affect describes subjective positive or negative feelings occur before, during and following behavior based on the stimulus properties of the behaviour itself. Activity related affect influence perceived self efficacy, which means the more positive the subjective feeling, the grater the feeling of efficacy, in turn, increased feeling of efficacy can generate further positive affect.

In this study this includes maintaining the nutritional status and improving the hemoglobin level of adolescent girls with iron deficiency anemia.

#### **e) Interpersonal influences**

According to the theory, cognition concerning behaviors belief or attitudes of the others. Interpersonal influences include norms (expectations of significant others) social support (Instrumental & emotional encouragement) and modeling (various learning through observing others engaged in a behaviour). Primary sources of interpersonal influences are families, peers and health care providers.

In this study the researcher influences the adolescent's girls with iron deficiency anemia and given them to consume nutritional ball along with one guava.

#### **f) Situational influences**

According to the theory, personal perceptions and cognitions of any given situation or context that can facilitate or impede behaviour.

In this study the knowledge regarding iron rich foods influences to maintain health status.

## **BEHAVIORAL OUTCOME**

### **i) Immediate change of practice low control to high control**

According to the 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 such as choice of ice cream or apple for a snack

In this study the adolescent girls accepts to follow consuming iron rich foods to prevent anemia.

### **II. Commitment to plan of action**

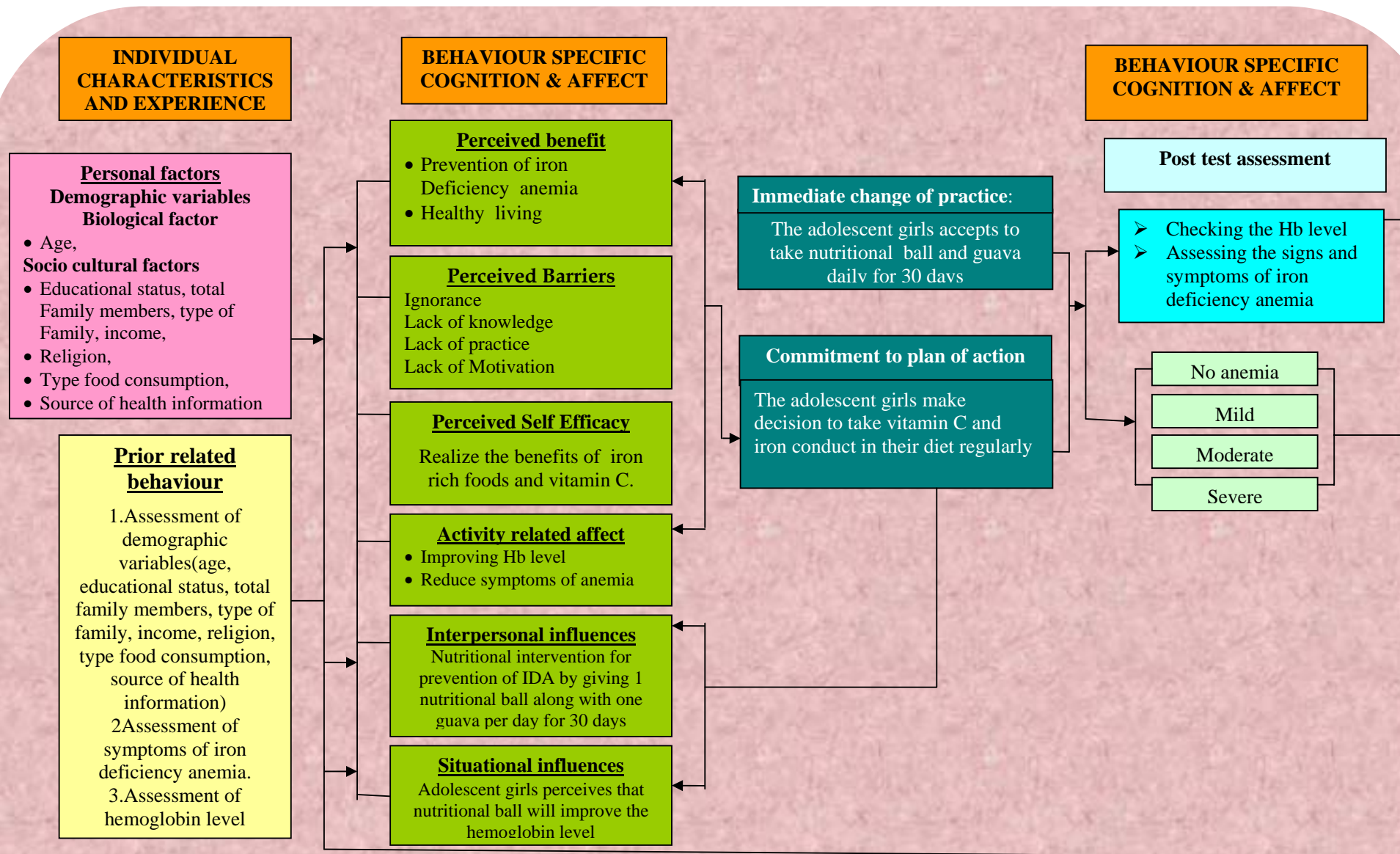
According to the theory the concept of intention and identification of a planned strategy leads of implementation of health behavior.

In this study the adolescent girls makes decision to maintain the proper nutritional status for preventing the iron deficiency anemia.

### **III. Health promoting behavior**

According to the theory health promoting behavior is an endpoint or action outcome directed toward attaining the health out comes as optimal well being personal fulfillment and productive living.

In this study the nutritional intervention brings the improvement in hemoglobin level.



**CONCEPTUAL FRAME WORK**  
**Fig : 1 MODIFIED REVISED (2002) PENDERS HEALTH PROMOTION MODEL**

## CHAPTER II

### REVIEW OF LITERATURE

The review of literature for the present study has been done from published articles, textbook, reports and Medline research.

The review of literature has been organized under the following headings.

**Part I : Over view of iron deficiency anemia**

**Part II : A. Studies related to iron deficiency anemia**

- Prevalence of iron deficiency anemia
- Epidemiological correlation of nutritional Anemia
- Pervasiveness of anemia
- Nutritional status of adolescent girls from an urban slum
- Sign and symptoms of anemia
- Source of iron rich foods
- Anemia prophylaxis in adolescents girls

**B. Studies related to nutritional interventions in iron deficiency anemia**

#### **PART I**

#### **OVERVIEW OF IRON DEFICIENCY ANEMIA**

#### **INTRODUCTION**

Blood is a major constituent in all living beings on which proper functioning of a living body depends. The blood is made up of a fluid called plasma, which contains three types of cells; white blood cells,

platelets, and Red blood cells. Red blood cells carry oxygen around the body in a pigment called hemoglobin.

Anemia is a condition in which the blood cannot carry enough oxygen. This may be due to the fewer number of red blood cells , the ability of red blood cells to carry enough oxygen than normal or because there is not enough hemoglobin in each cell. Iron is the main component of hemoglobin.

**Sharma A.,(2008)**

#### **DEFINITION**

Anemia can be defined as a reduction in the circulation of either hemoglobin or RBCs.

**Erickson.,(1996)**

#### **INCIDENCE**

Iron deficiency anemia is a global public health problem, as compelling and harmful as the epidemics of infectious diseases. With a global population of 6, 700 million, at least 3, 600 million have iron deficiency and 2000 million out of these suffer from iron deficiency anemia. India continues to be one of the countries with the highest prevalence of anemia. National Family Health Survey (NFHS) 3 estimates reveal the prevalence of anemia to be 70-80% in children, 70% in pregnant women and 24% in adult women.

**National Family Health Survey.,(2005-06)**

## DEGREES OF ANEMIA

The classification of anemia as recommended by WHO (1992) and NIN (1986) was followed for categorization of the subjects.

Standard	Category	Hb level gm/dl
National Institute of Nutrition (NIN)	Severe anemia	<7.0
	Moderate anemia	8.0-9.9
	Mild anemia	10.0-10.9
	No anemia	11.0-11.9

## TYPES OF ANEMIA

There are several types and classifications of anemia. Broadly anemias are of two types

- One in which red blood cells are lost quickly due to bleeding, especially when this has gone on for sometime or where the red blood cells are more fragile and therefore have a much shorter life span.
- Another in which the red blood cells are not manufactured properly in the bone marrow. This might be due to disease of the bone marrow itself, or to lack within the body of the building blocks of blood, such as iron or certain vitamins so that the process of blood cell manufacture is impaired.

Types of anemia include Iron deficiency anemia, acute hemorrhagic anemia, chronic hemorrhagic anemia, pernicious anemia, aplastic anemia, sickle cell anemia, and thalassemia.

**Caroline B.R.,(1999)**



## **IRON DEFICIENCY ANEMIA**

Iron deficiency anemia is of serious public health significance, given its impact on psychological and physical development, behavior and work performance. It is the most prevalent nutritional problem in the world today, affecting more than 700 million persons.

**Kumari N.,(2009)**

## **ETIOLOGY AND RISK FACTORS**

Major risk factors for Iron Deficiency Anemia includes

- Insufficient dietary intake of iron
- Blood loss
- Impaired absorption and
- Excessive demands for RBC production as a result of hemolysis.

## **CAUSES**

- Increased demand due to
  - Menarche.
- Decreased intake of iron due to
  - Inadequate diet
  - Loss of Appetite
  - Poor socio economic status
- Decreased absorption in gastro intestinal tract due to
  - Decreased gastric acidity
  - Dietary Imbalance
  - Intestinal infestation

## PATHOPHYSIOLOGY

- Iron is used in the bone marrow to form iron compounds called heme, which are required to synthesize hemoglobin, the key molecule responsible for the transport of oxygen in RBCs.
- Heme accounts for two thirds of the body's iron.
- Iron is also vital for the metabolic process of DNA synthesis and electron transport.
- The absorptive cells in the proximal small intestine regulate iron concentration in the body; these cells alter iron absorption to match body losses or iron. Errors in this balance also lead to anemia.
- Serum iron level (normally 50to150 mg/dl) decreased to 10mg/dl.
- Total iron binding capacity elevated to 350 to 500 mg/dl.(normally 250 to 350 mg/dl).
- Complete absence of hemosiderin (an insoluble form of storage of iron) from bone marrow.

**Black.M.J.,(2005)**

## CLINICAL MANIFESTATIONS

In mild cases of iron deficiency anemia the client is asymptomatic. Signs and symptoms of iron deficiency anemia are

## **SIGNS**

- Dyspnea
- Headache
- Irritability
- Fatigue
- Palpitation
- Pallor in the face, palm of the hand and nail buds

## **SYMPTOMS**

Symptoms of severe iron deficiency anemia are

- Dyspnea
- Rapid heart rate
- Brittle hair and nails
- Angular stomatitis
- Cellulitis

## **DIAGNOSTIC EVALUATION**

- Testing the hemoglobin level in the blood,normal hemoglobin level is 12-14 gm/dl.
- Stool is examined to detect hook worm infestation.
- Urine is examined mainly to detect urinary infection.
- Bone marrow aspiration.
- Total iron binding capacity

**Lewis. S.M.,(2004)**

## **OUTCOME MANAGEMENT**

Management of IDA focus on

- Diagnosis and correction of the underlying cause and
- Treatment through diet and supplemental iron preparations. Several oral preparations are available for treatment. E.g.; Ferrous sulphate, gluconate and fumarate.

## **NURSING MANAGEMENT**

- Diet high in iron should be planned with the client and his or her family.
- Client and families may need to be taught the elements of high iron diets both in terms of the food to be consumed and how it should be prepared to increase or prevent the loss of dietary iron.

**Caroline B.R.,(1999)**

## **PREVENTION OF ANEMIA**

- Maintain good sanitation
- Avoid barefoot while walking.
- Avoid open field defecation.
- Fortification of flour, bread and infant cereals with iron has been of some help in preventing anemia.
- Encourage taking iron rich diet.

## **CONSEQUENCES**

- In children anemia causes a 5-10 point deficiency in IQ and hampers growth and language development.
- In adolescents it leads to a fall in academic performance with decline in memory and concentration levels.

- It can also lead to physical exhaustory and susceptibility to infection. Which includes impaired motor development, impaired co-ordination, impaired language development, decreased physical activity etc.

