A STUDY TO ASSESS THE EFFECTIVENESS OF NUTRIENT MIXTURE ON THE LEVEL OF HAEMOGLOBIN AMONG THE ADOLESCENT GIRLS WITH ANEMIA AT SELECTED SCHOOL, THANJAVUR DISTRICT.

BY

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A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN NURSING.

OCTOBER 2015

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OCTOBER 2015

DECLARATION

I hereby declare that the present dissertation entitled **"A study to assess the effectiveness of nutrient mixture on the level of haemoglobin among the adolescent girls with anemia at selected school, Thanjavur district."** It is a outcome of the original research work undertaken and carried out by me, under the guidance of research guide **Prof. .Mrs.VANITHA INNOCENT RANI, M.Sc(N), Ph.D.,** professor cum principal, and **Mrs.AMBIKA, M.Sc(N),** Reader, Our Lady of Health College of Nursing, Thanjavur.

I hereby declare that the material of this has not found in any way, the basis for the award of any degree / diploma in this university or any other university.

301317352

CERTIFICATE

CERTIFICATE THAT IS THE BONAFIDE WORK OF

301317352

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LIST OF ABBREVATIONS

SHORT FORMS	ABBREVIATION
H_0	Null Hypothesis
H_1	Research Hypothesis
λ^2	Chi-square
S	Significant
NS	Not Significant
T	Test of Significance
%	Percentage
N	Number of sample
WHO	World health organization
UNICEF	United nation international child emergency fund
Hb	Heamoglobin level
SD	Standard deviation

ABSTRACT

A study to assess the effectiveness of nutrient mixture on the level of haemoglobin among the adolescent girls with anemia at selected school, Thanjavur district. A Quasi experimental (One group pre test – post test) design was used for this study. Samples were selected by using purposive sampling technique. The investigator assessed the pre test level of haemoglobin by using haemocue machine. On the same day, deworming was done by administering Tab.Albendazole 400 mg stat as per the paediatricians order. Then the next day, the Nutrient mixture was administered to the samples daily in the morning 11AM under the supervision of the researcher for a period of 1 month. On 31st day, the investigator assessed the post test level of haemoglobin by using the same instrument. Finally, the statistical analysis paired 't' test proved that the 't' value 10.7316 had a significant difference between the pre and post test levels of haemoglobin among the adolescent girls with anemia at 0.05 level of significance . The study finding showed that the Nutrient Mixture was effective for the adolescent girls with anemia.

CHAPTER I

INTRODUCTION

"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.

BACKGROUND OF THE STUDY

The word adolescent is derived from the Latin word, '**adolescere'**; meaning "to grow up, to mature". The **WHO** has defined adolescence as the age period between 10 to 19 years of age for both the sexes. There are about 1.2 billion adolescents in the world, which is equal to 1/5th of the world's population and their numbers are increasing. Out of these, 5 million adolescents are living in developing countries. India's population has reached the 1 billion mark, out of which 21% are adolescents.

Adolescent girls are the mothers of future generation and they need to be taken care in terms of their balanced nutrition to prevent morbidity and mortality. However, most of the adolescent girls diet are based on stable food with little meal intake which causes iron deficiency. In Indian context, adolescent girls are more prone for nutritional disorders due to ignorance and limits the access to health and leads to nutritional disorder.

Blood sustains life. It delivers oxygen, nutrients and other essential substances, including vitamins and medicines to the different cells and tissues of the body. A deficiency in the supply or quality of blood will impair the quality of life and even compromise life itself. **Red Blood Cell**, which is the most common type of blood cell, contains **haemoglobin**, a molecule specially designed to hold oxygen and carry it to cells that need it. Anemia is a condition in which blood does

not have enough haemoglobin or red blood cells. Anemia has many causes. One of the most common is an inadequate intake of iron in the diet. Iron Deficiency Anemia is a condition where a person has inadequate amounts of iron in the blood to meet body demands.

Iron is obtained from food and dietary supplements. Approximately 1mg of every 10 to 20 mg of ingested iron is absorbed in the duodenum and upper jejunum. Therefore only 5% to 10% of ingested iron is absorbed. When the stored iron is not replaced, haemoglobin production is reduced. Iron is of great importance in human nutrition. The adult human body contains between 3-4 g of iron, of which about 60-70 percent is present in the blood (Hb iron) as circulating iron, and the rest (1 to 1.5g) as stored iron in liver, spleen, bone marrow and kidney. Each gram of hemoglobin contains about 3.34 mg of iron. The normal values of haemoglobin in men are 13.5g/dl and females 12-16g/dl.

Iron deficiency is the most prevalent micronutrient deficiency among the adolescents .In teenagers, iron deficiency is more than just being pale and tired. It can affect their development and school performance. Studies have shown that adolescents with anaemia have decreased verbal learning and poor memory. Iron deficiency could cause shortened attention span, alertness and learning in adolescents. Adolescents with chronic illness, heavy menstrual blood loss (>80 ml/month) or who are underweight or malnourished are at increased risk for iron deficiency and should be screened Iron deficiency is the most common cause of anemia in adolescents in the United States, and an adolescent girl is 10 times more likely to develop anemia than a boy .Teenagers are at the highest risk of anemia during their adolescent growth spurt. Among girls, however, menstruation increases the risk for iron deficiency anemia throughout their adolescent and childbearing years.

TABLE 1.1 : The global prevalence of anemia 2011(WHO)

Country estimates for Percentage of non pregnant women with blood haemoglobin concentration aged 15-40 years,2011.

Country	**Mean blood haemoglobin concentration (g/l)**		**haemoglobin concentration ≤120(g/dl)**		**haemoglobin concentration ≤80(g/dl)**		**Level of public health significance**
	Estimate	95%	Estimate	95%	Estimate	95%	
China	129	123-135	19	8-41	0.3	0.0-1.4	Mild
India	**119**	**113-125**	**48**	**29-63**	**2.5**	**0.8-5.4**	**Severe**
Srilanka	127	120-132	26	12-46	0.7	0.1-2.3	Moderate
Malasiya	119	121-134	20	9-45	0.5	0.0-1.8	Moderate

NEED FOR THE STUDY

‘‘It is health that is real wealth and not pieces of gold and silver’’

-Mahatma Gandhi

Anemia is a significant morbidity worldwide. **WHO** has given definition of anemia as **“a condition with haemoglobin content of blood lower than normal as a result of deficiency of one or more nutrients regardless of the cause of such deficiency”.**

According to the **World Health Organization (WHO)**, there are two billion people with anaemia in the world and half of the anaemia is due to iron deficiency. Anaemia is a late indicator of iron deficiency, so it is estimated that the prevalence of iron deficiency is 2.5 times that of anaemia. The estimated prevalence of anaemia in developing countries is 39% in children <5 years, 48% in children 5–14 years, 42% in women 15–59 years, 30% in men 15–59 years, and 45% in adults >60 years . These staggering figures have important economic and health consequences for low- and middle-income countries.

Iron deficiency is believed to be the most important cause of anemia among children in India and is attributable to poor nutritional iron intake and low bioavailability. Around 48% of children are anemic. Preschool, adolescent, Ruralites & those from lower socio economic status are at maximum risk

WHO Department of Nutrition for Health and Development and the United States Centers for Disease Control and Prevention in 2011, it is estimated that 43% of children, 38% of pregnant women, and 29% of nonpregnant women and 29% of all women of reproductive age have anaemia globally, corresponding to 273million children, 496 million non-pregnant women and 32 million pregnant women.

TABLE 1.2: Indian Council of Medical Research 2010 Prevalence (%) of Anaemia among India

Category/ anaemia prevalence	**Mild anemia**	**Moderate anemia**	**Severe anemia**
Children(1-< 5years)	23.7	41.1	2.1
Males20-49 years ≥50years	44.7 56.2	6.6 17.0	0.3 1.2
Women **12-14years** **15-17years** 20-49 years ≥50years Lactating Pregnant	 **46.8** **47.0** 41.9 52.6 43.0 24.4	 **20.8** **20.9** 30.3 26.5 31.9 45.9	 **1.1** **1.8** 2.9 1.1 3.2 4.3

UNICEF/UNU/ WHO / MI report indicates that there are approximately 2.5 cases of iron deficiency for each case of anaemia. The functional consequences are known to occur prior to onset of clinical stage of iron deficiency. Many more adolescents are in fact suffering from iron deficiency (ID) with its adverse effects on health and physical stamina, than are frankly anaemic. Iron deficiency and iron deficiency anaemia (IDA) in adolescence is a major public health problem. Studies indicate that the incidence of anaemia in adolescents tends to increase with age and corresponds with the highest acceleration of growth during adolescence. The highest prevalence is between the

ages of 12-15 years when requirements are at peak. More than 50% girls in this age group have been reported to be anaemic.

Adolescents (age 10-19 years) are at high risk of iron deficiency and anaemia due to accelerated increase in requirements for iron, poor dietary intake of iron, high rate of infection and worm infestation as well as the social norm of early marriage and adolescent pregnancy.

Iron requirement peaks during adolescence due to rapid pubertal growth with sharp increase in lean body mass, blood volume and red cell mass, which increases iron needs for myoglobin in muscles and haemoglobin in the blood. The continuous increase in the median requirements for absorbed iron for both boys and girls

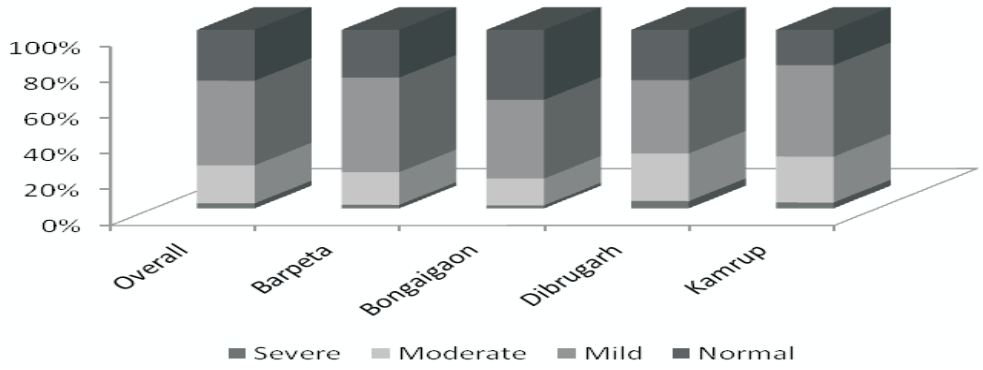
A school based cross sectional study was conducted to assess the prevalence of low anemia among adolescents in selected areas of simla, a total of 870 adolescent (480 males and 390 females) participated in the study, a semi structured interview schedule was used to collect the data and all the students were clinically examined for the signs of anemia, this study result showed that the prevalence of anemia in both males(12.9) and females(13.3) were highest in 10 to 13 years age group, it was observed that 84.6% had history of worm infestation. The study concluded that consumption of green leafy vegetables, milk and meat is useful to decrease prevalence of anemia among adolescent girls.

Santanu K (2008) et al., revealed that anaemia is a major public health problem among adolescent girl students of Assam. The overall prevalence of anaemia among adolescent girl students of Assam is as high as 71.5%. Non-nutritional factors such as infection due to helminths was substantially low (24.71%). Ascaris lumbricoides was the most frequent infection (10.6%), followed by Trichuris trichiura (6.2%), and hookworm infestations (3.9%). Serum ferritin

level in a subgroup of samples was in the lower normal range. The gene frequency for βE-globin gene ranged from 0.071 to 0.266. Statistically significant difference (F=3.471; P=0.001) of mean haemoglobin level was observed in different types of haemoglobin variants. Multiple regression analysis, in a subset of samples having information on Hb levels (g/dl), helminthic infestation (A. lumbricoides, T. trichuria and hookworm), haemoglobin type, revealed haemoglobin type (Hb E) was the important determinant of anaemia among adolescent girl students in the present study.

FIGURE 1.1: Prevalence and severity of anaemia among adolescent girl students of Assam

Severe (< 7 g/dl), Moderate (7–9.99 g/dl),
Mild (10–11.99 g/dl), Normal (≥ 12 g/dl)



An experimental study was conducted with amaranth and spinach to find out the iron availability by a nutritional supplement preparation, the ratio of amaranth, spinach, **jaggery** and **Bengal gram** in the supplement was 2:2:3:2, they also tested its iron availability after blanching and cooking. The result revealed an increase in haemoglobin serum ferritin level up to 13.2 gm/dl and there was significant reduction in the oxalic and phytic acid content.

Amla is the most widely used herb in the ayurveda, it helps in balancing three Doshas, Vayu, Pitta and Kapha and helps in digestive problems,

heart problems, improves defense mechanism, improves eye sight, adds a natural glow to hair and body and is a store house of Vitamin C.

Amla remains a popular Tonic consumed across the Globe. 81.2% of Amla fruit is water, thus it is a very good source of skin moisturizing. It is the richest natural source of Vitamin C. 100 gm. of Amla contains about 700 mg. of vitamin C, which is thirty times the amount found in oranges. It also contains calcium, iron, protein, tannic acids, sugar, phosphorus, carbohydrates etc

Ascorbic acid or other acid an acidic environment increases iron absorption acid reduce ferric iron to ferrous iron. The soluble form that is absorbed acid to a 50 mg of ascorbic acid to a meal by including leman and amla sources can triple the absorption of non heme iron. Gastric Hcl provides the optimal acid medium to prepare iron for absorption.

A balanced vegetarian diet that includes legumes, fortified grains, and green vegetables easily provides adequate iron. Fruits and vegetables contain vitamin C and organic acids (eg, citric acid) that keep iron in a reduced form, allowing for better absorption of non-heme iron.

It has been proved that iron supplementation along with vitamin C improves the level of haemoglobin in non pregnant female. Hence the researcher has decided to do the present study to improve the haemoglobin level in adolescents with iron deficiency anaemia by using combined mixture of iron diets.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of nutrient mixture on the level of haemoglobin among the adolescent girls with anemia at selected school, Thanjavur district.

OBJECTIVES

- To assess the level of Haemoglobin before and after administration of nutrient mixture among the adolescent girls with anemia.
- To determine the effectiveness of nutrient mixture on haemoglobin level among the adolescent girls with anemia
- To associate the pre test levels of Haemoglobin and their selected demographic variables such as Age, Educational status of mother, Food preference, Duration of menstruation, Menstrual cycle, Income of the family /month, Area of residence among the adolescent girls with anemia.

HYPOTHESES

All the Hypotheses are tested at 0.05 level of significance

- H 1- There will be a significant difference in pre and post test levels of haemoglobin among the adolescent girls with anemia.
- **H** 2- There will be a significant association between the pre test level of haemoglobin and their selected demographic variables such as Age, Educational status of mother, Food preference, Duration of menstruation, Menstrual cycle, Income of the family/month, Area of residence among the adolescent girls with anemia

OPERATIONAL DEFINITION

EFFECTIVENESS

In this study it refers to the extent to which the nutrient mixture improves the haemoglobin level of adolescent girls with anemia .

NUTRITIENT MIXTURE

In this study , it refers to the nutritional ball weighing 125 grams contains the ingredients such as 60 gram of Rice flakes, 25 gram of Bengal gram,25 gram of jaggery 15 gram of coconut dry, and 10 gram of amla powder.

LEVEL OF HEMOGLOBIN

In this study, it refers to the milligram of haemoglobin present in 100ml of blood which will be measured by using the haemocue machine.

ADOLESCENT GIRLS WITH ANEMIA

In this study it refers to the female children whose age group was between 14 and 17years and identified by using the haemocue machine as having 10-11.9 g/100ml of haemoglobin and categorized as having mild and moderate anemia.

ASSUMPTION

- The Adolescent girls may need high intake of iron.
- Nutrient Mixture of Rice flakes, bengalgram, coconut dry and jaggery with amla powder may help to improve the haemoglobin level of adolescent girls with anemia .
- Nutrient mixture which contains vitamin C may enhance the absorption of iron

DELIMITATION

- Data collection period was limited to 6 weeks.
- The sample size was limited to 32 samples

PROJECTED OUTCOME

- This study will help to understand that there will be improvement in the level of haemoglobin among the adolescent girls with anemia after administration of nutrient mixture.

CHAPTER II

REVIEW OF LITERATURE

A literature review is a text written by someone to consider the critical points of current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Review of Literature is the reading and organizing of previously written materials relevant to the specific problems to be investigated; frame work and methods appropriate to perform the study".

PART I

Theoretical frame work.

It is divided into five sections

SECTION A:

Literature related to prevalence of anaemia among the adolescent girls.

SECTION B:

Literature related to the effect of T.Albendazole to deworm before starting diet therapy.

SECTION C:

Literature related to the use of Heamocue machine to check the Haemoglobin level.

SECTION D:

Literature related to the effect of dietary interventions for iron deficiency anaemia

SECTION E:

Literature related to the effect of vitamin C for enhancing iron absorption.

PART II

Conceptual framework.

SECTION A: Literature related to the prevalence of anaemia among the adolescent girls

Omer Seid Adem,et al., Journal of Food and Nutrition Sciences (2015) stated that, Institutional based cross-sectional study design was employed. Using Multi-stage sampling technique. In first stage schools were selected randomly, in the second stage in the selected schools, 338 school going adolescent girls (age 14-19 years old) were selected systematically. Structured questionnaires were used to collect Socio-demographic, socio-economic, dietary pattern and frequency of study participants. After collecting the Blood sample, **Hemocue machine** was used to analysis the haemoglobin concentration. SPSS version16.1 statistical software was used to enter and analysis the data. Around one-fourth (22.8%) of school going adolescent girls were anemic. Anemia among the school going adolescent girls was moderate public health problem , Low Scioeconomic States, low consumption of egg, meat and other vegetables and high consumption of milk were the significant causes of anemia.

Shanti Devi et al., International Journal of Basic and Applied Medical Sciences (2015) stated that, The present study included 320 adolescent girls of (9 th and 10 th) from selected Government Secondary Schools of district Rohtak (Haryana) Prevalence of anaemia among the adolescent girls is a matter of great concern, as these girls enter the reproductive life soon after the attainment of their menarche. The overall prevalence came out to be 73% among study subjects. On the basis of severity nearly half of subjects (54%) were found with mild anaemic, 18% of girls had moderate anaemia while 1% girls were severely anaemic. The researcher emphasized that should impart nutrition education among school adolescent's girls to prevent the nutritional anemia.

Sanjay et al., Journal of Research in Engineering and Technology (2014) reported that Hospital based cross sectional study was conducted to assess the prevalence of anemia. The trend of anaemia from 2008 to 2011 was in increasing trend, 9%, 15%, 22%, and 27% respectively and in 2012 constant around 26%. Anaemia was more common in females than males, 18% males and 82% females were reported anaemia of various degrees in the study period. Anaemia was highest among 11-25 years of age 42% followed by 26-40 years 23% and lowest among 0-10 years of age 8.69%. Anaemia among elderly was quite higher 15.5%. Most of the males had mild anaemia 16% followed by moderate 6.61% and severe 0.77% in contrast most of the females had moderate anaemia 42% followed by mild 31.35% and severe 3%. Trend of anaemia in female patients were in increasing trend from 2008-2009, than little decreases in 2010 and further decreases in 2011 after that again increases in 2012. Anaemia was significantly higher in females in comparison to males in moderate and severe category. Anaemia was highest among 11-25 years of age group.

Md. Shamim Miah et al.,(2014) stated that a cross sectional survey was conducted among the adolescent girls selected purposively from different non

government High School. There were 17.5% girls were suffering from iron deficiency anemia. Among them 0.8% severe, 5.8% moderate and 10.9% were mild anemic. In this study 31.82% and 9.21% found anemic in joint and nuclear family. Most of anemic patients found in the family whose family member more than 8. About 66.67 % anemic adolescents were identified whose family's monthly income less than 6000 TK. About 23.08% anemic respondent's parents were illiterate. There was a strong relationship between BMI (Body Mass Index) and anemia. The P value of the association was 0.038 is statistically significant. Most of the respondents about 85.8% had no idea about iron deficiency anemia. Most of the anemic were found 5 days or more menstrual blood flow. All the anemic girls usually intake 5.21 mg irons per day that is not available to meet the daily requirement. So it is essential to increase awareness about taking more iron during adolescent period to reduce the prevalence of anemia.

Kawaljit Kaur et al., (2014) stated that anaemia is the most prevalent nutritional deficiency disorder in the world. It affects all age groups but the most vulnerable are preschool-age children, pregnant women, and non-pregnant women of childbearing age. The highest prevalence of anemia exists in the developing world where its causes are multi-factorial. National Family Health Survey statistics reveal that every second Indian woman is anaemic and one in every five maternal deaths is directly due to anaemia. This review will focus on recent advances in our understanding of the burden of anemia in specific sub-groups, the causes and consequences of anemia among women.

Neelam S et al., European Journal of Zoological Research (2013) stated that 1000 adolescent girls were included in the study between 12-15 years of age Modified kuppuswamy scale were used to classify in socio economic groups. The nutritional status of all girls was analysed .Blood was collected for following indices Hb RDW PCV RBC count. Among 1000 adolescent girls

60percent found to be anaemic, 18.4 percent as mild 41.3percent as moderate , and 0.4 percent was having severe anaemia. High prevalence of anaemia was reported among adolescent girls belonging to class III, IV, V as per modified kuppuswamy classification. Thin and severely thin adolescent girls were found to be at higher risk of anaemia.

Yasemin Isik Balci, MD (2012) stated that the prevalence of anemia was assessed among 1120 children (672 girls and 448 boys), aged 12 to 16 years. We found that the overall prevalence of anemia was 5.6%. 8.3% of the girls and 1.6% of the boys were anemic. We diagnosed iron deficiency anemia in 37(59%) anemic patients and combined iron deficiency and vitamin B12 deficiency anemia in 26 (41%) anemic patients. None of the patients had folic acid deficiency. Our results suggest that the socioeconomic status of the family, traditional eating habits of the region, the fear of gaining weight and irregular eating habits are of great importance in the development of adolescent anemia in Denizli.

Shilpa S et al., (2012) stated that a cross-sectional study was conducted for a period of one year from Jan 2008 – Dec 2008 at villages which were under Vantamuri PHC, a field practice area of J.N Medical College, Belgaum. A total of 840 adolescent girls (10-19 years of age) were included in the study. the blood samples were analyzed by using an automated cell counter. The diagnosis was established as anaemia when the haemoglobin level was less than12gm/dl. The prevalence of anaemia was 41.1% (with that of severe anaemia being 0.6%, that of moderate anaemia being 6.3% and that of mild anaemia being 34.6%). It was observed that the prevalence of anaemia was high in late adolescents (15-19yrs) as compared to that in the early adolescents (10-14yrs). A majority of the girls had mild anaemia. The prevalence of anaemia was considerably high among the girls who belonged to the low socio-economic

status. A high prevalence of anaemia was found among the adolescent girls, which was considerably high in the late adolescents. There was a significant association of anaemia with the socio-economic status. The prevalence of anaemia was high in girls who belonged to the low socio-economic status.

Premalatha et al., (2012), stated that, a cross-sectional survey was executed among 400 female school students in the age group of 13-17 years in Chennai. Sociodemographic details, anthropometric measurements were obtained. Haemoglobin was estimated using cyan method. Statistical analysis was done using IBM SPSS (Statistical Package for the Social Sciences). The prevalence of anemia was found to be 78.75% among school students. Chi-square statistics shows significant association.

Meenal Vinay Kulkarni, et al., National Journal of Community Medicine (2012) stated that a cross sectional community based study was conducted among 272 adolescent girls in an urban slum area under Urban Health Training centre, Nagpur from June 2009 to February 2010. Data was analyzed by mean, standard deviation and chi square test. Prevalence of anemia was found to be very high (90.1%) among adolescent girls. Majority of the girls were having mild or moderate anemia (88.6%). A significant association was found between adolescent girl's education, mother's occupation and anemia. No association was found between menstrual factors and anemia.

DR. Siddharam S,et al., American Society for Clinical Nutrition(2011) Stated that a cross sectional survey was conducted in selected Anganwadi centres of rural area of Hassan district. Three and Fourteen adolescent's girls (10-19 yrs old) were included in the study. The study was conducted from February to April 2011(3moths). Prevalence of anemia was found to be 45.2%. A statically significant association was found with iron deficiency anemia, weight loss and anemia, pallor and anemia. In the present

study it was seen that among the 45.2% of anaemic adolescent girls 40.1% had mild anaemia, 54.92% had moderate anaemia and 4.92% had severe anaemia. A high prevalence of anemia among adolescent girls was found, which was higher in low economic strata.

Choudhary A, et al.,(2010) stated that a community-based, cross-sectional study was conducted to determine the prevalence of anaemia. 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 haemoglobin (Hb) was estimated. The prevalence of anaemia (Hb < 12 g%) was 29%. Most had mild anaemia; severe anaemia was not seen. Significant associations were observed between anaemia and low socioeconomic status, religion and reporting infrequent/non-consumption of meat (heme iron). Only meat consumption was related to haemoglobin by multiple regression analysis. There is a need to improve their haemoglobin status through dietary modification along with preventive supplementation and nutrition education.

Saratha A et al.**, Indian journal of maternal and child health (2010)** stated that a cross-sectional medical institution based study was conducted. Information about background characteristics, anthropometric parameters and menstrual history was obtained. Out of total 300 medical and nursing students 228 (76%) were anaemic, 170 (56.67%) had mild and 58 (19.33%) had moderate anaemia. 157 (89.71%) students who did not consume green leafy vegetable regularly were anaemic. 97 (32.33%) students gave history of passing worms in stool. Association between anaemia and increasing age, increasing academic year, consumption of non-green leafy vegetable and passage of worms in stool was significant. No significant association could be found between anaemia and consumption of veg/non-veg foods, history of chronic illness. There was also no significant association between anaemia with height,

weight and BMI. Prevalence of mild to moderate anaemia among young adult female medical and nursing students was high.