**Smeltzer C.S.,(2004)**

### **SOURCES OF IRON**

- Cereals: Bajarae, ragi, garden cress seeds etc.
- Green leaf vegetables: Cauliflower, Mustard leaves, Raddish leaves etc.
- Pulses: Bengal gram, Soya bean etc.
- Dry fruits: Apricots, Dates seed etc.
- Non-vegetarian: Liver, Meat etc

<b>Foods</b>	<b>Iron mg/100gm</b>
Bajra	8.0
Rice flakes	6.2
Roasted Bengal Gram	9.5
Soya bean	11.5
Amaranthus	38.4
Cauliflower Greens	40.0
Drumstick leaves	16.9
Dried dates	7.3
Red meat (beef)	18.8
Sheep liver	6.3
Ragi	5.4

**Swaminathan M.,(2007)**

## **PART- II**

### **STUDIES RELATED TO IRON DEFICIENCY ANEMIA**

#### **(i) Studies related to prevalence of iron deficiency anemia**

**Sanjeev M Chaudhary, et.al., (2008)** conducted a study to estimate the prevalence of anemia among adolescent females and to study the socio-demographic factors associated with anemia. Materials and methods used for this study was a cross sectional survey, conducted in an urban area under Urban Health Training Center, Department of Preventive and Social medicine, Government Medical College and Hospital, Nagpur. A total of 296 adolescent females (10-19 years old) were included in this study. The study took place from October 2002 to March 2003(6 months). Statistical analyses were done using percentage, standard error of proportion chi-square test and students 't' test. The result revealed that the prevalence of anemia was found to be 35.1%. A significant association of anemia was found with socio- economic status and literacy status of parents. Mean weight and weight of subjects with anemia was significantly less than subjects without anemia. Conclusion about the study were a high prevalence of anemia among adolescent females was found, which was higher in the lower socio-economic strata and among those whose parents were less educated. It was seen that anemia affects the overall nutritional status of adolescent females.

**Rajee Reghunath (2001)** conducted a study on prevalence of anemia among women in the reproductive age group conducted in a Rural Backward colony in Kottayam District. Hemoglobin estimation was done in 19 women using Sahli's hemoglobin meter. All studied women were anemic when their life events were considered. 47.4% of women were moderately anemic and 26.3% were mildly anemic. It was

estimated that 2000 million people all over the world is suffering with anemia. Objectives of the study were to identify the selected demographic variables of women in the reproductive age group and to study the severity of anemia. Majority of the women are in the younger age group. Majority of unmarried women were not willing to participate in the study because of the fear of pain. The result of the study was 47.4% of the total subjects were moderately anemic and 26.3% are mildly anemic.

**ME Bentley et.al., (2003)** conducted a study to investigate the prevalence and determinants of anemia among women in Andhra Pradesh. Examined differences in anemia related to social class, urban=rural location and nutrition status body mass index (BMI). Hypothesized that rural women would have higher prevalence of anemia compared to urban women, particularly among the lower income groups, and that women with low body mass index (BMI;  $<18.5 \text{ kg/m}^2$ ) would have a higher risk compared to normal or overweight women. The National Family Health Survey 1998=99 (NFHS-2) provides nationally representative cross-sectional survey data on women's hemoglobin status, body weight, diet, social, demographic and other household and individual level factors. Ordered log it regression analyses were applied to identify socio-economic, regional and demographic determinants of anemia Setting of the study was Andhra Pradesh, a southern Indian state. A total of 4032 ever-married women aged 15 - 49 from 3872 households. Results revealed that Prevalence of anemia was high among all women. In all 32.4% of women had mild (100 - 109.99 g=l for pregnant women, 100 - 119.99 for non-pregnant women), 14.19% had moderate (70 - 99.99 g=l), and 2.2% had severe anemia ( $<70 \text{ g=l}$ ). Protective factors include Muslim religion, reported consumption of alcohol or pulses, and high

socioeconomic status, particularly in urban areas. Poor urban women had the highest rates and odds of being anemic. Fifty-two percent of thin, 50% of normal BMI, and 41% of overweight women were anemic.

**Choudry A., et.al., (2006)**, conducted a community based, cross section study to determine the prevalence of anemia among unmarried, adolescent south Indian girls in an urban slum setting. A total of 100 apparently healthy girls between the ages of 11 and 18 years were recruited. Their socioeconomic, dietary and anthropometric information was collected, and blood hemoglobin (Hb) was estimated. The prevalence of anemia (Hb <12 g%) was 29%. Most had mild anemia; severe anemia microz/L). Significant associations were observed. Only meat consumption was related to hemoglobin by multiple regression analysis. Anemia is a common problem among adolescent girls in this hemoglobin status through dietary modification along with preventive supplementation and nutrition education.

**Ahmed. F., et.al., (2008)** conducted a study to investigate the prevalence of selected micronutrient deficiencies amongst anemic adolescent schoolgirls in rural Bangladesh and to examine their relationship with hemoglobin (Hb) levels. It was a cross sectional study. Setting of the study was girl's high schools in rural areas of Dhaka district in Bangladesh. Subjects and methods of three hundred and ten anemic adolscent girls aged 14-18 years from eight schools participated in the study. The results of the study was 28% of the girls had depleted iron stores (serum ferritin < 12.0 microg.l), 89% had vitamin B(2)deficiency (erythrocyte glutathione reductase activity coefficient > or = 1.4) and 7% had vitmain B(12) deficiencies (serum vitamin B(12) <



150 pmol/l). Although the prevalence of vitamins A and C deficiency was very low, a significant proportion had low vitamin A (serum retinal between 0.70 and < 1.05 micromol/l) and vitamin C status (plasma ascorbic acid between 11.4-23.0 micromol /l). Frequency of consumption of meat, serum ferritin and Vitamin B(2) status were found to be strongly related to Hb by multiple regression analysis. For 1 microg/l change in serum ferritin, there was a 0.13 g/l change in Hb when adjusted for other factors. The study concluded that, there is coexistence of micronutrient deficiencies among anemic adolescent girls in rural Bangladesh, although they do not suffer from energy deficiency.

#### **(ii) Studies related to Epidemiological correlation of nutritional anemia**

S. Kaur, et.al., (2005) conducted a study about the epidemiological correlation of nutritional anemia among adolescent girls in rural Wardha. Methods used were a cross sectional study carried out in adolescent girls of four villages of Kasturba Rural Health Training Center, Anji. The relevant information was collected with an anthropometrics measurement and hemoglobin estimation. Univariate and multivariate logistic regression analysis was done using spss 10. The prevalence of anemia found to be 50.8%. In univariate analysis low economic status, low iron intake, vegetarian diet, history of worm infestation and history of excess menstrual bleeding showed significant association with anemia. While multivariate logistic regression analysis suggested that strongest predictor of anemia was vegetarian diet. (OR=5.83, CI =3.73-9.13) followed by history of excessive menstrual bleeding (OR=5.65, CI=1.26-25.38), iron intake <14mg (OR=4.16,

CI=2.08-8.31) followed by 14.2 mg (OR=2.07, CI=1.70-9.93) and history of worm infestation (OR=4.11 CI=1.70-9.93). However age, education, socio-economic status, BMI and status of menarche did not contribute significantly.

**Family welfare department (2005)** explained that anemia is confirmed by checking Hemoglobin level, which must be above 11gm/dl. Then visible signs of anemia such as paleness can be seen in the nails, tongue and inside of lower eyelids

**(iii) Studies related to Pervasiveness of anemia in adolescent girls.**

**Gupta N.,(2009)** has conducted a study on Pervasiveness Of Anemia in Adolescent Girls Of Low Socio-Economic Group Of The District Of Kurukshetra (Haryana) In the perspective study, one hundred ten adolescent girls between ages 13 -16 years of low socio-economic group of district Kurukshetra (Haryana) were screened for their hemoglobin level and for nutritional as well as socio-economic status. Data regarding socio-economic status was collected through pre-structured questionnaire cum interview method. Nutritional status was adjudged by their anthropometric measurements (height, weight and BMI) and nutrient intake. Dietary intake of selected subjects was adjudged by 24-hour recall method for three consecutive days and intake of nutrients from the diet was calculated with help of nutritive value of Indian foods. Hemoglobin level of each subject was measured by using Sahil's technique. Out of one hundred ten girls, more than two third (81.81 per cent) girls were suffering g/dl to 11.0 g/dl. The dietary data revealed that nutrient intake especially iron intake was very much less than as recommended by ICMR for adolescent girls. Due to low dietary intake, their weight was found less and the subjects were in energy deficit state. Analysis of data further disclosed that prevalence of

anemia was directly related to family size and type of family as that affect quality and quantity of food consumption.

**(iv) Studies related to nutritional status of adolescent girls from an urban slum**

**Prashant. K., et.al., (2009)**, conducted a study on nutritional status of adolescent girls from an urban slum area in south India. The objective of the study was to assess the nutritional status of adolescent girls in a slum community of urban health centre, Panangal. Method used was a community based cross sectional study carried out over a period of two months. 223 adolscent girls of age 10-18 years were selected randomly. Data was collected by interviewing the adolscents girls using predesigned, pre tested, and semi structured schedule. Parent's interview was taken whenever necessary. Anthropometric measurements were recorded using standardized methodology as recommended by world health organization (WHO). Standard operational definitions were used. Various statistical application like percentiles, mean, standard deviation and propotions were used for analyzis of the data. The results were overall prevalence was found to be 47% and 28.3% as per NCHS and Indian Standards respectively. Prevalence of underweight was 42.6% and 22.9% as per NCHS and Indian Standards respectively. Prevalence of thinness was 20.6% as per Indian Standards. This study concluded that there is a high prevalence of under nutrition among adolscent girls in slum community.

**(v) Studies related to symptoms of anemia**

**Souza (2006)** stated that symptoms of anemia include headache, dizziness, fatigue, breathlessness, palpitations and chest pain (angina). The pregnancy also contributes to iron deficiency because of the

diversion of iron to the fetus for erythropoiesis and blood loss at delivery.

**(vi) Studies related to source of iron rich foods**

**Suddarthis et.al (2005)** reported that food source high in iron include organ meats (beef or calf's liver, chicken liver), other meats, beans (black pinto and garbanzo), leafy green vegetables, raisin, iron rich foods with a source of Vitamin C enhances the absorption of iron. Iron is best absorbed on an empty stomach, so patients should be advised to take the supplements an hour before the meals. Antacids or diary products should not be taken with iron because they greatly diminish the absorption of iron.

**(vii) Studies related to anemia prophylaxis in adolescent school girls**

**K.N. Agarwal (2003)** conducted a study on anemia prophylaxis in adolescent school girls by daily or weekly iron - folate supplementation to examine the benefits of anemia prophylaxis in adolescent school.girls by weekly or daily iron-folate supplementation. Design used was Prospective study. Setting of the study was Government girl schools of northeast Delhi. 2088 subjects (with hemoglobin >7.9 g/dL), including 702 on daily and 695 on weekly iron-folate administration; 691 girls served as controls. Results revealed that about 85% girls were iron deficient out of which 49.3% were anemic. Weekly administration took longer time to raise hemoglobin but was effective as well as practical. Plasma ferritin estimation in girls showed rise in level in both the treated groups.

## **B. Studies related to nutritional interventions in iron deficiency anemia.**

**Ahamed F., et. al (2010)** conducted study on Long-term intermittent multiple micronutrient supplementation enhances hemoglobin and micronutrient status more than iron + folic acid supplementation in Bangladeshi rural adolescent girls with nutritional anemia. Previous short-term supplementation studies showed no additional hematologic benefit of multiple micronutrients (MMN) compared with iron + folic acid (IFA) in adolescent girls. This study examines whether long-term once- or twice-weekly supplementation of MMN can improve hemoglobin (Hb) and micronutrient status more than twice-weekly IFA supplementation in anemic adolescent girls in Bangladesh. Anemic girls (n = 324) aged 11-17 y attending rural schools were given once- or twice-weekly MMN or twice-weekly IFA, containing 60 mg iron/dose in both supplements, for 52 wk in a randomized double-blind trial. Blood samples were collected at baseline and 26 and 52 wk. Intent to treat analysis showed no significant difference in the Hb concentration between treatments at either 26 or 52 wk. However, after excluding girls with hemoglobinopathy and adjustment for baseline Hb, a greater increase in Hb was observed with twice-weekly MMN at 26 wk ( $P = 0.045$ ). Although all 3 treatments effectively reduced iron deficiency, once-weekly MMN produced significantly lower serum ferritin concentrations than the other treatments at both 26 and 52 wk. Both once- and twice-weekly MMN significantly improved riboflavin, vitamin A, and vitamin C status compared with IFA. Overall, once-weekly MMN was less efficacious than twice-weekly MMN in improving iron, riboflavin, RBC folic acid, and vitamin A levels. Micronutrient supplementation beyond 26 wk

was likely important in sustaining improved micronutrient status. These findings highlight the potential usefulness of MMN intervention in this population and have implications for programming.