SECTION B: Literature related to effect of T. Albendazole for iron deficiency anaemia

Degarege.A et al.,(2014) stated that in this cross-sectional study, the associations between helminth infections and ABO blood group, anaemia and under nutrition were investigated in 480 febrile outpatients who visited Dore Bafeno Health Centre, southern Ethiopia, in December 2010. Haemoglobin level was measured using a **HemoCue machine** and blood group was determined using an antisera haemagglutination test. Nutritional status of the study participants was assessed using height and weight measurements. Among the study participants, 50.2% were infected with intestinal helminths. In conclusion, infection with multiple intestinal helminths was associated with lower haemoglobin level

Bobby Joseph,et al**,(2013),** stated that a multi-pronged intervention was carried out to reduce the prevalence of anaemia among workers of 7 apparel manufacturing factories using a regime consisting of a supervised single dose of albendazole (400mg) followed by a weekly dose of dried ferrous sulphate (150mg), folic acid (0.5mg) and vitamin C (100mg). The total duration of the intervention was 16 weeks. Haemoglobin levels of a randomly selected sample of workers were tested before and after the intervention using a computerized non-cyan-meth-haemoglobin method. Of the 10810 workers who were enrolled a sample of 515 workers was randomly selected for the blood investigations. At the end of the intervention (18 weeks after the first blood sample was collected) only 361 out of the 515 who had been enrolled a little more than 16 weeks earlier still remained in the factories and among women 279 out of 385 enrolled were still working in the factories. In the 385 unmatched samples the number of anaemic

women had reduced from 141 before the intervention to 79 after - mean haemoglobin increasing from 12.2 to 13.0 ($p < 0.001$) and in the 279 paired samples prevalence of anaemia had reduced from 105 to 58 - mean haemoglobin increasing from 12.1 to 13.0 ($p < 0.001$)

Maipanich W, Et al., The Southeast Asian journal of tropical medicine and public health (2011) stated that, hookworm infection is associated with anemia, especially among children and deworming can improve anemic status. We chose hookworm-endemic rural areas of Thailand, Subjects were selected by primary school-based stool egg examinations. Blood tests of 182 hookworm-positive primary school children, composed of 22 heavy, 65 moderate and 95 light infections, were compared with a control group of 57 children who were helminth-free both before and after receiving deworming medicine. Before deworming, the red blood cell (RBC), hemoglobin (Hb), hematocrit (Hct), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) and albumin levels of the hookworm-infected groups were significantly lower than the helminth-free control group. The Hb and Hct levels showed an inverse relationship with intensity of hookworm infection. After deworming, the Hb, Hct, total protein and albumin levels of the hookworm-infected children improved within 2 months to become comparable with the helminth-free control group. One year after deworming, the mean blood test results in the 2 groups were not significantly different from each other.

Hee Jae hyun, et al (2010), stated that this report describes clinical and parasitological findings of an female patient who lived in a local rural village and suffered from severe chronic anemia for several years. She was transferred to the National Police Hospital in Seoul for management of severe dyspnea and dizziness. At admission, she showed symptoms or signs of severe anemia. Gastroduodenoscopy observed hyperemic mucosa of the duodenum and

discovered numerous moving roundworms on the mucosa. Endoscopy isolated seven of them, which were identified as Necator americanus by characteristic morphology of cutting plates in the buccal cavity. The patient was treated with albendazole and supportive measures for anemia, and her physical condition much improved. This case suggests the possibility that hookworm N. americanus is still transmitted in a remote local mountainous area in Korea.

Jennifer L, Smith, **(2010**) stated that a cross-sectional studies, moderate- and heavy-intensity hookworm infections were associated with lower Heamoglobin in school-aged children, Using albendazole, impact of treatment corresponded to a 1.89 g/l increase (95%CI: 0.13–3.63) in mean Hb while mebendazole had no impact. Anaemia is most strongly associated with moderate and heavy hookworm infection. The impact of anthelmintic treatment is greatest when albendazole is co-administered .

M Ramzi,et al., Iranian Red Crescent Medical Journal, (2011) stated that a total of 363 adolescent school girls were evaluated by a cross sectional study. Socioeconomic, demographic and related risk factors were obtained by a questionnaire. Hematological parameters and serum iron indices were measured.There were 21 cases of anemia , Most of anemic girls (85.7%) had mild anemia. MCV, TIBC, age, and BMI had statistically significant relationship with hemoglobin. Only parasites infestation in the last three months had a 6.83 times more risk of anemia than those without this history (95% CI, 1.66-28.11).

SECTION C: Literature related to the use of haemocue machine to check the haemocue level.

Gomez-Escolar Viejo l, et al (2015) stated that study was conducted the reliability of HemoCue in patients with gastrointestinal hemorrhage

and to determine whether there are any differences in hemoglobin measurement between HemoCue and the reference laboratory.

a cross-sectional, observational paired sample study of 54 patients treated in the digestive bleeding unit. Hemoglobin was measured simultaneously by HemoCue and by laboratory determination in patients with gastrointestinal bleeding, both in the acute phase (first 24h of bleeding) and in the stable phase. The results are expressed as means. Fifty-four patients (34 males) were included. In the acute phase, mean arterial pressure (MAP) was 83.8, mean hemoglobin in capillary blood was 8.07 g/dl by HemoCue in 0.81 min, and mean hemoglobin in venous blood was 8.17 by laboratory determination in 44.87 min. Pearson's correlation coefficient was 0.979. There is a good correlation between HemoCue and laboratory determinations. Consequently, HemoCue is a quick and reliable method both in the acute and stable phases of gastrointestinal bleeding.

Hayedeh J ,et al.,(2013) stated that this study was to evaluate the accuracy of measurements by HemoCue in blood donors.Three hundred and fourteen randomly selected, prospective blood donors were studied. Single fingerstick blood samples were obtained to determine the donors' haemoglobin levels by HemoCue, while venous blood samples were drawn for measurement of the haemoglobin level by both HemoCue and an automated haematology analyser as the reference method. The sensitivity, specificity, predictive values and correlation between the reference method and HemoCue were assessed. Cases with a haemoglobin concentration in the range of 12.5–17.9 g/dL were accepted for blood donation..HemoCue is suitable for screening for anaemia in blood donors.

Gwetu TP et al.,(2013) stated that the Hemocue is being introduced for routine use in clinics and hospitals in many developing nations. This study

seeks view literature on the diagnostic accuracy of the Hemocue among children. This is a semi-systematic review of studies analysing the Hemocue device's diagnostic accuracy determining haemoglobin levels among children aged zero to fifteen years. 18 studies were included. The main finding of this investigation is that the Hemocue system is a good screening test, being sensitive and reliably projecting necessity of a full blood count. It is not likely that diagnosis of a clinically significant condition can be overlooked by this investigation. Thus it would seem to be a useful method to use for Hb screening in appropriate situations. A trend for underestimation of Hb values was reported with most studies. The Hemocue had a sensitivity range of 75-91%, specificity range of 88-100% and positive predictive values ranging from 75-80% for the detection of anaemia. The mean difference in Hb from paired samples ranged from 0.2- 0.35 g/dl (0.7%). The Hemocue is comparable to usual laboratory methods for determination of Hb level in children. It is well appropriate for use in care of healthy paediatric patients and children with hematologic disorders. A full blood count is recommended when anaemia is identified or in suspected non-anaemic iron deficiency.

Fabian Sanchis-Gomar ,et al.,(2012) stated that the diagnosis of anemia can also be accomplished by assessing hemoglobin (Hb) concentration with point-of-care testing (POCT) devices such as the HemoCue test systems. In several situations, these devices might suitably replace traditional laboratory testing, including several areas of health care where a very rapid Hb measurement might be required to make immediate therapeutic decisions. Because of its optimal performance along with the fact that the HemoCue is probably one of the most commonly used devices worldwide, the aim of this article is to review the literature data about the performance of this test system as compared with laboratory reference testing estimations and according to the biological matrix.

Nkrumah, et al, the academic journal(2011) stated that In resource poor settings where automated hematology analyzers are not available, The HemoCue hemoglobin photometer has been used for these purposes. Blood collected was immediately processed to estimate the hemoglobin concentration using three different methods (HemoCueï¿½, Sysmex KX21N and Cyanmethemoglobin). The Intraclass correlation coefficient (ICC) was used to determine the within subject variability of measured hemoglobin. The result Of 398 subjects, 42% were males with the overall mean age being 19.4 years. Comparing the hemoglobin determined by the HemoCue to Cyanmethemoglobin, the concordance correlation coefficient was 0.995 (95% CI: 0.994-0.996, $p < 0.001$). There was no significant difference in the hemoglobin determined by the HemoCue compared to Cyanmethemoglobin (coef = -0.127, 95% CI: -0.379 - 0.634). Hemoglobin determined by the HemoCue method is comparable to that determined by the other methods. The HemoCue photometer is therefore recommended for use as on-the-spot device for determining hemoglobin in resource poor setting.

Shalini Bahadu, et al.,(2010), stated that haemoglobin estimation is an integral part of donor screening in blood banks.Various methods are available for hemoglobin estimation and each one of them has its advantages and limitations. Hemocue as a hemoglobinometer is gaining widespread popularity not only for donor screening but also as a bedside hemoglobinometer. We conducted a study involving 535 donors with an aim to assess the accuracy of hemocue readings and compared it with cell counter values. We also compared the hemocue readings using capillary blood with the venous blood.

Gupta,et al., (2008), stated that the investigated the suitability of the HemoCue photometer to measure the concentration of haemoglobin in suction

fluid obtained at elective caesarean section in 30 women. Laboratory analysis was used as a gold standard against which values generated by the HemoCue were compared. We used the method of Bland and Altman to analyse the data. The bias and the limits of agreement were)0.013 and)0.39 to 0.36 mg.dl)1 respectively, **indicating a good level of agreement.** Mean (SD) total blood loss calculated using these data, combined with the weight of the swabs, was consistently greater than clinical estimation: 768 (496) ml versus 506 (249) ml respectively ($p < 0.001$). We have found that the HemoCue near patient testing device may be used to estimate blood loss accurately in the suction fluid obtained at elective Caesarean section.

SECTION D:Literature related to the effect of dietary interventions for iron deficiency anaemia

M. Angel, K.P.Vasantha Devi,et al.,(2015), stated that, the present study was carried out to assess the therapeutic impact of garden cress seed ladoo among the selected anaemic adolescent girls of the age group 12-15 years. Ethical approval for the study was obtained from the Government Ethical clearance committee. Screening for anaemia was conducted by assessing the haemoglobin level of the 505 adolescent school girls. From that, 200 moderately anaemic adolescent girls (each 100 in the Experimental Group and the Control Group) were chosen for further study. A ladoo of fifty grams containing garden cress seeds (5g), **rice flakes** (20g), bajra (5g), **roasted Bengal gram dhal** (5g), samai (5g) and 10g of **jaggery** was supplemented along with 5 grams of **amla** to 100 selected moderately anaemic adolescent girls in the Experimental Group for a period of 6 months. The ladoo contained 10 mg of iron. Deworming was done prior to the supplementation. Both deworming and supplementation was not given to the Control Group. After 6 months of supplementation, improvement was observed in

the clinical signs of the Experimental Group. The haemoglobin level (g/dl) gradually increased from 8.67±0.59 to 12.43±0.70. There was no specific change in the Control Group.

Adhikari BK et al ,(2012) stated that Control of iron deficiency disorders is prioritized in the nutrition policies of Nepal. The situation is still threatening the public health in both rural and urban areas. This study was undertaken to find out the extent of iron deficiency anemia and intake of dietary iron among the general population in Nepal. Nearly 46 percent of children (6–59 months) and 35 percent of women (15–49 years) were still suffering from anemia though the trend has been decreasing for the last 15 years. Mostly, young children (6–23 months) and pregnant women were the victims due to their high iron requirements and lower intake of dietary iron. The most common risk factors related to iron deficiency anemia (IDA) found in different studies were low intake of dietary iron, vitamin A deficiency, hookworm infection, malaria, heavy menstrual blood loss, and multiparity. Iron deficiency situation in the Nepalese population was triggered by Illiteracy, lack of awareness, negligence, poor economy, food insecurity, lack of food diversity, changes in dietary behavior, cultural behaviors, poor health and sanitation, and patriarchal structure of the society. The main risk factor of IDA was low intake of dietary iron.

Lindsay H Allen,et al., (2010) stated that the effect of supplementation of micronutrient fortified biscuits on haemoglobin and serum iron levels of adolescent girls (n = 46, 10-16 years) studying in a government school in Jaipur city, India. The intervention was with biscuits fortified with 30 mg iron, 100 μg folic acid, 600 μg vitamin A, 40 mg vitamin C and 150 μg iodine. The iron status of adolescent girls was determined through haemoglobin and serum iron levels. The results revealed that 95.7 per cent of the adolescent girls suffered from anaemia of which 28.3 per cent had “mild” deficiency and

67.4 per cent had “moderate” deficiency. Anaemia was more prevalent in the older age groups. On supplementation, there was a significant increase in the haemoglobin levels. There was a three-fold increase in the percentage of adolescent girls in the “normal” category of anaemia from 4.3 to 13.0 per cent and more than two-fold decrease in the “moderate” category of anaemia from 67.4 to 28.3 per cent. Moreover, 21.7 per cent of the subjects had “normal” levels while the rest (78.3 per cent) had low levels of serum iron; the percentage of adolescent girls in the normal category increased to 93.5 per cent after intervention on the basis of serum iron levels. The paper recommends that the school system can be used for micronutrient supplementation to improve the nutritional status of children and adolescents as the students are more regimented here for distribution of nutrient fortified food products.

Francisco P,et al.,(2010) stated that research consisted of a 12-week randomized, controlled double-blind trial conducted in 2007 at a state-run school in Sobral, Brazil, The study sample was divided into two groups-one consuming cashew juice mixed with 25 g of rapadura(jaggery) and 40 mg of ascorbic acid (per 200-mL serving), and another consuming the same quantity of juice and ascorbic acid sweetened with 25 g of standard refined sugar. A significant statistical increase in hemoglobin was observed in the group consuming the rapadura-fortified beverage. It was therefore concluded that consumption of rapadura increased hemoglobin and thus reduced iron deficiency anemia in preschool children.