**Prakash V.B., et. al (2010)** Conducted a study on Sustainable effect of Ayurvedic formulations in the treatment of nutritional anemia in adolescent students. Objectives of the study was to study the effect of two non-iron-containing Ayurvedic preparations-Sootshekhar Rasa plus Sitopaladi Churna-in improving nutritional anemia among adolescent students. The design was a single-blinded, randomized, controlled study. Setting was Dehradun district, North India. The subjects comprised a total of 1646 boys and girls, aged 11-18 years, attending school in Dehradun district. Intervention as per World Health Organization guidelines, a total of 1322 adolescent anemic students were randomly divided into 5 groups. Students of group I (control) received starch. Group II, III, and IV students received Sootshekhar Rasa (SR) plus Sitopaladi Churna (SC) in various combinations, namely, SR 125 mg + SC 500 mg daily, SR 250 mg + SC 400 mg daily, and SR 250 mg + SC 400 mg weekly, respectively. Group V student were given iron and folic acid tablet. All the students received treatment for 90 days and were followed up for the next 180 days. Results revealed that overall prevalence of anemia was found to be 81.3%. At baseline, the mean hemoglobin (Hb) was 97.4 +/- 13.2 g/L and ranged from 96.4 +/- 0.8 g/L to 98.3 +/- 0.8 g/L in various groups. At end of follow-up (day 270), a significant increase in Hb levels from baseline was observed in all treatment groups; however, the Hb gain (6.9 +/- 0.6 g/L) in group III and group V (3.64 +/- 0.56 g/L) differed significantly from the control group.

**Gopaldas.T (2002)** Conducted a study on Iron-deficiency anemia in young working women can be reduced by increasing the consumption of cereal-based fermented foods or gooseberry juice at the workplace. This efficacy for both employers and employees (young working women 18 to 23 years of age) was undertaken to determine whether culturally acceptable dietary changes in lunches in the workplace and at home could bring about a behavioral change and improvement in their iron-deficiency anemia status. Maximum weight was given to increasing consumption of idly, a popular cereal-based-fermented food, or of gooseberry juice. Four small factories were selected in periurban Bangalore, with a sample of 302 women. The 180-day interventions were supervised at the workplace. In unit 1 (72 women), the intervention consisted of idly four times a week plus information, education, and communication (IEC) related to iron-deficiency anemia. Unit 2 (80 women) received 20 ml of gooseberry juice (containing 40 mg of vitamin C) three times a week plus IEC once a month. Women in unit 3 (70 women), the positive control, received 400 mg albendazole once plus ferrous sulfate tablets (60 mg elemental iron) two times a week. No IEC was given. Unit 4 (70 women) served as the negative control and received no intervention. The pre-post impact measures were dietary and nutrient intake, knowledge and practice, and hemoglobin status. In units 1, 2, and 3, the hemoglobin status of the women improved significantly from 11.10 to 12.30 g/dl, 11.20 to 12.70 g/dl, and 11.50 to 13.00 g/dl, respectively. In unit 4 there was no change: the values were 10.90 g/dl before and after intervention. The results show that the type of workplace lunch was of greater significance than IEC. Knowledge gains were impressive, but behavioral change was not sustained.

**Rani.V., et.al (2010)** Conducted a study on 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 Mangali village situated in Hisar 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.

**Mohanraj J., et.al.,(2008)** conducted a study on 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 hemoglobin among women with anemia and to determine the effect of consuming nutritive balls on Hb level of women with anemia. The research design used for this study was experimental design. 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 Hb is 9.59gm and post test Hb 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 Hb of women.



## CHAPTER III

### METHODOLOGY

This chapter deals with methodology adopted for the study. It includes the research approach, research design, setting of the study, criteria for sample selection, sampling technique, sample size, instruments, and method of data collection and plan for data analysis.

#### RESEARCH APPROACH

An Evaluative research approach was used for the present study.

#### RESEARCH DESIGN

The research design for the present study was one group pre test and post test pre experimental design.

#### SCHEMATIC REPRESENTATION

GROUP	PRE TEST	INTERVENTION	POST TEST
1	O <sub>1</sub>	X	O <sub>2</sub>

O<sub>1</sub> = Collection of demographic data and assessment of level of anemia

X = Intervention

O<sub>2</sub> = Assessing the level of anemia after the intervention.

#### RESEARCH SETTING

The study was conducted at Nanchiyampalayam, which comes under Dharapuram block and it is 3 km away from Bishop's college of Nursing. The total population was 6770. In this the adolescents were 391. In that the girls were 191. The area consists of 7 streets. Most of the

people are coolie workers going for construction work and others includes tailors, shop workers, and mill workers.

## **POPULATION**

The population for this study was the adolescent girls.

## **SAMPLE**

Adolescent girls between the age group of 13-19 years

## **CRITERIA FOR SAMPLE SELECTION**

### **Inclusion criteria**

- Adolescent girls with Hemoglobin less than 11 gm/dl
- Adolescent girls who have attained menarche

### **Exclusion criteria**

- Adolescent girls who have any other systemic diseases.

## **SAMPLE SIZE**

Sample size of this study was 50 adolescent girls.

## **SAMPLING TECHNIQUE**

Adolescent girls with anemia who met the inclusion criteria were selected as the samples by using non-probability purposive sampling method.

## **DESCRIPTION OF THE TOOL**

The tool consists of 3parts.

**Part I:** It consists of structured interview schedule to assess the demographic data such as age, educational status, total family members, type of family, monthly income, religion,

type of food consumption, and source of health information.

**Part II:** It contains the observation check list which contains 15 items. It consists of 7 items in signs and 8 items in symptoms.

**Part III:** It includes assessing the Hb level of adolescent girls by using Sahli's Haemometre method.

### SCORING PROCEDURE

#### Part II: Structured observational check list

This is an observational checklist to assess the level of iron deficiency anemia.

The signs and symptoms present was scored one (1) and the signs and symptoms absent was scored zero (0). The total score is 15 and interpreted as follows

Category	Scores	Percentage
Severe	10- 15	61 - 100%
moderate	5 - 9	31 - 60%
Mild	<5	<30%

#### Part III: -Hemoglobin level score interpreted as follows

Standard	Category	Hb level gm/dl
National institute of Nutrition (NIN)	Severe anemia	<7.0
	Modeate anemia	8.0-9.9
	Mild anemia	10.0-10.9
	No anemia	11.0-11.9

National institute of Nutrition (NIN),.(1986)

## **VALIDITY AND RELIABILITY**

### **Validity**

The validity of the tool was established by consultation with guide and four nursing experts in the field of community health nursing and one medical expert. The tool was modified according to the suggestions and recommendations of experts. The accuracy of the instrument was assessed by using Karl Pearson's formula [r=0.9].

### **Reliability**

The reliability of the instrument was assessed by using interrator method (Karl Pearson's formula). The value was found to be reliable [r=0.9]. The reliability of the observational checklist was assessed by using interrator method (Karl Pearson's formula). The value was found to be reliable [r=0.9].

## **PILOT STUDY**

Pilot study was conducted on 5 samples in Nehru Nagar Dharapuram for a period of 1 month. Written permission was obtained from the municipal health office and oral consent was taken from the study participants after explaining the purpose of the study .The samples who met the inclusion criteria were selected by using purposive sampling method .On the first day demographic variables was collected and signs and symptoms of anemia was assessed by structured observational check list and Hemoglobin was checked by Sahli's hemometre method. The adolescent girls who had the hemoglobin level below11gms were included as samples and made to consume nutritional balls and one guava once in a day. The intervention was done for 30 days. After 30 days Hemoglobin level was checked and the signs and symptoms of iron deficiency anemia were

assessed by using the same observational checklist to find out the level of iron deficiency anemia. The findings showed that the mean pretest score was 15.3(SD  $\pm$  0.32) and the mean posttest score was 13.4 (SD  $\pm$ 0.28) and it was found to be feasible and practicable to conduct the main study. ( $t=8.26$ )

## **DATA COLLECTION PROCEDURE**

The main study was conducted in Nanchiyampalayam, Dharapuram. Before the study the investigator has obtained the written permission from the Municipal health office and oral consent was taken from the study participants after explaining the purpose of the study. The samples who had less than 11gm of Hb 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 hemoglobin 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 hemoglobin 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 collected data were entered and analyzed statistically.

## PLAN FOR DATA ANALYSIS

The data was analyzed by using descriptive and inferential statistics. The statistical method used to analyze the data was as follows

SI No	DATA ANALYSIS	METHOD	OBJECTIVE
1	Descriptive statistics	Frequency percentage	To assess the demographic variables of adolescent girls with iron deficiency anemia
		Mean, standard deviation	To assess the level of iron deficiency anemia and Hemoglobin level scores
2	Inferential statistics	Paired 't' test	To assess the effectiveness of nutritional intervention
		Chi square test	To find the association between the post test level of iron deficiency anemia with their selected demographic variables.

## PROTECTION OF HUMAN SUBJECTS

The study was conducted after the approval of research committee. Verbal consent was taken from the adolescent girls by explaining the purpose of the study before collecting the blood samples for hemoglobin assessment.

## CHAPTER – IV

### DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data collected from the 50 adolescent girls with iron deficiency anemia in Nanchiyamplayam at Dharapuram.

The present study was designed to assess the effectiveness of the nutritional intervention among adolescent girls with iron deficiency anemia. The collected data was organized and interpreted using descriptive and inferential statistics and was coded and analyzed as per objectives of the study under the following headings.

#### ORGANIZATION OF DATA:-

The data has been organized and tabulated as follows.

- Section A** : Distribution of demographic variables
- Section B** : Assess the levels of anemia among adolescent girls before nutritional intervention
- Section C** : Assess the levels of anemia among adolescent girls after nutritional intervention
- Section D** : Assessment of the effectiveness of nutritional intervention
- Section E** : Association between the post test levels of iron deficiency anemia with their selected demographic variables

## SECTION A: DISTRIBUTION OF DEMOGRAPHIC VARIABLES

Table 1: Frequency and percentage of demographic variables of adolescent girls with iron deficiency anemia.

<b>S. No</b>	<b>Demographic Variables</b>	<b>Frequency (F)</b>	<b>Percentage (%)</b>
1	<b>Age</b> a) 13 - 14 years b) 15 - 16 years c) 17 - 18 years d) 18 - 19 years	9 7 12 22	18% 14% 24% 44%
2	<b>Education</b> a) No formal education b) Primary school c) Secondary school d) Higher secondary	1 19 24 6	2% 38% 48% 12%
3	<b>Total family members</b> a) 3 b) 4 c) 5 d) 6 and above	2 9 21 18	4% 18% 42% 36%
4	<b>Type of family</b> a) Nuclear family b) Joint family	14 36	28% 72%
5	<b>Income per month</b> a) Below Rs. 1000 b) Rs. 1001 - Rs. 2000 c) Rs. 2001 - Rs. 5000 d) Rs. 5001 and above	0 0 15 35	0 0 30% 70%



6	<b>Religion</b>		
	a) Hindu	47	94%
	b) Muslim	0	0
	c) Christian	3	6%
	d) Others	0	0
7	<b>Type of food consumption</b>		
	a) Vegetarian	7	14%
	b) Non-vegetarian	43	86%
8	<b>Source of health information</b>		
	a) News paper/magazine	0	0
	b) Radio/television	5	10%
	c) Friends/ relatives	0	0
	d) Health professionals	45	90%

Table - 1 showed that among 50 adolescent girls with iron deficiency anemia 9(18%) belongs to 13 -14 years, 7(14%) belongs to 15-16 years and 12(24%) belongs to 17 - 18 years, 22(44%) belongs to 19 years of age.

Regarding education 1(2%) belongs to no formal education, 19(38%) belongs to primary school education, 24(48%) belongs to secondary school education, 6(12%) belongs to higher secondary education.

Regarding family members 2(4%) belongs to 3 family members group, 9(18%) belongs to 4 family members group, 21(42%) belongs to 5 family members group, 18(36%) belongs to above 6 family members group.

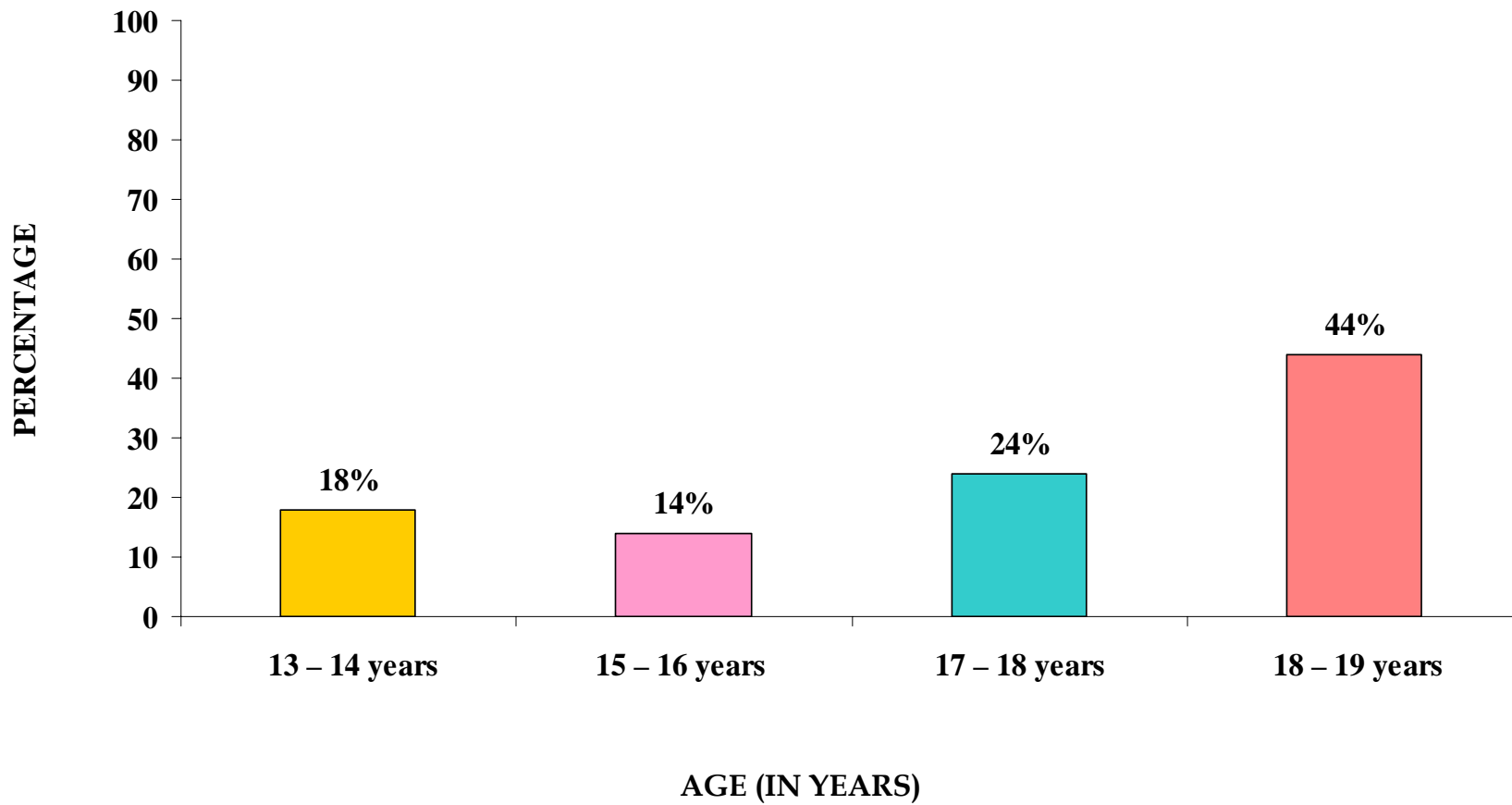
Regarding the type of family 14 (28%) belongs to nuclear family and 36(72%) belongs to joint family.

Regarding income per month 15 (30%) belongs to Rs.2001-Rs.5000 income group, and 35(70%) belongs to Rs. 5001 and above income group.

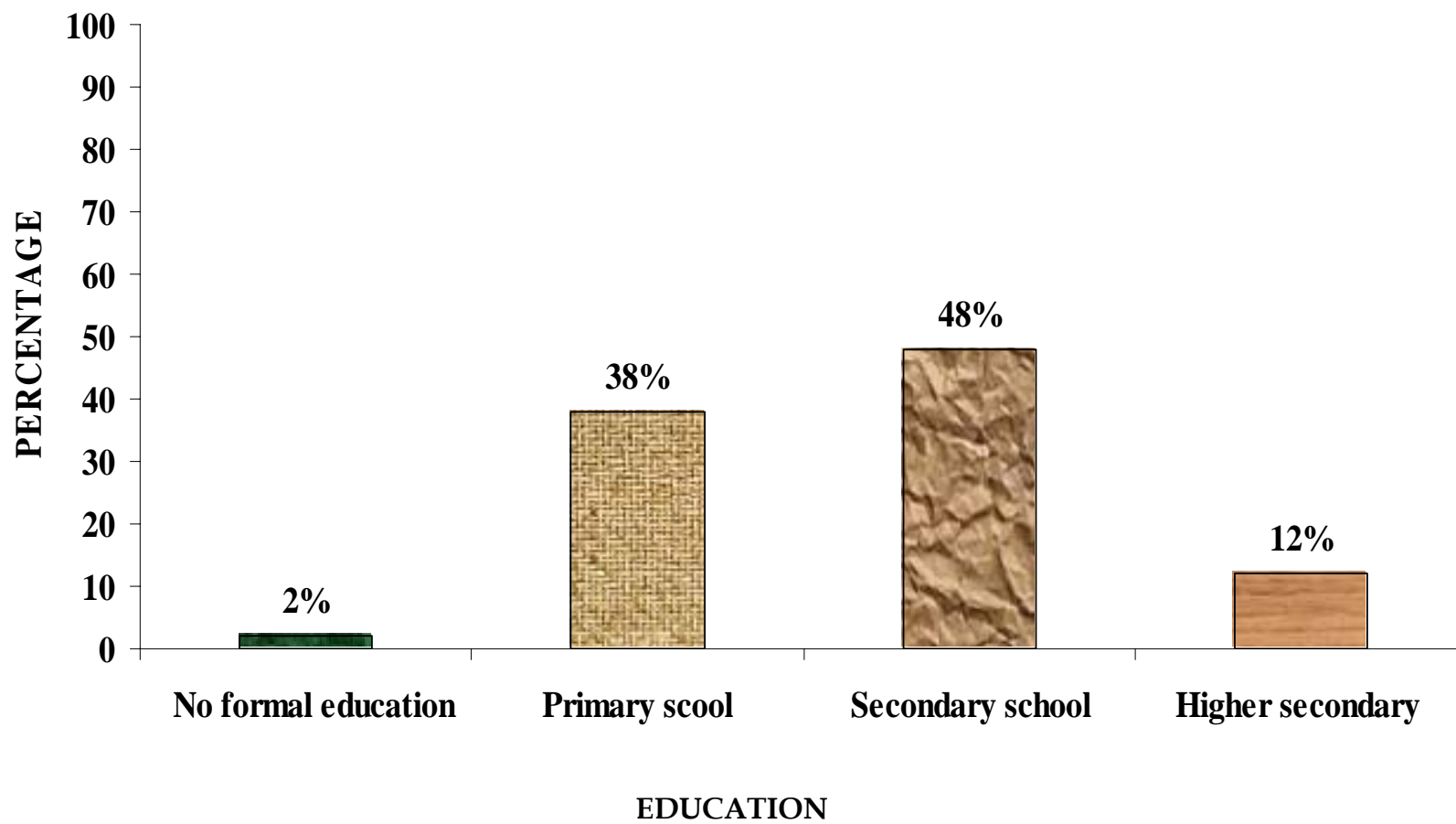
Regarding religion 47(94%) were Hindu and 3(6%) were Christian.

Regarding type of food consumption 7(14%) were vegetarian and 43(86%) were non-vegetarian.

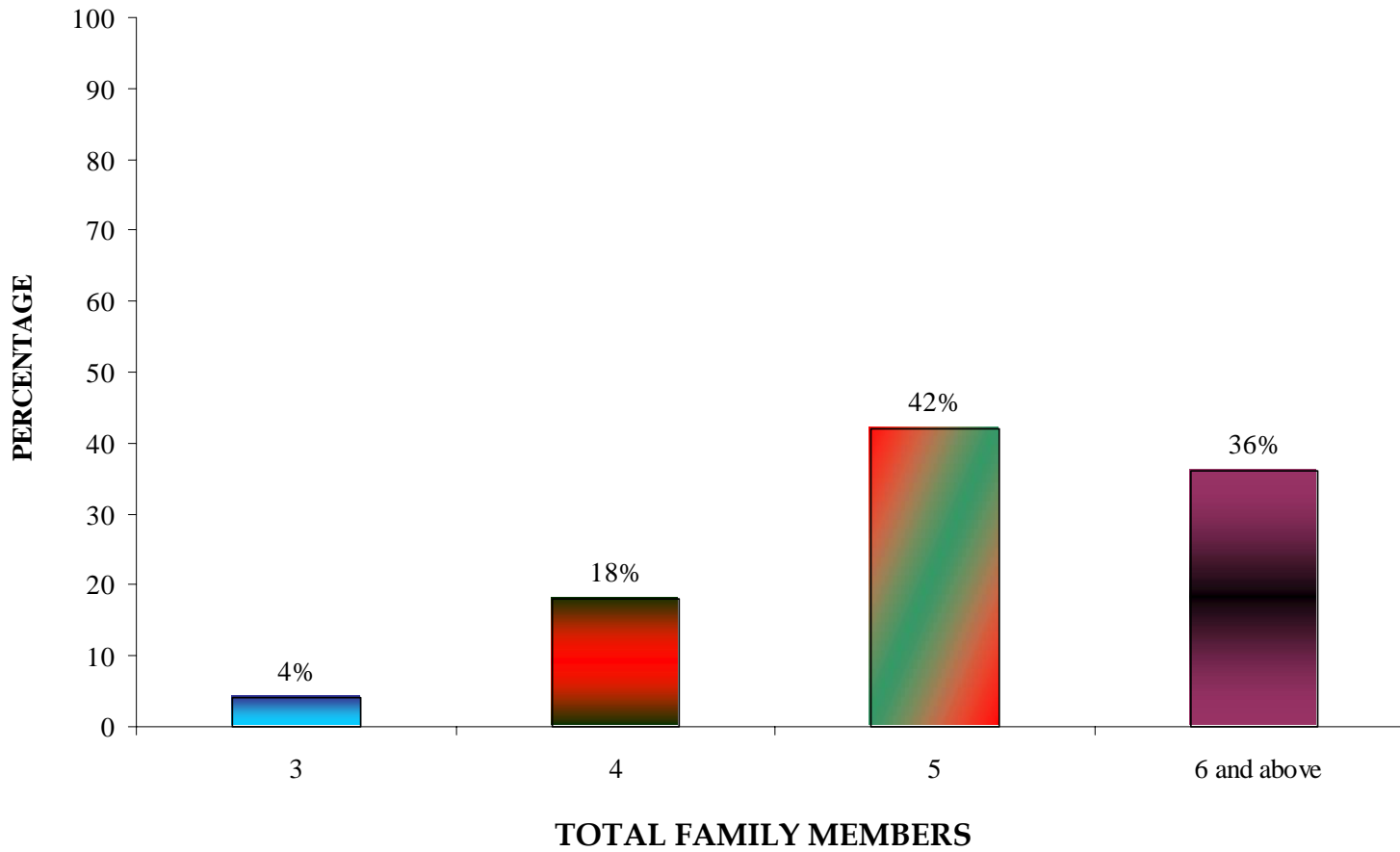
Regarding source of health information 5(10%) got the health information from radio/television and 45(90%) got the health information from health professionals.