Narayanasamy Sangeetha ,et al., Academic Journals (2010) stated that the present study was aimed to reduce the prevalence of iron deficiency anemia and also to improve the immune status, school performance through dietary supplementation with micronutrient rich foods (wheat germ, **rice flakes, gingelly** seeds, microwave oven dehydrated carrot powder, **jaggery**).The present

study was conducted on children in the from primary corporation school located in the urban areas of Chennai district. Out of 1675 children, 1151(68.7%) children had exclusive signs and symptoms of anemia. The blood hemoglobin levels revealed that 662 children were moderately anemic and the remaining 15 and 74 children showed severe and mild signs and symptoms of anemia respectively. Out of 662 children who were moderately anemic, 150 children were randomly selected for the supplementation study. They were further divided into three groups of 50 children each to receive the food based supplement (Micronutrient rich balls), synthetic supplement (Riconia tablet, a micronutrient fortified tablet) and the third group constituted the control group. The results revealed that, supplementation in the food form resulted in significant improvement in the parameters studied. The findings of this research leads to the conclusion beyond doubt that the food based approach will serve as an effective strategy to combat deficiencies and to promote health and well being of the children and ensure global security.

SECTION E: Literature related to the effect of Vitamin C for enhancing iron absorption.

Padma Venkatasubramanian,(2014) stated that Phyllanthus emblica L. (Indian gooseberry or amla) is a well-known dietary supplement (Rasayana) in Ayurveda used in the management of iron deficiency anaemia (Pandu). Amla is said to act by regulating the 'metabolic fire' (agni), which is important for proper digestion and absorption of nutrients. In the present study standard cell-free and cell-based models that are employed in biomedical sciences to study digestion and bioavailability of nutrients were used to examine the influence of amla fruit juice on iron dialysability and uptake. Amla juice contained 0.35% ascorbic acid (AA), 0.33% tannins (gallic acid equivalent), 0.13% gallic acid, 0.58% total organic acid and 0.002% iron on a w/w basis.

Amla juice exhibited a dose response to iron dialysability with an optimum at 1 0.25 molar ratio of Fe amla juice (AA equivalent) in the cell-free digestion model and 1 0.5 in both Caco-2 and HepG2 cell lines. Amla juice increased the dialysable iron three times more than the FeSO4 alone control in thecell-free digestion model. Iron uptake in Caco-2 and HepG2 cell lines increased 17.18 and 18.71 times more than the control respectively, in the presence of amla juice. AA, a known Fe bioavailability enhancer, at the same molar ratios showed an enhancement only by 1.45 times in the cell-free model and 13.01 and 12.4

Sankaran mirunalini,et al (2013) International Journal of Pharmacy and Pharmaceutical Sciences stated that Medicinal plants are natural gift to human lives to promote disease free healthy life. Phyllanthus emblica, commonly known as **amla** is widely distributed in tropical and subtropical areas and has therapeutic potential against deleterious diseases. Earlier it becomes a notable fruit for its **rich amount of vitamin C,** polyphenols such as tannins, gallic acid, ellagic acid, flavonoids like quercetin and rutin

Chhavi gupta,et al.,(2011) Asian Journal of Home Science stated that the study was conducted to assess the effect of garden cress seeds and Amla intervention on haemoglobin level of non pregnant women . Total 45 respondents were taken from G.D.M Girls hostel, Modinagar. 10g garden cress seeds were provided per day to experimental group I for 3 months which provided 10 mg iron per day, while 10 g garden cress seeds with **10g amla** chutney were provided to experimental group II for 3 months. the study concluded that inclusion of garden cress seeds alone and with vitamin C, which have high content of iron, on a daily basis effectively increased haemoglobin level in those respondents who have low initial haemoglobin level. While a little effect was also seen on anthropometric measurement and clinical assessment also. Effect of garden cress seeds and Amla

intervention on the haemoglobin status of non-pregnant women .Vitamin C greatly increases iron absorption. Amla is an excellent source of vitamin-C

Richard Hurrell,et al.,(2010) stated that Iron differs from other minerals because iron balance in the human body is regulated by absorption only because there is no physiologic mechanism for excretion. On the basis of intake data and isotope studies, iron bioavailability has been estimated to be in the range of 14–18% for mixed diets and 5–12% for vegetarian diets in subjects with no iron stores, and these values have been used to generate dietary reference values for all population groups. Dietary factors that influence iron absorption, such as phytate, calcium, **ascorbic acid**, and muscle tissue, have been shown repeatedly to influence iron absorption in single-meal isotope studies, whereas in multimeal studies with a varied diet and multiple inhibitors and enhancers, the effect of single components has been, as expected, more modest.

B.S Gowri,et al .,(2001) Nutrition research stated that Amla fruits used as an acidulant in Indian dietary are claimed to be rich source of ascorbic acid, and the latter has been known to **enhance intestinal absorption of dietary iron.** The study was examined the beneficial influence of amla fruits on food iron availability, by virtue of their high ascorbic acid content.

CHAPTER III

RESEARCH METHODOLOGY

Research methodology is a way to systematically solve the research problem. In this chapter the investigator discusses the Research approach, Research design, Variables, Setting, Population, Sample, Sample size, Sampling technique, Criteria for data collection, Description of the tool, Plan for data analysis and production of human rights.

RESEARCH APPROACH:

Evaluative research approach was used in this study.

RESEARCH DESIGN:

Quasi - experimental [one group prê test-post test] research design was used in this study

O_1	X	O_2

O_1 – pre test

X – Nutrient Mixture

O_2 – Post test

VARIABLES:

Independent variable: Nutrient mixture

Dependent Variable : haemoglobin level.

Demographic Variables: Age , Educational status of mother, Food preference, Duration of menstruation, Menstrual cycle, Income of the family per month, Area of residence among the adolescent girls with anemia

SETTING:

The study was conducted at Little Rose Matriculation School Thanjavur district.

POPULATION:

The adolescent girls aged between 14 and 17 years .

. **SAMPLE:**

The number of adolescent girls who were studying 9 th standard in Little Rose Matriculation School, Thanjavur.

SAMPLE SIZE:

32 adolescent girls with anemia.

SAMPLING TECHNIQUE:

Non probability- purposive sampling technique was chosen for this study

CRITERIA FOR SAMPLE SELECTION:

INCLUSION CRITERIA:

- Adolescent girls with anemia who were having haemoglobin level of 7 - 11 grams/dl
- The adolescent girls with anemia who were available at the time of data collection.
- The adolescent girls with anemia who were studying in9 th standard at selected school, Thanjavur district.
- The adolescent girls with anemia who were willing to participate in the study.

EXCLUSION CRITERIA:

- The adolescent girls with anemia who were studying in 10^{th} and 12^{th} standard.
- The adolescent girls who had severe anemia.
- The adolescent girls with anemia who were under treatment .
- The adolescent girls with anemia who had menstrual problems.
- The adolescent girls with anemia who had the hemoglobin level less than 7grams% or more than 11grams% .

DEVELOPMENT AND DESCRIPTION OF THE TOOL:

THE TOOL COMPRISED OF II PARTS:

PART I: Demographic variables (Age, Educational status of mother, Food preference, Duration of menstruation, Menstrual cycle, Income of the family per month, Area of residence)

PART II: Measuring the haemoglobin level using haemocue machine

REPORT OF PILOT STUDY

Pilot study was conducted for a period of two weeks. The investigator obtained a written permission from the head of the institution and the participants prior to the study. Pilot study was conducted for 3 adolescent girls with anemia in Nalantha matriculation school. The adolescent girls who met inclusion criteria were selected as samples by using purposive sampling technique. Pre test haemoglobin level was assessed by using haemocue machine. the next day, nutrient mixture was administered to the sample daily in the morning 11 AM under the supervision of the researcher for a period of 15 days. The effectiveness was assessed on 16^{th} day by using same instrument. Prior to the pre test , deworming was done by administering Tab.Albendazole 400mg stat as per the paediatricians order. The statistical analysis showed that the study was feasible to do . Hence the main study was conducted.

RELIABILITY AND VALIDITY OF THE TOOL

To evaluate the effectiveness of nutrient mixture and the tool was constructed and modified by the researcher which were validated by the expert committee members. The reliability of the tool was established by test- retest (Karl Pearson Co-efficient Formula) method.

METHOD O F DATA COLLECTION.

The investigator obtained a written permission from the head of the institution and the participants prior to the study. the study was conducted in Little Rose Matriculation school. The adolescent girls who met inclusion criteria were selected as samples by using purposive sampling technique. Pre test haemoglobin level was assessed by using haemocue machine. The next day, nutrient mixture was administered to the sample daily in the morning 11 AM under the supervision of the researcher for a period of 30 days. The effectiveness was assessed on 31st day by using same instrument. Prior to the pre test, deworming was done by administering Tab.Albendazole 400mg stat as per the paediatricians order. The statistical analysis showed that the nutrient mixture was effective.

SCORING AND INTERPRETATION PROCEDURE

(A) SCORING OF THE TOOL

TABLE 3.1 Represents the level of haemoglobin

CATEGORY	**LEVEL OF HAEMOGLOBIN**
MILD HAEMOGLOBIN	**10 -11.9**
MODERATE HAEMOGLOBIN	**7 -9.9**
NORMAL	**12-14**

PLAN OF DATA ANALYSIS.

Collected data was tabulated and analyzed by using descriptive and inferential statistical methods.

S.NO	DATA ANALYSIS	METHODS	REMARKS
1.	Descriptive statistics	frequency, percentage, Mean, and standard deviation	To describe the pre test and post test level of haemoglobin among the adolescent girls with their demographic variables
2.	Inferential statistics	Paired "t" test	To Analyzing the significant difference between the pre and post test level of haemoglobin among the adolescent girls with anemia.
		Chi-square test	To Analyzing the association between the pre test level of haemoglobin and demographic variables of adolescent girls with anemia.

PROTECTION OF HUMAN RIGHTS

Research proposal was approved by the dissertation committee of Our Lady of Health College of Nursing, prior to pilot study. Formal permission was obtained from the school authorities. After the clear explanation about the study, oral consent was obtained from each participant of the study and their parents before starting the data collection. Assurance was provided to the subjects that the anonymity, confidentiality and subject privacy would be guarded.

CHAPTER-IV

DATA ANALYSIS

This chapter deals with the description of sample characteristics , analysis and interpretation of data collected from adolescent girls with anemia

This chapter represents the organization of data and the collected data was interpreted by using the descriptive and inferential statistical methods. The data was coded and analysed as per the objectives of the study.

ORGANIZATION OF DATA

The data was organized and tabulated as follows.

SECTION : 1

Assessment of demographic variables of the adolescent girls with anemia.

SECTION : 2

Assessment of pre test and post test levels of haemoglobin among the adolescent girls with anemia.

SECTION : 3

Compare the significant difference between the pre test and post test levels of haemoglobin. among the adolescent girls with anemia.

SECTION : 4

Assessment of association between the pre test levels of haemoglobin among the adolescent girls with anemia and their demographic

variables such as Age , Educational status of the mother, Food preference, Duration of menstruation, Menstrual cycle, Income of the family per month, Area of residence .

PRESENTATION OF DATA

SECTION : I

Assessment of demographic variables of the adolescent girls with anemia.

TABLE 4.1 :

REPERSENTS THE PERCENTAGE AND FREUENCY DISTRIBUTION OF DEMOGRAPHIC VARIABLES OF THE ADOLESCENT GIRLS WITH ANEMIA AT SELECTED SCHOOL THANJAVUR.

N = 32

S.NO	DEMOGRAPHIC VARIABLES	NOs	%
1.	**Age of the adolescent girls with anemia**		
	a) 14-15 years	25	78.125%
	b) 16-17 years	7	21.875%
2.	**Educational status**		
	a) Illiterate	3	9.375%
	b) Primary	11	34.375%
	c) Secondary	10	31.25%
	d) Higher secondary	6	18.75%
	e) Diploma	-	-
	f) Graduate	2	6.25%
3.	**Food preference**		

	a) Vegetarian diet	9	28.125%
	b) Non vegetarian diet	23	71.875%
4.	**Duration of menstruation**		
	a) 2 – 3 days	8	25%
	b) 4 - 5 days	8	25%
	c) 6 - 7 days	16	50%
5.	**Menstrual cycle**		
	a) 21 -25 days	7	21.875%
	b) 26 -30days	8	25%
	c) 31 - 35 days	17	53.125%
6.	**Income of the family per month**		
	a) Below Rs. 5000 per month	9	28.125%
	b) Rs.5001 –Rs.10000 per month	5	15.625%
	c) Rs. Above Rs.10001 per month	18	56.25%
7.	**Area of Residence**		
	a) Urban	-	-
	b) Rural	21	65.6%
	c) Semi urban	11	34.37%

From this table, it implied that, 32 adolescent girls with anemia from Little Rose matriculation school, most of them aged between 14-17 years, among them 25 (78.12%) girls between 14-15 years, 7(21.875%) girls between 16-17 years.

Regarding the educational status of the mother 3(9.375%) were illiterate, 11(34.375%) studied primary education, 10(31.25%) studied secondary education, 6(18.75%) studied higher secondary education, 2(6.25%) studied graduate in education and none of them were studied diploma.

Regarding the food preference 9(28.125%) adolescent girls with anemia taking vegetarian diet, 23(71.875%) adolescent girls with anemia taking non vegetarian diet.