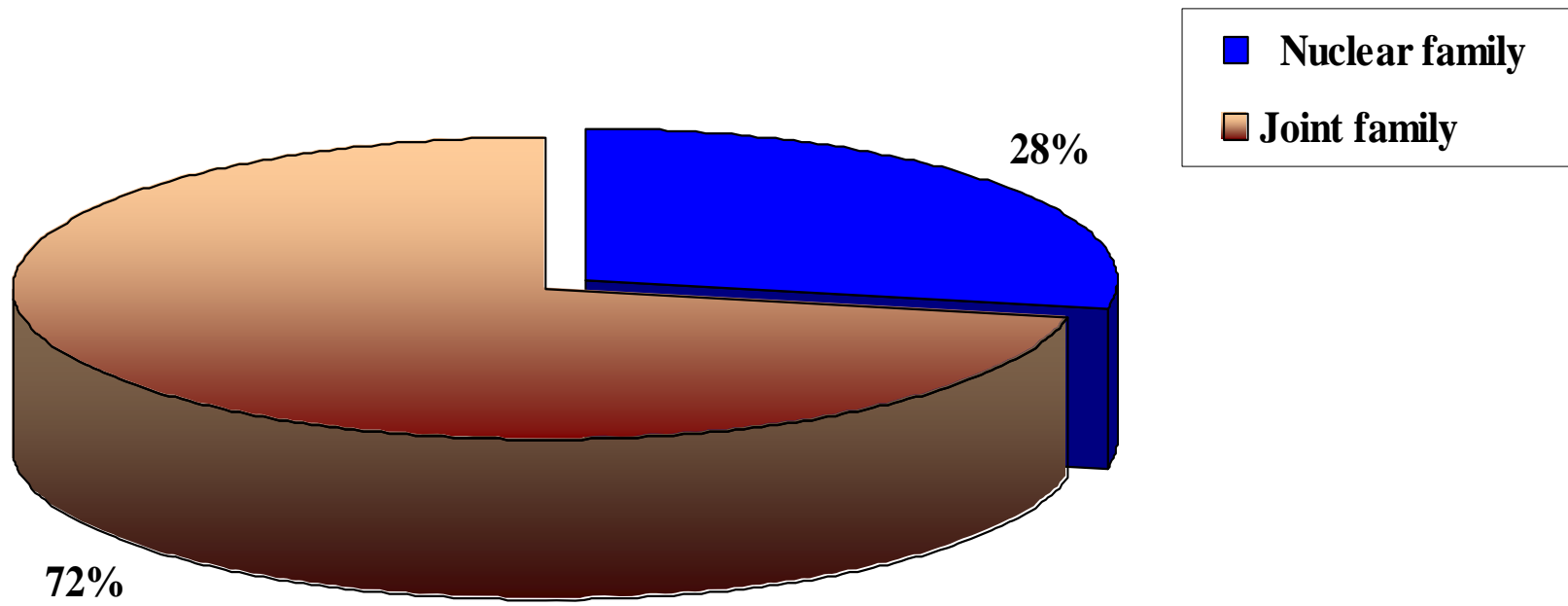
**Fig : 2 Percentage distribution of adolescent girls with iron deficiency anemia according to Age (In Years).**