Regarding the Duration of menstruation 8 (25%) adolescent girls had menstruation (2-3 days), 8(25%) were had 4-5 days, 16(50%) were had 6-7 days.

Regarding the menstrual cycle 7(21.87%) girls were 21-25 days, 8(25%) girls were 26-30 days , 17(53.125%) girls were 31-35 days

Regarding the income of the family 9(28.12%) of adolescent girls with anemia belongs to below Rs. 5000/month,5(15.625%) were belongs to Rs.5001-10000/month ,and 18 (56.25%) were above Rs.10001/month

Regarding area of resistance 21(65.6%) adolescent girls with anemia belongs to rural area,11(65.6%) were belongs to semi urban area, and none of them are belongs to urban area.

FIGURE 4.1 : REPERSENTS THE PERCENTAGE DISTRIBUTION OF ADOLESCENT GIRLS WITH ANEMIA BASED ON AGE

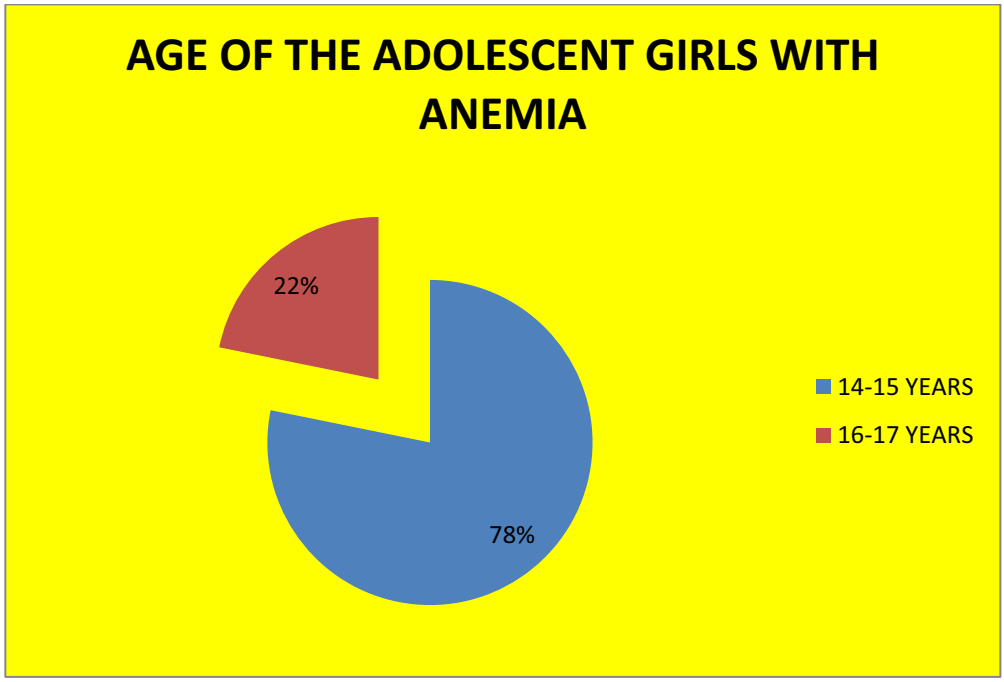


FIGURE 4.2: REPERSENTS THE PERCENTAGE DISTRIBUTION BASED ON EDUCATIONAL STATUS OF THE MOTHER

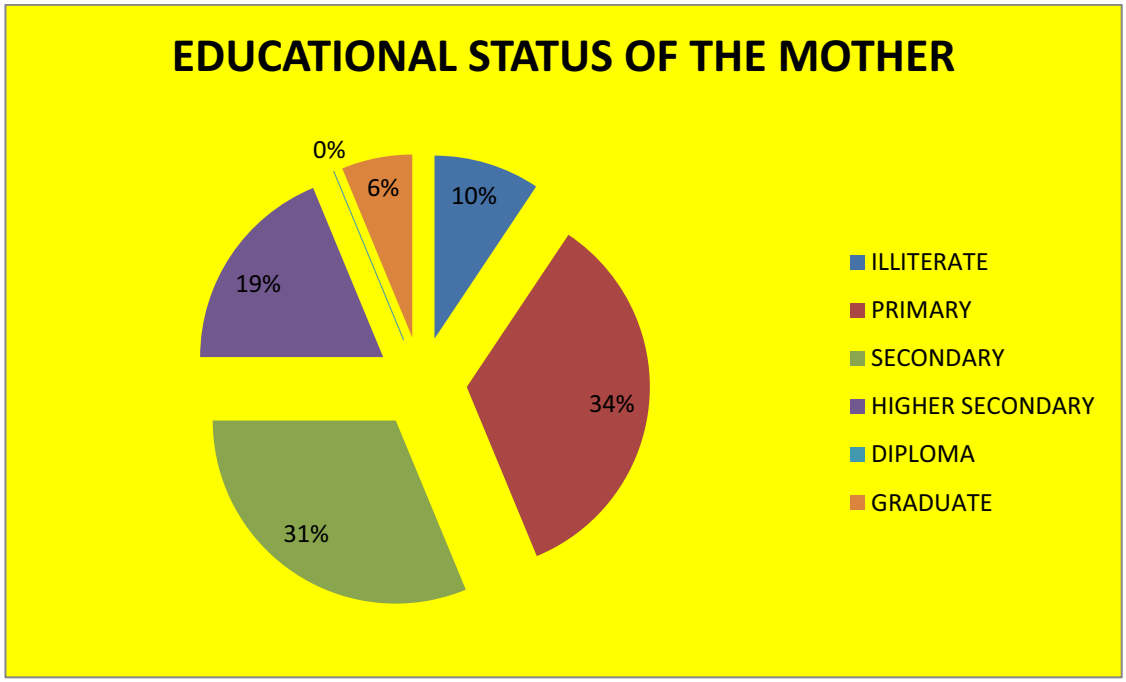


FIGURE 4.3 : REPERSENTS THE PERCENTAGE DISTRIBUTION OF ADOLESCENT GIRLS WITH ANEMIA BASED ON FOOD PREFERENCE

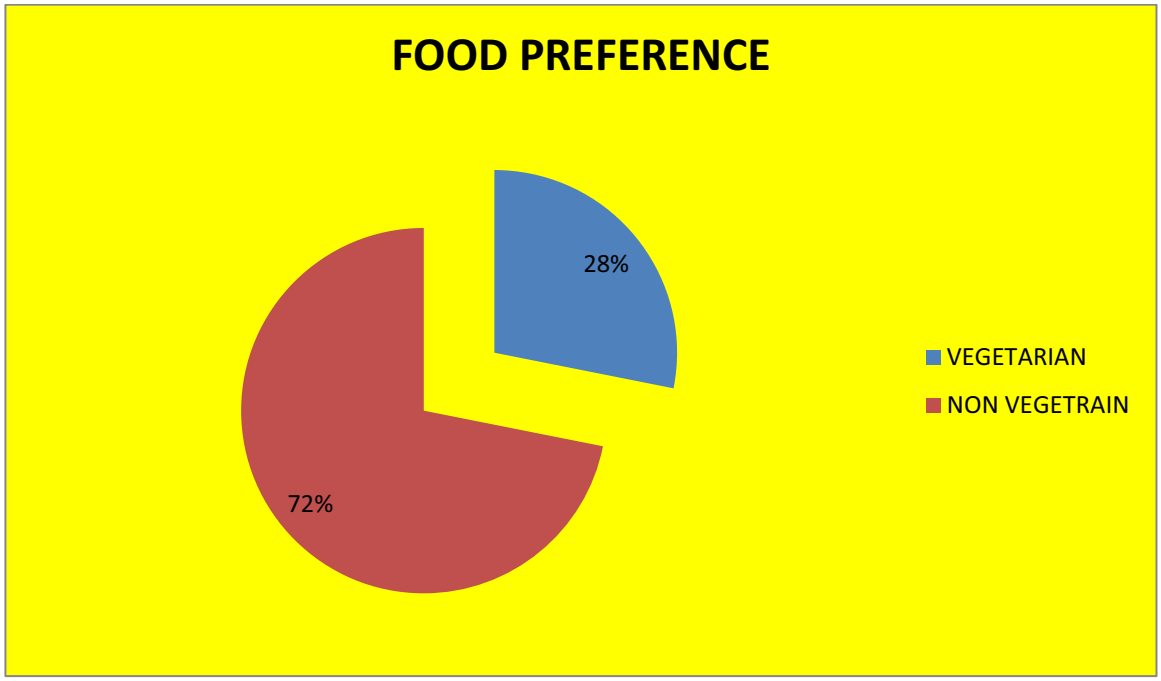


FIGURE 4.4 : REPERSENTS THE PERCENTAGE DISTRIBUTION OF ADOLESCENT GIRLS WITH ANEMIA BASED ON DURATION OF MENSTRUATION

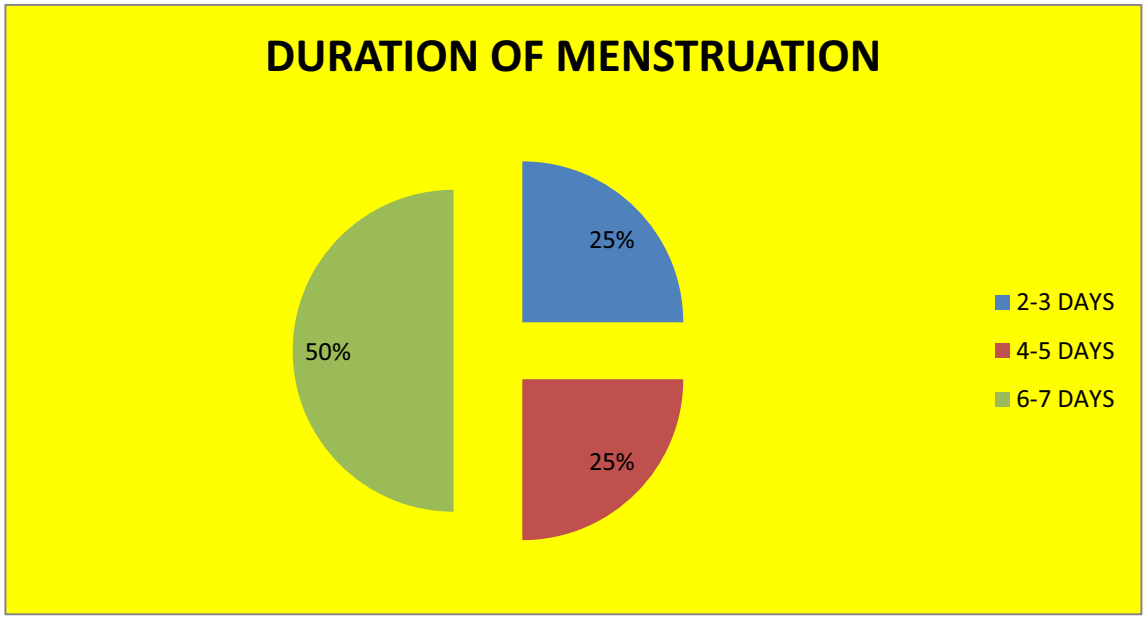


FIGURE 4.5 : REPERSENTS THE PERCENTAGE DISTRIBUTION OF ADOLESCENT GIRLS WITH ANEMIA BASED ON MENSTRUAL CYCLE

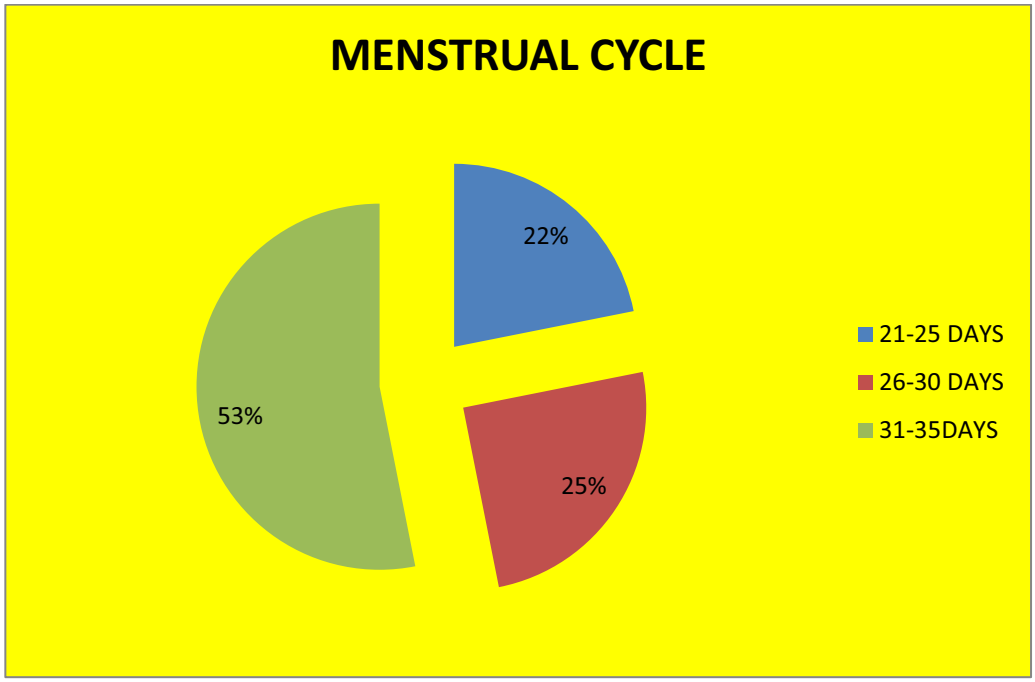


FIGURE 4.6 : REPERSENTS THE PERCENTAGE DISTRIBUTION OF ADOLESCENT GIRLS WITH ANEMIA BASED ON INCOME OF THE FAMILY PER MONTH

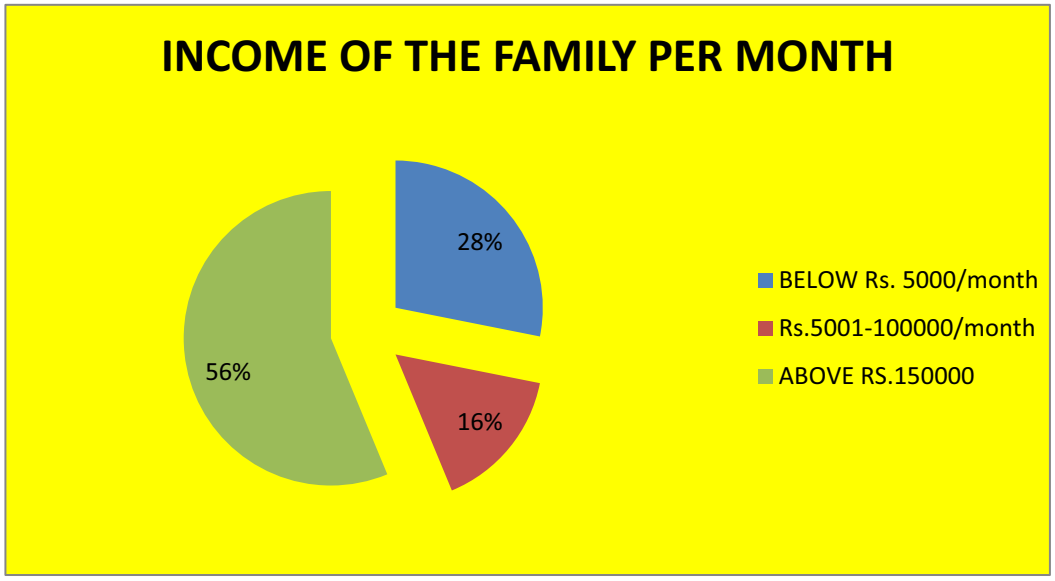
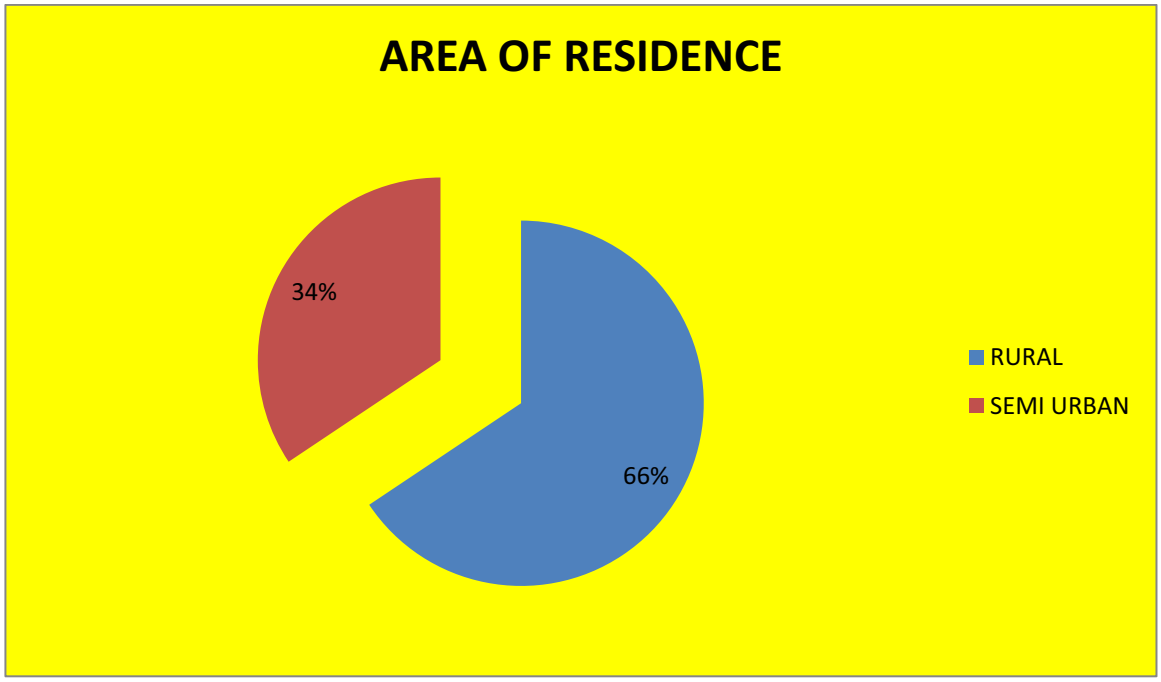


FIGURE 4.7 : PERCENTAGE DISTRIBUTION OF ADOLESCENT GIRLS WITH ANEMIA BASED ON AREA OF RESIDENCE



SECTION 2

Assessment of pre test and post test levels of haemoglobin among the adolescent girls with anemia.

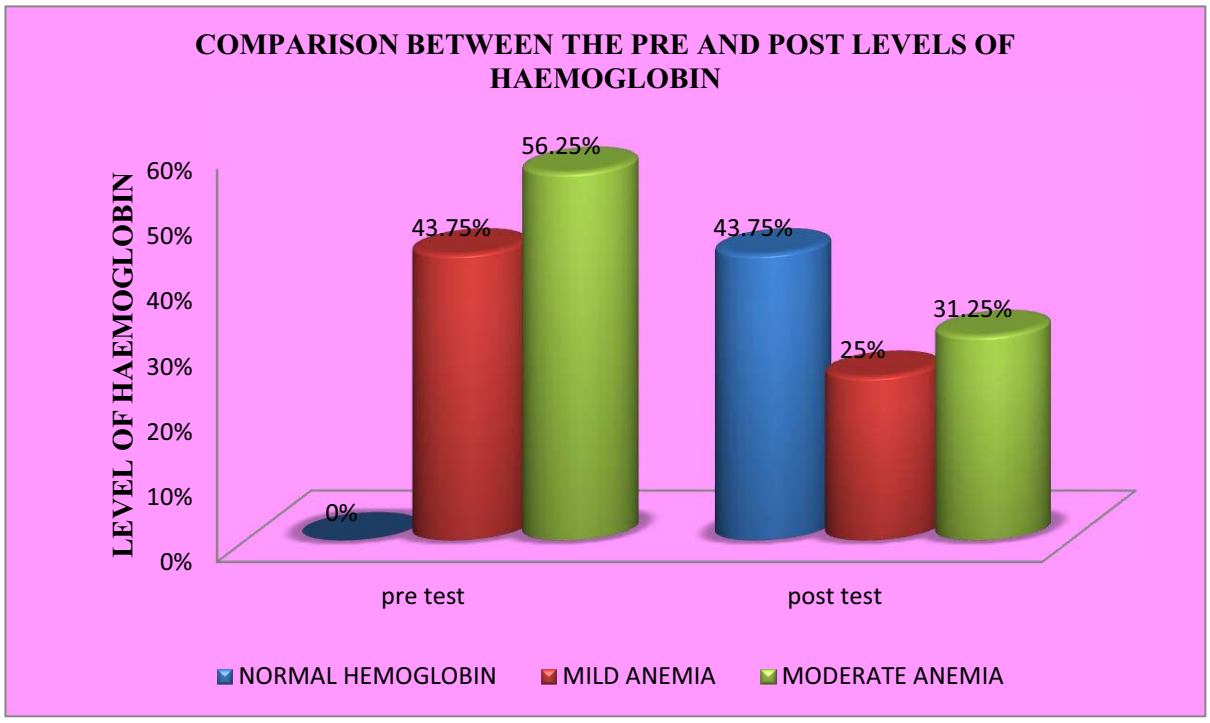
TABLE :4.2: REPERSENTS THE COMPARISON OF THE LEVELS OF HAEMOGLOBIN BETWEEN PRE AND POST TEST AMONG ADOLESCENT GIRLS WITH ANEMIA

N=32

S.NO	LEVELS OF HEMOGLOBIN	PRE TEST		POST TEST	
		Frequency	%	Frequency	%
.1.	NORMAL	-	-	14	43.75%
2.	MILD ANEMIA	14	43.75%	8	25%
3.	MODERATE ANEMIA	18	56.25%	10	31.25%

This table showed that in pre test level of haemoglobin 14(43.7%) had mild anemia, 18(56.25%) had moderate anemia and The post test level of haemoglobin revealed that normal haemoglobin 14 (43.75%), had mild anemia 8 (25%) had moderate anemia 10(31.25%).

FIGURE :4.8 REPERSENTS THE COMPARISON BETWEEN THE PRE AND POST LEVELS OF HAEMOGLOBIN AMONG THE ADPLESCENT GIRLS WITH ANEMIA



SECTION 3

Assess the significant difference between the pre and post test level of haemoglobin among the adolescent girls with anemia.

TABLE :4.9 REPRESENTS THE COMPARISON BETWEEN THE PRE AND POST TEST SCORES OF MEAN AND STANDARD DEVIATION FOR THE HAEMOGLOBIN LEVEL AMONG THE ADOLESCENT GIRLS WITH ANEMIA.

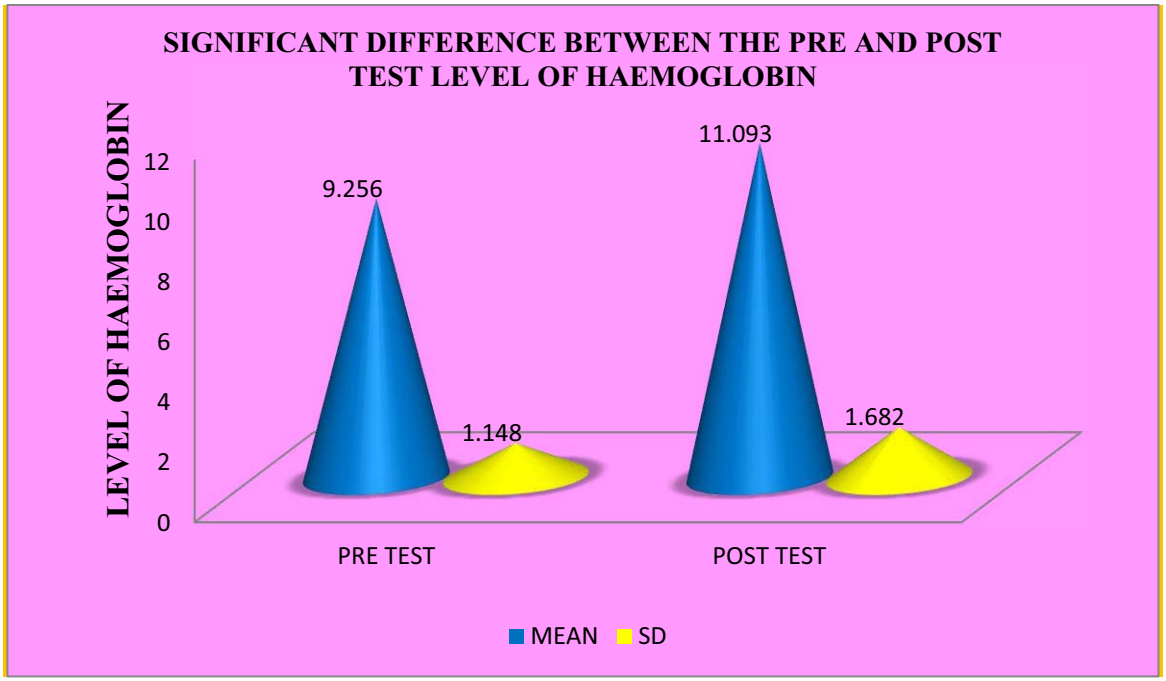
N=32

S.NO	VARIABLES	PRE TEST		POST TEST		PAIRED 't' TEST
		MEAN	SD	MEAN	SD	
1.	HEMOGLOBIN	9.256	1.148	11.093	1.837	10.7316

H0 – There was no significant difference between the pre and post test level of haemoglobin among the adolescent girls with anemia

This table showed that the mean and SD of pre and post test survey regarding haemoglobin. In pre test, the mean score regarding haemoglobin was 9.256 with SD of 1.148 and in post test, the mean score was 11.093 with SD of 1.837 The 't' value CV = 10.7316, TV = 2.0395 (CV > TV) which was statistically significant at 0.05 level of significance. It showed that , there was a significant difference between the haemoglobin level of pre and post test among the adolescent girls with anemia . So the given Nutrient Mixture was effective.

FIGURE 4.12: ASSESSMENT OF SIGNIFICANT DIFFERENCE BETWEEN THE PRE AND POST TEST LEVEL OF HAEMOGLOBIN AMONG ADOLESCENT GIRLS WITH ANEMIA.



SECTION 5:

Association between the pre test levels of haemoglobin among the adolescent girls with anemia and their selected demographic variables such as age, Educational status of the mother, Food preference, Duration of menstruation , Menstrual cycle, Income of the family per month, area of residence among the adolescent girls with anemia .