**Fig : 3 Percentage distribution of adolescent girls with iron deficiency anemia according to Education.**

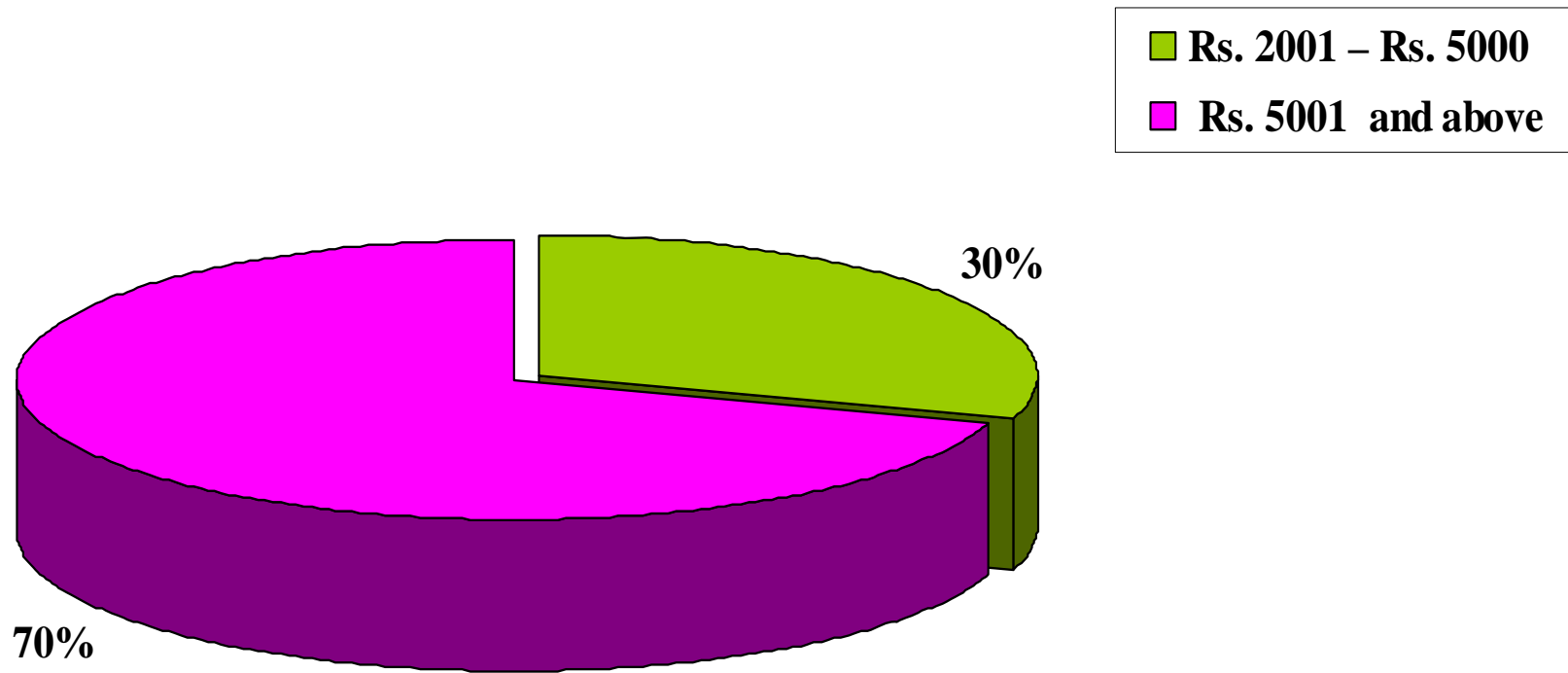


**Fig : 4 Percentage distribution of adolescent girls with iron deficiency anemia according to total family members.**



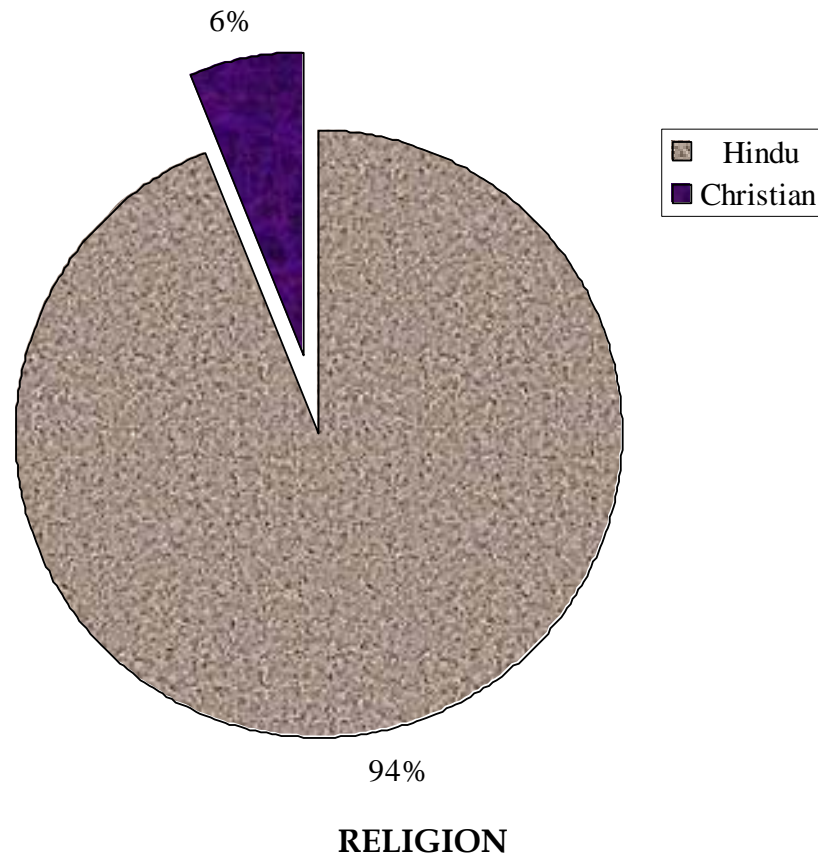
**TYPE OF FAMILY**

**Fig : 5 Percentage distribution of adolescent girls with iron deficiency anemia according to Type of family**



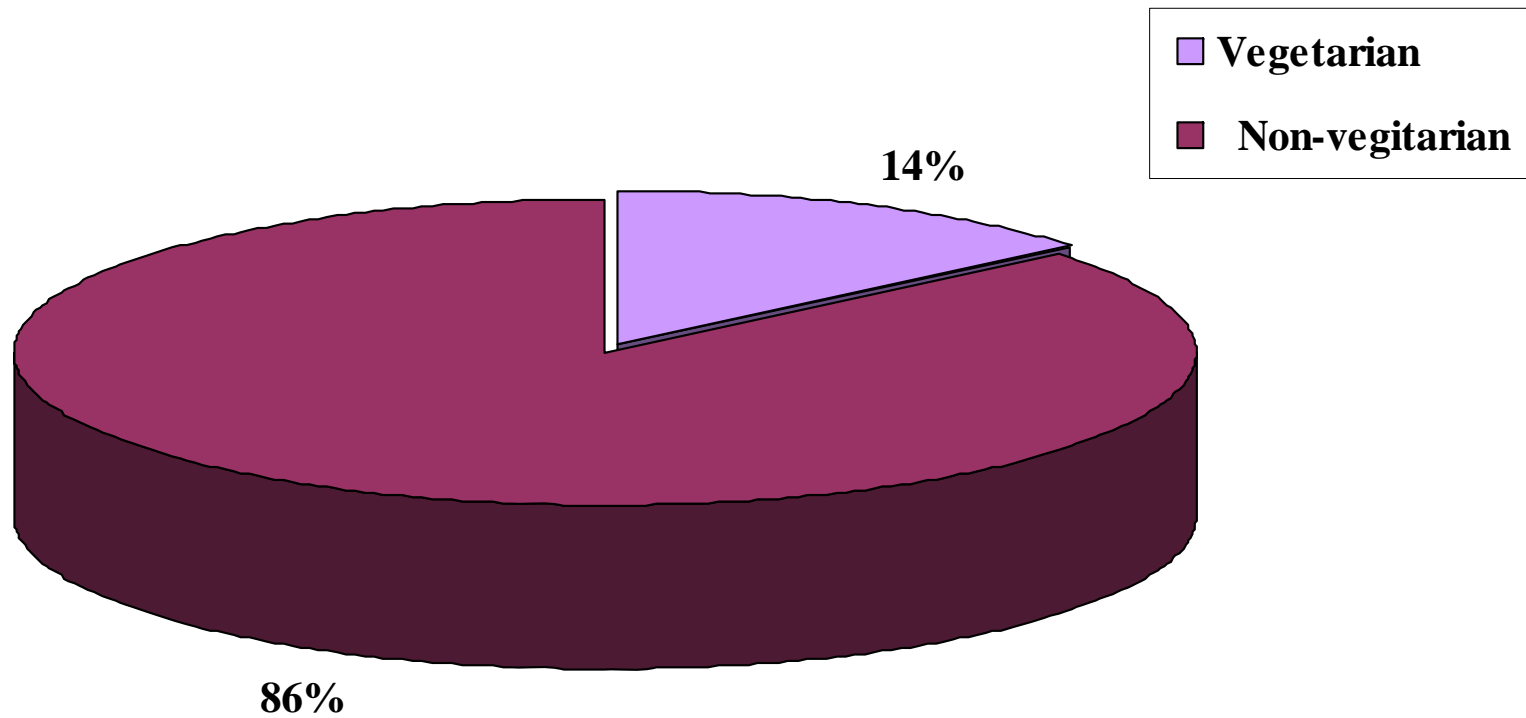
**INCOME PER MONTH**

**Fig : 6 Percentage distribution of adolescent girls with iron deficiency anemia according to Income per month.**



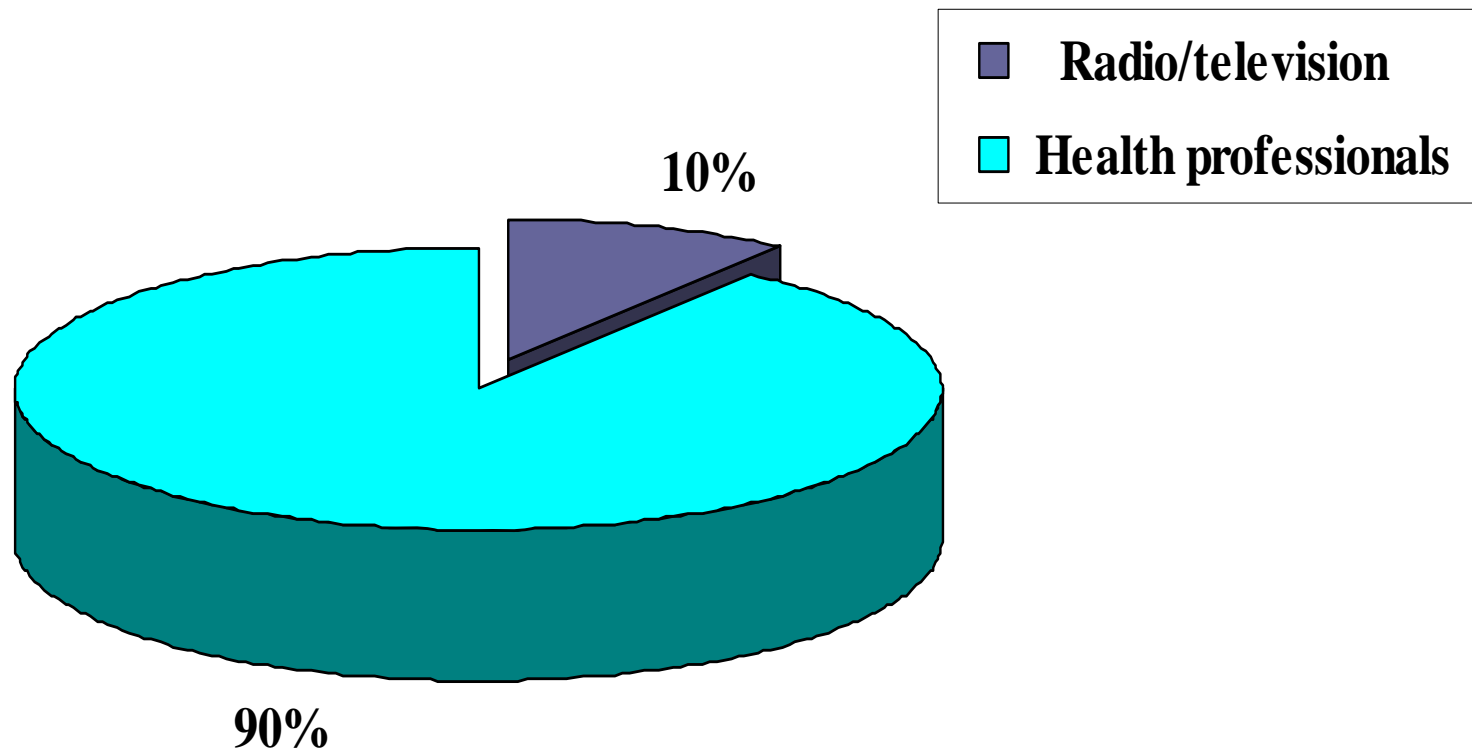
**Fig : 7 Percentage distribution of adolescent girls with iron deficiency anemia according to their Religion**





**TYPE OF FOOD CONSUMPTION**

**Fig : 8 Percentage distribution of adolescent girls with iron deficiency anemia according to Type of food consumption**



**SOURCE OF HEALTH INFORMATION**

**Fig : 9 Percentage distribution of adolescent girls with iron deficiency anemia according to source of health information.**

**SECTION - B: ASSESS THE LEVELS OF ANEMIA AMONG ADOLESCENT GIRLS WITH IRON DEFICIENCY ANEMIA BEFORE NUTRITIONAL INTERVENTION**

**Table - 2:** Frequency and percentage level of anemia among adolescent girls before nutritional intervention.

CATEGORY	LEVELS OF ANEMIA	
	F	%
Mild	8	16%
Moderate	33	66%
Severe	9	18%

Table 2 shows that the level of anemia before giving nutritional intervention. Among 50 adolescent girls with iron deficiency anemia 8 (16%) had mild level of anemia, 33 (66%) had moderate level of anemia and 9(18%) had severe anemia.

**SECTION - C : ASSESS THE LEVELS OF ANEMIA AMONG ADOLESCENT GIRLS WITH IRON DEFICIENCY ANEMIA AFTER NUTRITIONAL INTERVENTION.**

**Table - 3 :** Frequency and percentage level of anemia among adolescent girls after nutritional intervention.

n=50

CATEGORY	LEVELS OF ANEMIA	
	F	%
Mild	29	58%
Moderate	21	42
Severe	-	-

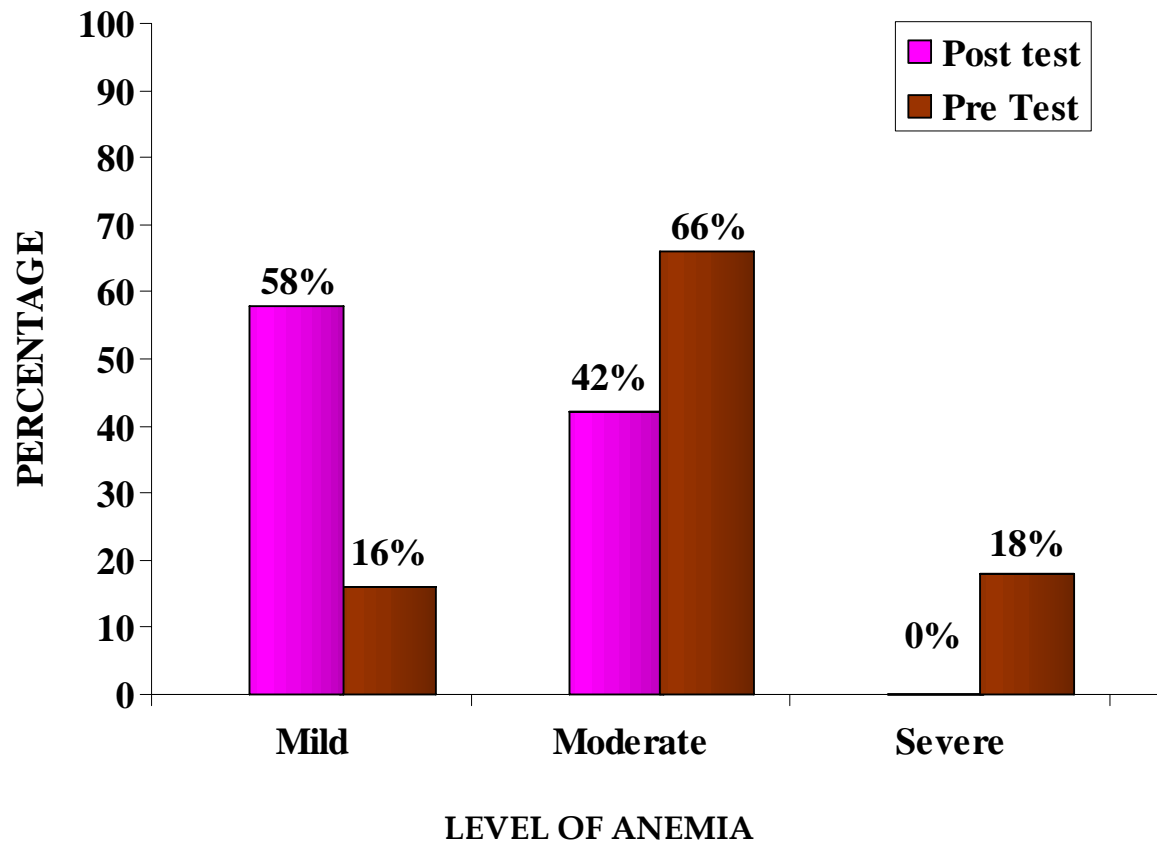
Table 3 shows that among 50 adolescent girls with iron deficiency anemia 29 (58%) adolescent girls had mild level of anemia and 21(42%) adolescent girls had moderate level of anemia after giving nutritional intervention.

**Table - 4 :** Comparison of frequency and percentage distribution of level of anemia among adolescent girls with iron deficiency anemia before and after nutritional intervention.

n=50

CATEGORY	LEVELS OF ANEMIA			
	Before Nutritional intervention		After Nutritional intervention	
	F	%	F	%
Mild	8	16	29	58
Moderate	33	66	21	42
Sever	9	18	-	-

Table 4 shows that in before nutritional intervention among 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.



**Fig : 10 Percentage distribution of level of anemia among adolescent girls with iron deficiency anemia before and after nutritional intervention**

**SECTION D : ASSESSMENT OF THE EFFECTIVENESS OF NUTRITIONAL INTERVENTION AMONG ADOLESCENT GIRLS WITH IRON DEFICIENCY ANEMIA.**

**Table 5 :** Comparison of mean, mean percentage ,mean difference, standard deviation and 't' Value score of level of anemia in pre test & post test

n=50							
S. No	Variable	Mean	SD	Mean percentage	Mean Difference	't' value	Table value
1	Pre Test	14.828	1.16	29.656	1.29	8.94	2.01
2	Post Test	13.54	0.55	27.08			
df (49)					P<0.05		

Table 4 shows that the mean scores of pre test and post test level of anemia among adolescent girls 14.828 (SD  $\pm$  1.16) and 13.54 (SD  $\pm$  0.55) respectively. Thus the difference in pretest and posttest mean was 1.29. The overall pretest mean percentage was 29.656, where as the post test mean percentage was 27.08.

Post test level of anemia mean score is less than the pre test score. Paired 't' value is 8.94 which was significant at 0.05 level.

**SECTION - E : ASSOCIATION OF THE POST TEST LEVEL OF IRON DEFICIENCY ANEMIA WITH THEIR SELECTED DEMOGRAPHIC VARIABLES.**

**Table. 6** Association of the level of iron deficiency anemia with their selected demographic variables.

n=50

<b>Demographic Variables</b>	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>	$\chi^2$	<b>Table value</b>	<b>Inference</b>
<b>Age</b>						
a) 13 - 14 years	6	3	-		3.84	NS
b) 15 - 16 years	4	3	-	0.195		
c) 17 - 18 years	7	5	-	df(1)		
d) 19 years	12	10	-			
<b>Education</b>						
a) No formal education	1	-	-		7.82	NS
b) Primary school	10	9	-			
c) Secondary school	15	9	-	1.32		
d) Higher secondary	3	3	-	df(3)		
<b>Total family members</b>						
a) 3		2	-		7.82	NS
b) 4	5	4	-			
c) 5	13	8	-	3.027		
d) 6 and above	10	8	-	df(3)		
<b>Type of family</b>						
a) Nuclear family	7	7	-		3.84	NS
b) Joint family	22	14	-	0.5 df(1)		



<b>Income per month</b>						
a) Below Rs. 1000	-	-	-			
b) Rs1001-Rs2000	-	-	-			
c) Rs2001- Rs5000	10	5	-	0.33	3.84	NS
d) Rs5001 and above	19	16	-	df(1)		
<b>Religion</b>						
a) Hindu	29	18	-	4.40		
b) Muslim	-	-	-		5.99	NS
c) Christian	-	3	-	df(2)		
d) Others	-	-	-			
<b>Type of food consumption</b>						
a) Vegetarian	4	3	-	0.178	3.84	NS
b) Non-vegetarian	25	18	-	df(1)		
<b>Source of health information</b>						
a) News paper/ magazine	-	-	-			
b) Radio/ television	1	4	-	3.29	3.84	NS
c) Friends/ relatives	-	-	-	df(1)		
d) Health professionals.	28	17	-			

**NS - Non Significant**

**P<0.05 level**

Chi - square value was calculated to find out the association between the nutritional intervention among adolescent girls with iron deficiency anemia with their selected demographic variables such as age, education, total family members, type of family, income per month, type of food consumption and source of health information.

The demographic variables like age, education, total family members, type of family, income per month, religion, type of food consumption, source of health information had no association with hemoglobin and signs and symptoms scores of iron deficiency anemia after nutritional intervention among adolescent girls. Therefore there was no significant association between the post test level scores of iron deficiency anemia with their selected demographic variables.

## CHAPTER V

### DISCUSSION

The discussion chapter deals with sample characteristics and objectives of the study.