TABLE :4.4 REPRESENTS THE ASSOCIATION BETWEEN THE PRE TEST LEVEL OF HAEMOGLOBIN AMONG THE ADOLESCENT GIRLS WITH ANEMIA AND THEIR SELECTED DEMOGRAPHIC VARIABLES.

N = 32

Demographic variables	**Level of haemoglobin**				**λ^2**
	mild		**Moderate**		
	No	**%**	**No**	**%**	
Age of the adolescent girls with anemia					
a) 14-15 years	10	31.25%	15	46.875%	0.65
b) 16-17years	4	12.5%	3	9.375%	(NS)
Educational status of the mother					
a) Illiterate	1	3.12%	2	6.25%	**22.2101***
b) Primary	10	31.25%	1	3.12%	**(S)**

c) Secondary	-	-	10	31.25%	
d) Higher secondary	1	3.12%	5	15.62%	
e) Diploma	-	-	-	-	
f) Graduate	2	6.25%	-	-	
Food preference					
a) vegetarian	2	6.25%	7	21.875%	2.34 (NS)
b) Non vegetarian	12	37.5%	11	34.375%	
Duration of menstruation					
a) 2-3 days	7	21.875%	1	3.125%	**18.5395* (S)**
b) 4-5 days	6	18.75%	2	6.25%	
c) 6-7 days	1	3.125%	15	46.875%	
Menstrual cycle					
a) 21-25 days	7	21.875%	-	-	**22.0802* (S)**
b) 26-30 days	6	18.75%	2	6.25%	
c) 31-35 days	1	3.125%	16	50%	
Income of the family per month					
a) Below Rs 5,000 /month	7	21.875%	2	6.25%	

b) Rs.5001-10000/month	2	6.25%	3	9.375%	
c) Above Rs. 10001/month	5	15.625%	13	40.625%	6.1288(NS)
Area of residence					
A) Urban	-	0	-	0	
B) Rural	9	28.125%	12	37.5%	
C) Semi urban	5	15.625%	6	18.75%	0.0192(NS)

(NS – Not Significant , S⁎ – Significant)

H0 – There was no significant association between the pre test levels of haemoglobin among the adolescent girls with anemia and their selected demographic variables such as Age , Food preference, Income of the family per month, Area of residence .

The above table showed that the chi-square were calculated to find out the association between the pre test level of haemoglobin among the adolescent girls with anemia and their selected demographic variables revealed that the chi square value for Age of the adolescent girls with anemia (λ^2= 0.65), Educational status of the mother (λ^2=22.2101), Food preference(λ^2=2.34), Duration of menstruation (λ^2= 18.5395), Menstrual cycle(λ^2= 22.0802) ,Income of the family per month (λ^2= 6.1288), Area of residence(λ^2= 0.019)

The analysis showed that there was a significant association between the Educational status of the mother, Duration of menstruation ,Menstrual cycle and there was no significant difference between the Age of the adolescent girls with anemia, Food preference, Income of the family per month , Area of residence Age at menarche , Area of resistance . The analysis were tested at 0.05 level of significance.

CHAPTER V

DISCUSSION

This chapter deals about the discussion of the study with appropriate statistical analysis and the finding of the study based on the objectives and hypothesis of the study.

The study was a quasi experimental (one group pre test post test) design. The problem stated as " a study to assess the effectiveness of nutrient mixture on level of haemoglobin among the adolescent girls with anemia at selected school, Thanjavur district"**.**

The investigator obtained a written permission from head of the institution and the participants prior to the study. a study was conducted in Little Rose Matriculation school . The adolescent girls who met inclusion criteria were selected as samples by using purposive sampling technique. Pre test haemoglobin level was assessed by using haemocue machine. The next day, nutrient mixture was administered to the sample daily in the morning 11 AM under the supervision of the researcher for a period of 30 days. The effectiveness was assessed on 31st day by using same instrument. Prior to the pre test , deworming was done by administering Tab.Albendazole 400mg stat as per the paediatricians order, The statistical analysis showed that nutrient mixture was effective. The data was grouped and analyzed using descriptive and inferential statistics.

The first objective of this study was to assess the level of haemoglobin before and after administration of nutrient mixture among the adolescent girls with anemia.

The data analysis revealed that the pre test level of haemoglobin 14(43.75%) had mild anemia, 18(56.25%) had moderate anemia .The result

showed that there was decreased level of haemoglobin among adolescent girls with anemia .

The second objectives of this study were to evaluate the effectiveness of nutrient mixture on haemoglobin level among the adolescent girls with anemia

In pre test the overall mean score for haemoglobin was 9.256 with SD of 1.148 and in post test, the mean score was 11.093 with SD of 1.682 The 't' value was CV = 10.7316, TV = 2.03995 (CV > TV) which was statistically significant at 0.05 level. So, the research hypothesis H_1 was accepted. Finally, there was a significant difference between the pre and post test level of haemoglobin among adolescent girls with anemia

The third objective of this study was to determine the association between the pre test level of Haemoglobin among adolescent girls with anemia and their selected demographic variables such as Age, Educational status of the mother, Food preference, Duration of menstruation, Menstrual cycle, Income of the family per month, Area of residence among the adolescent girls with anemia.

Regarding the demographic variables, the analysis revealed that there was a significant association between the Educational status of the mother, Duration of menstruation, Menstrual cycle of pre test level of haemoglobin hence the research hypothesis H2 was accepted and there was no significant difference between the Age of the adolescent girls with anemia, Food preference, Income of the family per month, Area of residence is rejected.

CHAPTER – VI

SUMMARY AND CONCLUSION

A Quasi – experimental study was conducted to assess the effectiveness of nutrient mixture on level of haemoglobin among the 32 adolescent girls with anemia at selected school Thanjavur. The samples were selected on the basis of inclusion criteria by using purposive sampling technique. The requirements used in this study was demographic variables, Nutrient mixture, Haemocue machine. For analysis of data, descriptive and inferential statistics was used. The major findings are summarized as follows.

The analysis revealed that, 32 adolescent girls with anemia from Little Rose matriculation school, most of them aged between 14-17 years, among them 25 (78.12%) were between 14-5 years, 7(21.875%) were between 16-17 years.

Regarding the educational status of the mother 3(9.375%) were illiterate, 11(34.375%) studied primary education, 10(31.25%) studied secondary education, 6(18.75%) studied higher secondary education, 2(6.25%) studied graduate in education and none of them were studied diploma.

Regarding the food preference 9(28.125%) adolescent girls with anemia taking vegetarian diet, 23(71.875%) adolescent girls with anemia taking non vegetarian diet.

Regarding the Duration of menstruation 8 (25%) adolescent girls had menstruation (2-3 days), 8(25%) were had 4-5 days ,16(50%) were had 6-7 days.

Regarding the menstrual cycle 7(21.87%) girls were 21-25 days, 8(25%) girls were 26-30 days, 17 (53.125%) girls were 31-35 days

Regarding the income of the family 9(28.12%) of adolescent girls with anemia belongs to below Rs. 5000/month, 5(15.625%) were belongs to Rs.5001-10000/month, and 18 (56.25%) were above Rs.10001/month

Regarding area of resistance 21(65.6%) adolescent girls with anemia belongs to rural area,11(65.6%) were belongs to semi urban area, and none of them are belongs to urban area.

In pre test level of haemoglobin 14(43.75%) had mild anemia, 18(56.25%) had moderate anemia. The post test level of Haemoglobin revealed that 14(43.75%) had normal Haemoglobin, 8(25%) had mild anemia, 10(31.25%) had moderate anemia.

In pre test, the mean score regarding haemoglobin was 9.256 with SD of 1.148 and in post test, the mean score was 11.093 with SD of 1.837 The 't' value of CV = 10.7316, TV = 2.0395 (CV > TV) which statistically significant at 0.05 level. The above results revealed that , there was a significant difference between the haemoglobin level of pre and post test among the adolescent girls with anemia . So the given Nutrient Mixture was effective.

Regarding the association , the analysis showed that there was a significant association between the , Educational status of the mother, Duration of menstruation, Menstrual cycle of pre test level of haemoglobin and there was no significant difference between the Age of the adolescent girls with anemia, Food preference, Income of the family per month, Area of residence. So the H_0 is rejected. The significant association was tested at 0.05 level

CONCLUSION

The main objective of the study was to determine the effectiveness of nutrient mixture on haemoglobin level among the adolescent girls with anemia The results showed that there was a significant difference between pre and post test level of Haemoglobin (paired 't' test value 2.0395). In relation to the effectiveness of Nutrient mixture, there had been markedly increased Haemoglobin after the administration of Nutrient mixture. So, the given Nutrient mixture was effective for adolescent girls with anemia.

NURSING IMPLICATIONS

The findings of the study which enable us to conclude that Nutrient mixture is effective on improving Haemoglobin level among adolescent girls with anemia have implications to the Nursing profession, including Nursing practice ,Nursing education, Nursing administration, and Nursing research.

NURSING SERVICE:

Nurses are as an educator, leader, supervisor, protector and team member in various situation of work. Education may be given to care givers or students regarding Nutrient mixture to improve the haemoglobin among the adolescent girls with anemia.

The finding of the study will help the adolescents to recover from the signs and symptoms of anemia and help to improve the haemoglobin level.

NURSING EDUCATION:

The result of the study will help to the nurse educator to increase the awareness regarding Nutrient mixture among adolescent girls with anemia.

The nurse educator educate the community people and staff nurses regarding iron rich diet.

NURSING RESEARCH:

The study can be baseline for further studies to built upon.

The study can be conduct in various group of students and to the public.

The study also conducted for various age group to educate about the anemia.

NURSING ADMINISTRATION:

The finding of the study will help the nurses to organize and plan for education programmes in various methods. This also used in hospital and community to provide counselling to adolescent girls with anemia.

RECOMMENDATION:

The following recommendations are done based on this study:

- The similar study can be conducted with large samples for better generalization.
- A comparative study can be conducted to assess the Haemoglobin among the adolescent girls with anemia.
- A study can be conducted to assess the knowledge and attitude regarding Nutrient mixture among adolescent girls with anemia
- A similar study can be conducted retrospective study.

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NUTRIENT MIXTURE

INTRODCTION:

Iron has several vital functions in the body. It serves as carrier of oxygen to the tissues from the lungs red blood cell haemoglobin, as a transport medium for electrons within cell, and as an integrated part of important enzyme system in various tissues.

MOLECULAR MECHNISMS INVOLVED IN INTESTINAL IRON ABSOPTION:

Iron is an essential trace metal for all organisms. In human it plays numerous bio chemical roles including oxygen binding in haemoglobin and as in haemoglobin important catalytic centre in many enzymes.

All body cell need iron, It is crucial production, and cellular growth and proliferation .Iron is mainly absorbed in the duodenum and upper jejunum. Normally, individual absorb less than 10% of dietary iron, or (1-2 mg/day)

In normal healthy adult , some 0.5 -2mg o iron is lost every day due to blood loss and the constant exfoliation of iron containing epithelial cell that line the gastrointestinal and urinary tract, skin, and hair. Menstruation increases the average daily iron loss to about 2mg per day for women with regular menstrual periods.

Therefore, the same amount of iron from dietary sources is required each day to replace the lost iron and maintain body iron homeostasis.

Even though iron is an essential metal in human metabolism it is highly toxic and tissues if present in elevated level.

WHO CLASSIFICATION OF ANEMIA:

MILD : 10-11.9mg/dl

MODERATE : 7-9.9mg/l

SEVERE : less than 7 mg/dl

RECOMMENDED DIETARY ALLOWANCES (RDA) FOR IRON BY AGE AND SEX:

FOOD AND NUTRITION BOARD, INSTITUTE OF MEDICINE , NATIONAL ACADEMIES

AGE/GROUP	LIFE STAGE	IRON (Mg/day)
INFANTS	0-6 months	0.27
	7-12months	11
CHILDREN		
MALES	1-3 years	7
	4-8 years	10
	9-13 years	8
	14-18 years	11
	19-30 years	8
	31-50 years	8
	51-70 years	8
	Above 70 years	8
FEMALES	9-13 years	8
	14-18 years	**15**
	19-30 years	18
	31-50 years	18
	51-70 years	8
	Above 70 years	8

RECOMMENDED DIETARY ALLOWANCE (RDA) FOR VITAMIN C BY AGE AND SEX:

AGE GROUP	VITAMIN C Mg/Day
14-18 YEARS	65Mg/day

NUTRIENT MIXTURE OF THE INGREDIENTS:

NAME OF THE FOOD	**AMOUNT**	**IRON(Mg)**
Rice flakes	60 gram	12mg
Roasted Bengal gram	25 gram	2.375mg
Coconut dry	15 gram	1.395g
Jaggery	25 gram	2.85 mg

Total iron content: 18.62mg of iron.

NAME OF THE FOOD	**AMOUNT**	**VITAMIN C(Mg)**
Dry amla powder	10 gram	70 mg

PREPARATION OF NTRIENT MIXTURE:

Weighed quantity of 60 gram of rice flakes , 25 gram of Bengal gram, 15of gram coconut dry are roasted and cooled separately. 10 gram of dry Amla was added.

The mixture was ground and 25 gram of jaggery was mixed with water and boiled to make syrup. the powder was added to the jaggery syrup and made into a ball.