The aim of the present study was to assess the effectiveness of nutritional intervention among adolescent girls with Iron deficiency anemia in Nanchyampalayam, Dharapuram.

#### **Description of sample characteristics.**

The adolescent girls who belongs to the age group of 13-14 yrs were only 9(18%), 7(14%) belongs to 15-16 yrs, very few 12(24%) adolescence were in the age group of 17-18yrs and majority of them 22(44%) were in the age group of 19yrs.

The data showed that 1(2%) of the adolescents had no formal education and 19(38%) of the adolescents had primary education. The majority 24(48%) of the adolescents studied secondary education and 6(12%) of the adolescents studied higher education

Regarding family members 2(4%) belongs to 3 family members group, 9(18%) belongs to 4 family members group, majority of them 21(42%) belongs to 5 family members group and 18(36%) belong to above 6 family members group.

Regarding the type of family 14 (28%) belongs to nuclear family and 36(72%) belongs to joint family.

Regarding income per month 15 (30%) belongs to Rs.2001-Rs.5000 income group, and majority 35(70%) belongs to Rs. 5001 and above income group.

Regarding religion 47(94%) were Hindu and 3(6%) were Christian.

Regarding type of food consumption 7(14%) were vegetarian and 43(86%) were non-vegetarian.

Regarding source of health information 5(10%) got the health information from radio/television and 45(90%) got the health information from health professionals.

**The findings of the study discussed according to the objectives as follows**

- 1) Assess the level of anemia among adolescent girls before giving nutritional intervention.
- 2) Assess the level of anemia among adolescent girls after giving nutritional intervention.
- 3) Assessment of the effectiveness of nutritional Intervention.
- 4) Association between the post test level of iron deficiency anemia with their selected demographic variables.

## **THE FIRST OBJECTIVE**

### **ASSESS THE LEVEL OF ANEMIA AMONG ADOLESCENT GIRLS WITH IRON DEFICIENCY ANEMIA AFTER NUTRITIONAL INTERVENTION.**

Assessment of level of anemia among adolescent girls before giving nutritional intervention, it was found that among 50 adolescent girls with iron deficiency anemia 8 (16%) had mild level of anemia, 33 (66%) had moderate level of anemia and 9(18%) had severe anemia.

This findings are consistent with the study findings of Bentley M.E.,(2003)where the study results revealed that prevalence of anemia was high among all women. In all 32.4% of women had mild anemia, 14.19% had moderate and 2.2% had severe anemia.

## **THE SECOND OBJECTIVE**

### **ASSESS THE LEVEL OF ANEMIA AMONG ADOLESCENT GIRLS WITH IRON DEFICIENCY ANEMIA AFTER NUTRITIONAL INTERVENTION.**

Assessment of level of anemia among adolescent girls after giving nutritional intervention, it was found that among 50 adolescent girls with iron deficiency anemia 29 (58%) adolescent girls had mild level of anemia and 21(42%) adolescent girls had moderate level of anemia after giving nutritional intervention.

This study findings are consistent with the study findings of Gopaldas. T.,(2002) were the results revealed that there was a significant raise in the level of hemoglobin after cereal-based fermented foods or gooseberry juice at the workplace. This study was conducted in 4 factories. The result revealed that in units 1, 2, and 3, the hemoglobin status of the women improved significantly from 11.10 to 12.30 g/dl,

11.20 to 12.70 g/dl, and 11.50 to 13.00 g/dl, respectively. In unit 4 there was no change: the values were 10.90 g/dl before and after intervention.

### **THE THIRD OBJECTIVE ASSESSMENT OF THE EFFECTIVENESS OF NUTRITIONAL INTERVENTION.**

Among 50 adolescent girls with iron deficiency 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.

Post test level of anemia mean score is less than the pre test score. Paired 't' value is 8.94 which was significant at 0.05 level.

This study findings are consistent with the study findings of Mohanraj J.,(2008) were the result revealed that there was a reduction in the percentage level of 7-9 gm/dl in women from 30% to 3.3% and 60% to 86.7. The pretest Hb is 9.59gm and post test Hb is 10.18 gm. The gain score is 0.59 gm/dl. Therefore the research hypothesis H<sub>1</sub>- there will be a significant difference between the level of iron deficiency anemia before and after nutritional intervention is accepted.

**THE FOURTH OBJECTIVE  
ASSOCIATION BETWEEN THE POST TEST LEVELS OF IRON  
DEFICIENCY ANEMIA WITH THEIR SELECTED DEMOGRAPHIC  
VARIABLES.**

Chi square values were calculated to find out the association of the level of iron deficiency anemia with their selected demographic variables such as age( $\chi^2=0.195$ ), education( $\chi^2=1.32$ ), total family members ( $\chi^2=3.027$ ), type of family( $\chi^2=0.5$ ), income per month ( $\chi^2=0.33$ ), religion ( $\chi^2=4.40$ ) type of food consumption ( $\chi^2=0.178$ ) and source of health information( $\chi^2=3.29$ ).

There was no association with the demographic variables like age, educational status, total family members, type of family, monthly income of the family, religion, type of food consumption and source of health information between the post test levels of iron deficiency anemia.

This study finding is contradict with the study finding of Sanjeev .M. Choudhary(2008) were the result revealed a significant association was found between the level of anemia and literacy status of the parents. Therefore the research hypothesis H<sub>2</sub>- “There will be significant association between the levels of anemia after nutritional intervention among adolescent girls with their selected demographic variables” was rejected.

## CHAPTER-VI

### SUMMARY, CONCLUSION, IMPLICATION, RECOMMENDATIONS AND LIMITATIONS

**This chapter is divided into 5 aspects**

1. Summary of the study
2. Conclusion
3. Implication for nursing
4. Recommendations
5. Limitations

#### **SUMMARY OF THE STUDY**

The focus of the study was to assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia.

The research design used for this study was pre-experimental one group pre-test and post-test design. The research approach used for the study was evaluative approach which was conducted in Nanchiyampalayam of Dharapuram. Conceptual frame work was based on modified revised Penders .Health Promotion Model(2002). The samples were selected by non probability purposive sampling technique.50 adoloscent girls with the age group of 13-19 years were selected for the study. The instrument used for this study were Sahlis hemometer, observational checklist and interview schedule. 50 adolescent girls with iron deficiency anemia were selected and hemoglobin checked. Nutritional intervention that is one guava along with nutritional balls for 30 days were given. On the 31<sup>st</sup> day again the hemoglobin level were checked and the signs and symptoms were



assessed using the same checklist and interview schedule for finding out the effectiveness of nutritional intervention in iron deficiency anemia.

#### **MAJOR FINDINGS OF THE STUDY :**

- Most of the adolescents' girls [44 %] were in the age group of 19 years.
- Most of the [48 %] adolescents girls studied secondary education
- Most of the adolescents girls [42%] were belong to 5 family members group.
- Most of the adolescents girls [72%] belongs to joint family.
- Highest percentage [70%] belongs to Rs 5001 and above group.
- Highest percentage of adolescents girls [94%] were Hindu.
- Majority [ 86%] adolescent girls were non vegetarian.
- Highest percentage [90%] of the adolescents girls had health information from health professionals.

During pretest most of the adolescents girls (66%) had moderate anemia and (18%) of the adolescents girls had severe anemia and (16%) of the adolescent girls had mild anemia. Where as in posttest 58 % of the adolescents girls had mild anemia and 42 % of the adolescent girls had moderate anemia.

Highly significant difference was found between pretest and posttest nutritional intervention at  $P < 0.05$  level.

The study revealed that the nutritional intervention among adolescent girls with iron deficiency anemia was highly significant after nutritional intervention. The mean and standard deviation findings showed that the nutritional intervention was effective in increasing the hemoglobin level among adolescent girls with iron deficiency anemia.

Thus nutritional intervention played an important role in improving hemoglobin level.

The study findings revealed that there was a statistical significant difference in the pretest symptoms scores of iron deficiency anemia and the post test symptoms scores of iron deficiency anemia after the nutritional intervention among adolescent girls. ('t' value 8.94)

## **CONCLUSION**

The present study assessed the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia. The study findings revealed that there was a significant difference in the pre and post test nutritional intervention score.('t' value 8.94)Therefore the investigator found out it is evident that the nutritional intervention is effective in reducing iron deficiency anemia among adolescent girls.

## **IMPLICATIONS**

### **NURSING PRACTICE**

The investigator recommended the following implications drawn from the study which were vital concern for nursing service. The nutritional intervention can be used effectively by the community health nurse in reducing the symptoms of iron deficiency anemia and raising hemoglobin level among the various age group people in the community.

### **NURSING EDUCATION**

The nurse educators can provide in-service education to nursing personnel to update their knowledge about nutritional intervention on iron deficiency anemia and its valuable benefits to the adolescent girls to improving their nutritional status.

## **NURSING ADMINISTRATION**

The nurse administrator should conduct in-service education to disseminate the research findings through continuous nursing education to all nurses. And also cooking demonstrations, conferences, workshop and symposium based on the management of iron deficiency anemia among the different age group of people in the community.

Nurse administrators have more responsibility as a supervisor on creating awareness among adolescents regarding iron rich diet.

## **NURSING RESEARCH**

The findings may be utilized by the emerging researchers for their reference purpose.

This study helps to expand the scientific body of professional knowledge upon which further researches can be conducted.

## **RECOMMENDATIONS**

Similar study can be replicated in a large sample.

A study can be conducted regarding measures to reduce the iron deficiency anemia.

Similar study can be repeated by using laboratory hemoglobin level checking method.

## **LIMITATIONS**

Since the understanding level of adolescent was different the investigator faced difficulty in obtaining the blood samples for checking the hemoglobin level even after explaining the purpose of the study.

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## APPENDIX - A

அனுப்புநர்  
திரு. சா. துரை.எம்.ஏ.,  
ஆணையர்  
தாராபுரம் நகராட்சி

பெறுநர்  
முதல்வர்  
பிஷப்நர்சிங் கல்லூரி  
சி.எஸ்.ஐ மிஷன் காம்பவுண்ட்  
தாராபுரம்

ந.க.எண் 3352/09/எச்1

நாள் 22.04.10

பொருள் :- தாராபுரம் நகராட்சி - நகராட்சி பகுதிகளில் நோய்கள் பற்றி பொதுமக்களிடம் விழிப்புணர்வு ஆய்வு கட்டுரை சமர்ப்பிக்க MSc (N) மாணவிகளுக்கு அனுமதி அளித்தல் - தொடர்பாக.

பார்வை :- முதல்வர் பிஷப் நர்சிங் கல்லூரி, தாராபுரம் அவர்களின் கடிதம்

தாராபுரம் நகராட்சி எல்லைக்குட்பட்ட நஞ்சியம்பாளையம் பகுதியில் வார்டுஎண் 1,2,3, மற்றும் 4 ஆகிய பொதுமக்களிடம் நோய்கள் பற்றிய விழிப்புணர்வு குறித்து ஆய்வுக்கட்டுரை தயார் செய்ய தங்களது கல்லூரி MSc (N) இரண்டாம்ஆண்டு பயிலும் 1) செல்வி. லெடியா ஜாஸ்மின் 2) திருமதி. நீயா அனியன் 3) திருமதி. அனுசுயா 4) செல்வி.சாலினி ஆகிய மாணவிகளுக்கு இதன்மூலம் அனுமதியளிக்கப்படுகிறது.

  
22/4/2010  
ஆணையர்  
தாராபுரம் நகராட்சி

  
22-4-10





**C.S.I. Dr. ANNE BOOTH MISSION HOSPITAL,  
DHARAPURAM.**

(Health Service Unit of C.S.I. Trichy - Tanjore Diocese)  
ERODE DISTRICT, TAMILNADU. PIN - 638 656.

Ph : 04258 - 220642

Email : csidramhd@sancharnet.in

Date :

10.07.2010

TO WHOM SO EVER IT MAY CONERN

This is to certify that Mrs. Neeba Aniyam, II Year M.Sc(N) student has been sufficiently instructed o Sahli's Method of Estimation of Hemoglobin and is hereby permitted to use the same in her project work.

Place: Dhurapuram

Date: 10/7/10



Dr JOSEPH.S. M B B S  
REG NO:86601

**MEDICAL OFFICER**  
C S.I.Dr.ANNE BOOTH  
MISSION HOSPITAL  
DHARAPURAM-638656



**C.S.I. Dr. ANNE BOOTH MISSION HOSPITAL,  
DHARAPURAM.**

(Health Service Unit of C.S.I. Trichy - Tanjaore Diocese)  
TIRUPUR DISTRICT, TAMILNADU. PIN - 638 656.

Ph : 04258 - 220642

Email : csiabmh@rediffmail.com  
csidrabmh@rediffmail.com

Date : 4/5/2010

TO WHOMSOEVER IT MAY CONCERN

This is to certify that 5 adolescent girl volunteers underwent Hemoglobin testing in this hospital to evaluate the accuracy of the instrument used by Mrs. Neelam, II year MSc. Nursing student for the purpose of her project.

(JOSEPH S.)

**MEDICAL OFFICER**  
C.S.I. Dr. ANNE BOOTH  
MISSION HOSPITAL  
DHARAPURAM - 638 656



**APPENDIX - B**  
**LETTER SEEKING EXPERT'S OPINION FOR**  
**VALIDITY OF TOOLS**

From

Mrs. Neeba Aniyam,  
M.Sc (Nursing) II year,  
Bishop's College of Nursing,  
Dharapuram.

To

Respected Madam/Sir,

**SUB : Requisition for content validity of tool**

I am M.Sc., (Nursing) second year student of Bishop's College of Nursing, Dharapuram, under Dr. M.G.R Medical University, Chennai. As a partial fulfillment of my M.Sc (N) Degree Programme, I am conducting a research on "**A Study To Assess the effectiveness of the nutritional intervention on anemia among adolescent girls with iron deficiency anemia in Nanchiampalayam at Dharapuram**". One of the initial steps of the research study is to develop a tool. I am sending the above stated for content validity and for your expert and valuable opinion.

I will be very thankful to return it to the undersigned.

Your's sincerely,

(NEEBA ANIYAN)

**Encl ;**

1. Certificate of content validity
2. Statement of problem, objectives, operational definition, hypothesis
3. Description of the tool and tool for data collection
4. Self addressed envelope

**Principal**

**APPENDIX - C**  
**COMMUNITY HEALTH NURSING**

**LIST OF EXPERTS OF VALIDATION**

- 1) **Prof. Mrs. Sivagami.Rm , M.Sc(N),**  
HOD,  
Department of Community Health Nursing,  
KMCH College of Nursing,  
Coimbatore.
- 2) **Mrs. Amudha, M.Sc(N),**  
Associate Professor,  
HOD of Community Health Nursing,  
Dhanvanthri College Of Nursing,  
Namakkal.
- 3) **Mr. Kandaswamy, M.Sc(N),**  
HOD,  
Department of Community Health Nursing,  
Sri Gokulam College of Nursing,  
Salem.
- 4) **Mr.Y. John Sam Arun Prabu, M.Sc(N),**  
Reader,  
Department of Community Health Nursing,  
CSI Jayaraj Annapackiam College of Nursing,  
Madurai.
- 5) **Prof.Dr.Arun Vijaya Paul,**  
Associate professor  
Department of Community Medicine  
Coimbatore Medical College  
Coimbatore

## APPENDIX - D

### CERTIFICATE FOR VALIDITY

This is to certify that the observational checklist and interview schedule on "A study to assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia in selected urban area at Dharapuram," has been validated by me and found appropriate with mentioned suggestions.

Signature : 


Name : Y. Jeyaraj Annapoosam

Designation : READER

College : CSI. Jeyaraj Annapoosam  
College of Nursing  
Punalai  
Madurai.

## CERTIFICATE FOR VALIDITY

This is to certify that the observational checklist and interview schedule on "A study to assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia in selected urban area at Dharapuram," has been validated by me and found appropriate with mentioned suggestions.

Signature :   
26/5/10.

Name : M. AMUDHA, M.Sc.N.

Designation : ASSO. PROFESSOR,  
HOD, CHN department

College : Dhanvantri  
College of Nursing,  
Krode.

## CERTIFICATE FOR VALIDITY

This is to certify that the observational checklist and interview schedule on "A study to assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia in selected urban area at Dharapuram," has been validated by me and found appropriate with mentioned suggestions.

Signature : 

Name :

Designation :

College :

**ASSISTANT PROFESSOR OF S.P.M.,  
Department of Community Medicine  
Coimbatore Medical College,  
Coimbatore-641 014**



## CERTIFICATE FOR VALIDITY

This is to certify that the observational checklist and interview schedule on "A study to assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia in selected urban area at Dharapuram," has been validated by me and found appropriate with mentioned suggestions.

*Prof. Sivagani Ramathan*  
M.Sc (Nursing)  
HOD/Community Health Nursing  
KMCH College of Nursing, Coe-1a

*Prof. Sivagani Ramathan*  
M.Sc (Nursing)  
HOD/Community Health Nursing  
KMCH College of Nursing, Coe-1a

Signature : *Rm. Sivagani*


Name : *Rm. Sivagani*

Designation : *HOD/PROFESSOR*

College : *KMCH COLLEGE  
OF NURSING  
CHIMBATUR*

## CERTIFICATE FOR VALIDITY

This is to certify that the observational checklist and interview schedule on "A study to assess the effectiveness of nutritional intervention among adolescent girls with iron deficiency anemia in selected urban area at Dharapuram," has been validated by me and found appropriate with mentioned suggestions.

Signature : 

Name : KANDASAMY M

Designation : HOD/Associate Prof.  
Dept of Community Health Nsg

College : Sri Gokulam College of  
Nursing, Salem

## APPENDIX - E

### CERTIFICATE OF ENGLISH EDITING

#### TO WHOM SOEVER IT MAY CONCERN

This is to certify that the dissertation work, " A Study To Assess the effectiveness of the nutritional intervention on anemia among adolescent girls with iron deficiency anemia in Nanchiampalayam at Dharapuram" done by Mrs.Neeba Aniyar, II Year M.Sc (Nursing) student of Bishop's College of Nursing, Dharapuram is edited for English Language appropriateness by Mr. P.Sampath, M.A,M.Ed. M.Phil.,

Date :

Address :

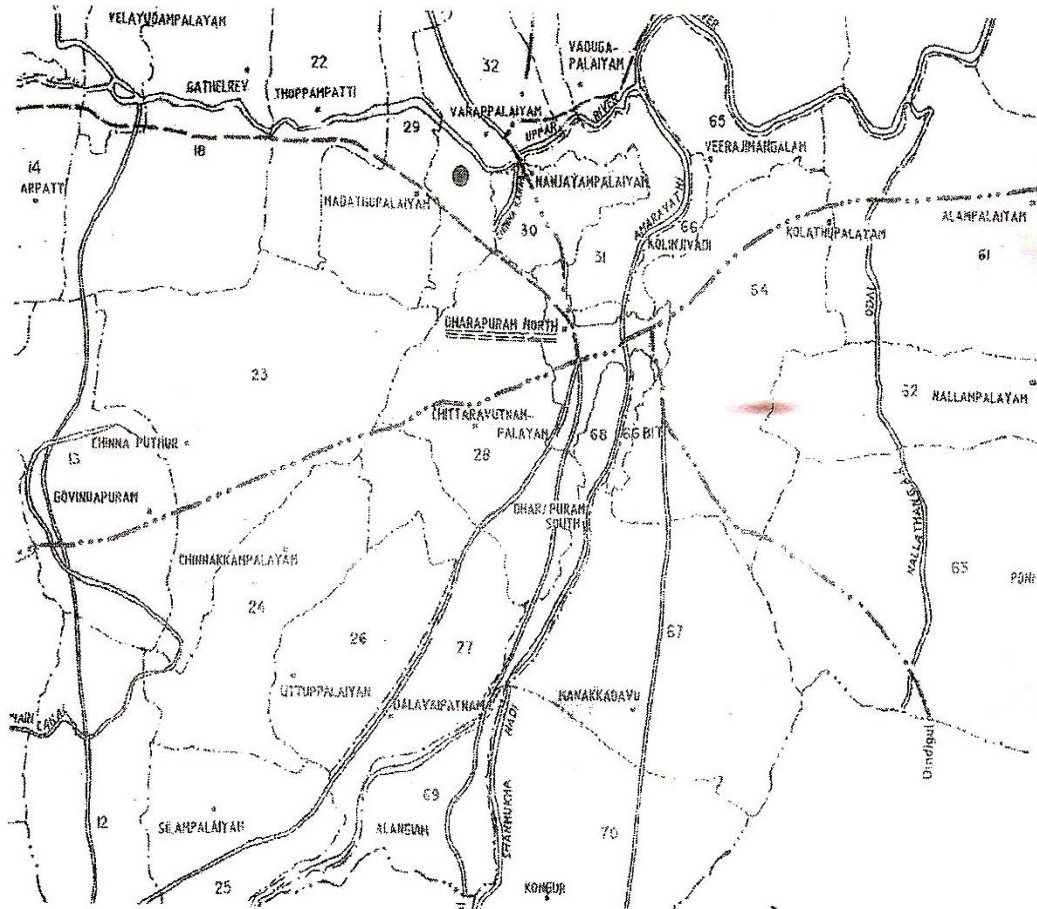
  
Signature

P-SAMPATH

**P.SAMPATH, M.A., M.Phil., M.Ed.,**  
**Lecturer in English,**  
**Maharani Teacher Training Institute,**  
**Dharapuram.**

# APPENDIX - F

## NANCHIYAMPALAYAM AREA MAP



● Setting of the study

## APPENDIX – G

### TOOLS

#### OBSERVATIONAL CHECK LIST ON SIGNS AND SYMPTOMS OF IRON DEFICIENCY ANEMIA

SL. No	CONTENT	PRESENT (1)	ABSENT (0)
	<b><u>OBSERVATIONAL CHECK LIST</u></b>		
I	<b>SIGNS</b> (a) Pallor in conjunctiva, tongue and nail (b) Glossitis (inflammation of tongue) (c) Stomatitis (inflammation of mouth) (d) Oedema of legs (e) Tachycardia (f) Puffiness of face (g) Irritability		
II	<b>SYMPTOMS</b> (a) Fatigue (b) Loss of appetite (c) Headache (d) Breathlessness (e) Giddiness (f) Palpitation (g) Brittle hair (h) Bone pain		

**TOTAL SCORE : 15**

**HAEMOGLOBIN SCORE**

Severe Anemia : 10 – 15	Mild Anemia : 10- 10.9gm/dl
Moderate Anemia : 5 – 9	Moderate Anemia:7.1-9.9gm/dl
Mild Anemia : < 5	Severe Anemia :<7gm/dl

## DEMOGRAPHIC DATA

### 1. Age

- a. 13 -14years
- b. 15 -16years
- c. 16 -17years
- d. 17 -19years

### 2. Educational status

- a. No formal education
- b. Primary school
- c. Secondary school
- d. Higher secondary

### 3. Total family members

- a.3
- b.4
- c.5
- d.6 and above

### 4. Type of family

- a. Nuclear
- b. Joint

### 5. Monthly income of the family

- a. <1000
- b. 1001 -2000
- c. 2001 -5000
- d. 5001 and above

6. Religion

- a. Hindu
- b. Muslim
- c. Christian
- d. Others

7. Type of food consumption

- a. Vegetarian
- b. Non - vegetarian

8. Source of health information

- a. News paper/Magazine
- b. Radio / Television
- c. Friends / Relationships
- d. Health professionals

## APPENDIX – H

### NUTRITIONAL INTERVENTION

#### A. Preparation of Nutritional Ball

Content used for 50gm Nutritional Ball

Ragi	:	20gm
Groundnut	:	10gm
Jaggery	:	20gma
And along with 1 Guava	:	100gm

Ragi was washed and dried. The dried ragi was fried and powdered. Ragi powder was prepared once in a week and was stored in a dry container. Ground nut was fried and powdered everyday. Everyday to prepare 50 balls 100 tablespoons of ragi powder and ground nut powder mixed in a container with a clean spoon. 100gm of Jaggery was boiled till it becomes sticky form. 2500ml of jaggery paste was made and it was strained with a clean strainer. The boiled jaggery paste was mixed with the powder, which was already mixed and kept. After stirring it well, when it was warm, the balls were prepared with clean hands by the researcher.



## **B. Cost Effectiveness for nutritional ball**

### **Cost for the Nutrition Ball and Guava for 30days**

Ragi 30kg	:	Rs.450
Groundnut 15kg	:	Rs1025
Jaggery 30kg	:	Rs1100

**Total = Rs2575**

Total amount for Guava: Rs4615

**Total Amount =Rs7190**

# APPENDIX - I

## PHOTOS