TOOL –I

Sample no : _____

DEMOGRAPHIC VARIABLES:

1. **Age of the adolescent girls with anemia**

   a. 14-15 years b.16-17 years

2. **Educational status of the mother**

   a. Illtrate b.Primary c. Secondary d. Diploma e. Graduate

3. **Food preference**

   a. Vegetarian diet b. Non vegetarian diet

4. **Duration of Menstruation**

   a. 2-3 days b. 4-5 days c.6-7 days

5. **Menstrual cycle**

   a. 21-25 days b. 26-30 days c. 31-35 days

6. **Income of the family/month**

   a. below Rs.5000/month b. Rs.5001-10000/month

   c. Rs.above 10001/month

7. **Area of residence**

   a. Urban b.Rural c. Semi urban

ANNEXURES-3

LIST OF EXPERTS

1.Dr.Thangasaravanan.,M.D D.C.H.,

Consultant Pediatrician

Our lady health hospital,

Thanjavur-7.

2.Mrs. Parasakthi M.SC (N).

Vice principal,

Sakunthala College of Nursing,

Trichy.

3.Mr.M.P.Venkatesan Msc (N),

Vinayaka Missions College of Nursing,

Karaikal, Puducherry(Ut)

4.Mrs. Sujatha Msc (N),Phd

PIMS College of Nursing

Pondicherry.

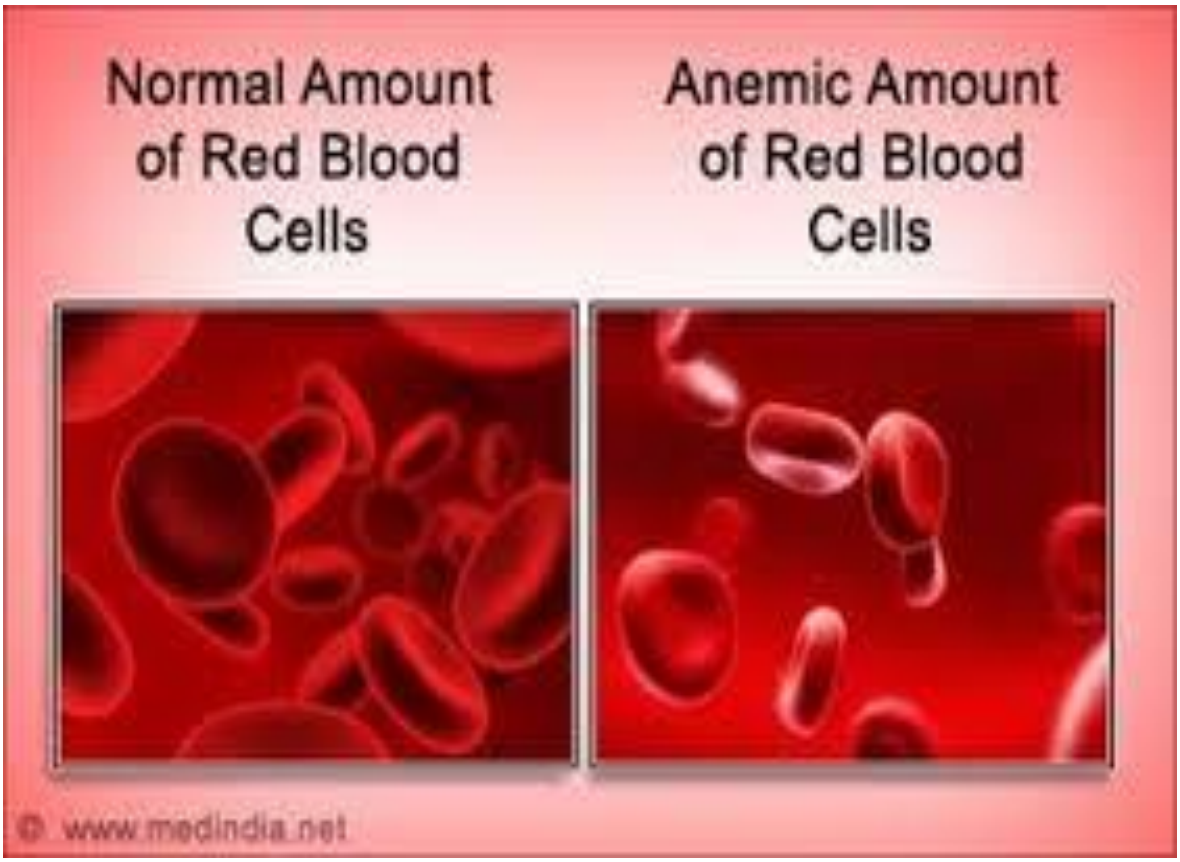
5.Mrs. S.Sharmila Msc (Nutrition).

Chief Dietitian

Meenakshi Hospital

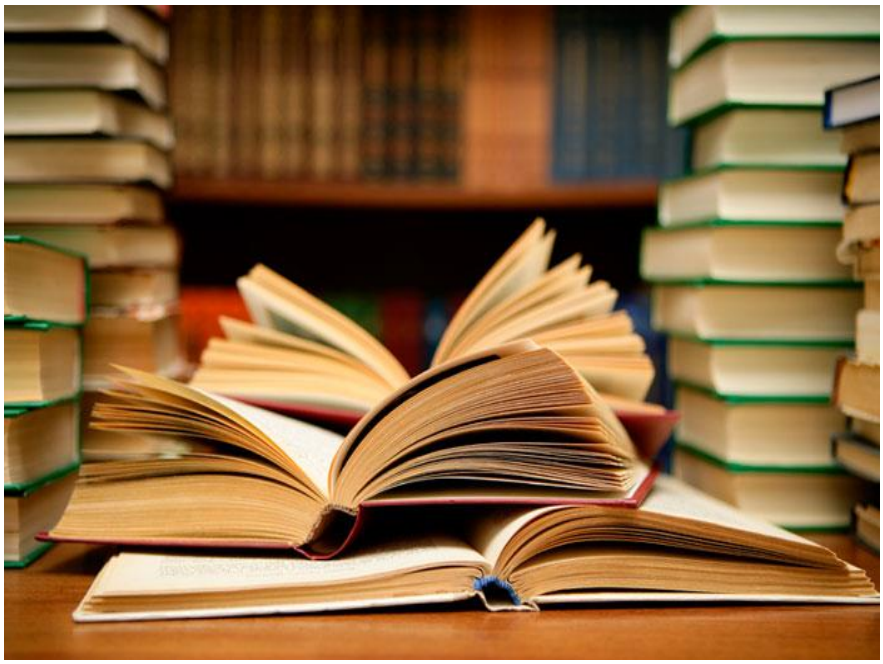
Thanjavur

CHAPTER I



INTRODUCTION

CHAPTER II



REVIEW OF LITERATURE

CHAPTER III

RESEARCH METHODOLOGY

CHAPTER IV

DATA ANALYSIS & INTERPRETATION

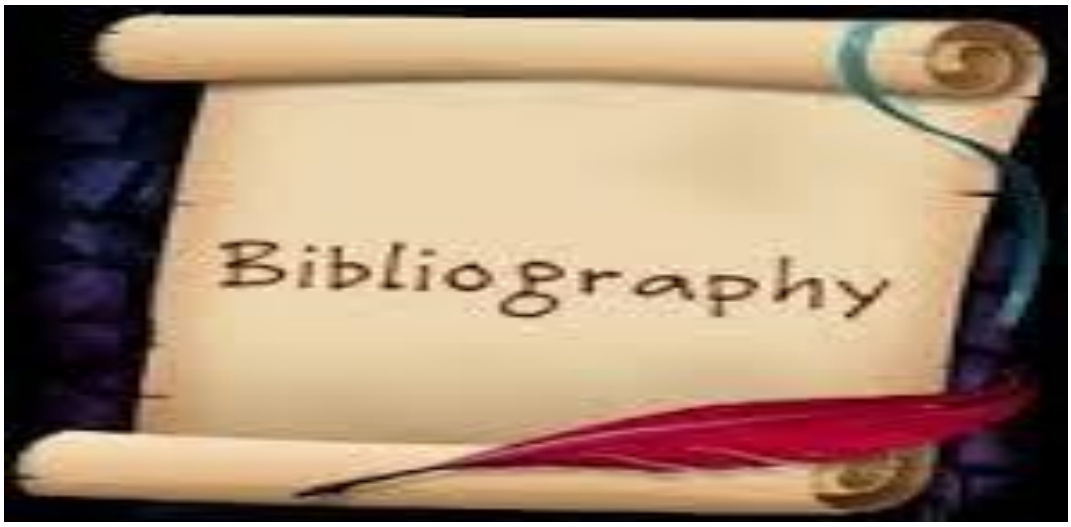
CHAPTER V

DISCUSSION

CHAPTER VI

SUMMARY AND CONCLUSION

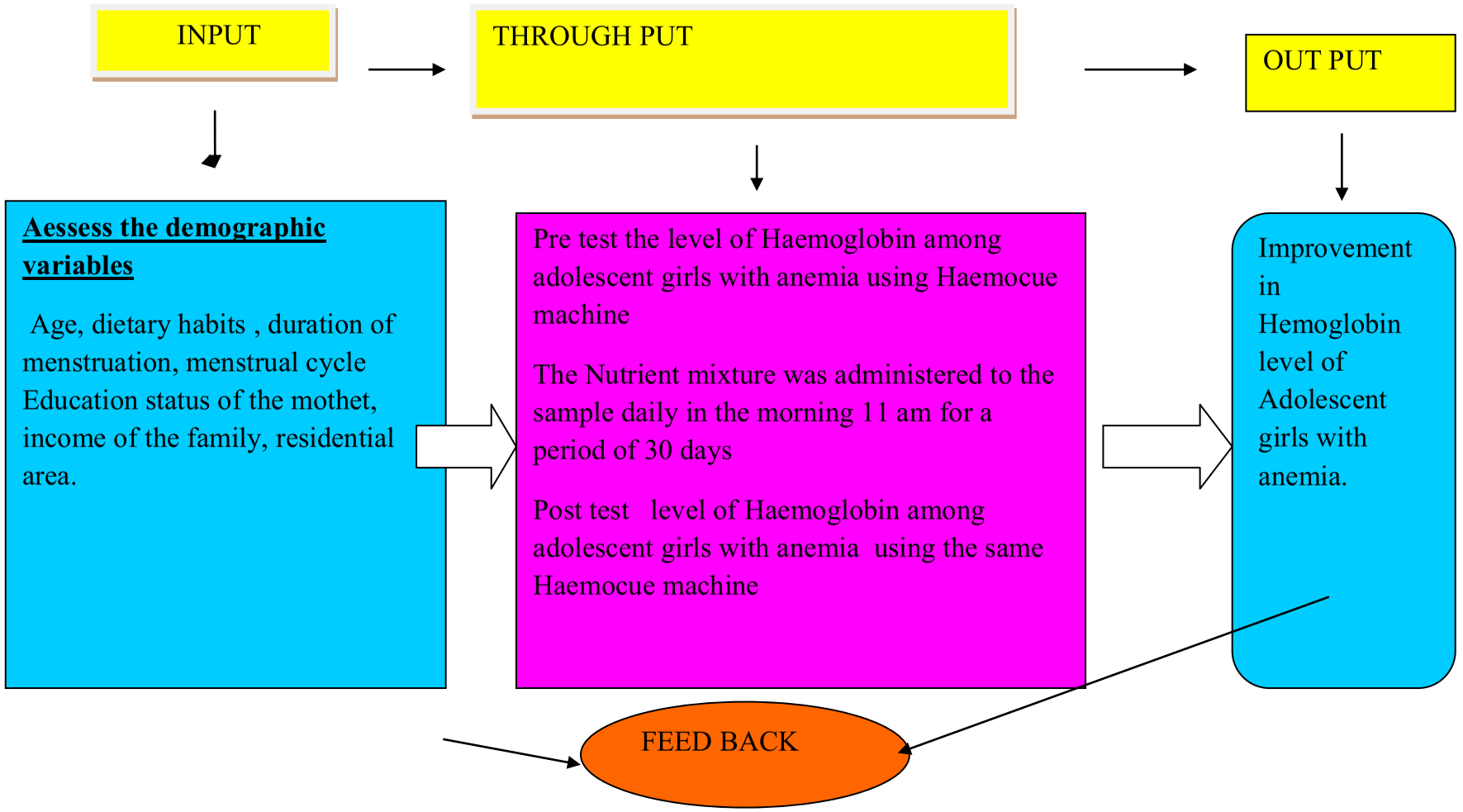
REFERENCES



ANNEXURES

THE END

CONCEPTUAL FRAMEWORK



J.W. KENNYS OPEN SYSTEM MODEL 1999

CONCEPTUAL FRAME WORK

The study is based on modified J.W kenny's open system model (1999).

This theory was introduced by Jennet W. Kenny. She was born in the year 1946 at Scotland. The open system model was formulated in the year 1999.The open system enumerates various aspects of system and interaction. She formulated various theories based on management.

An open system is a system which continuously interacts with its environment. The interaction can take the form of information, energy or material transfers into or out of the system boundary, depending on the discipline which defines the concept. An open system should be contrasted with the concept of an isolated system which exchanges neither energy and matter nor information with its environment.

Open system theory is useful in breaking the whole process into sequential tasks to ensure goal realization. The three major aspects of the systems are:

INPUT:

Input is any type of information, energy and material that enters the systems from environment through its boundaries. In this study it refers to pre test level of heamoglobin of adolescent girls with and obtaining demographic variables from the adolescent girls with anemia.

THROUGHPUT:

Throughput is that any information, energy or material that is given to the adolescent girls with anemia and the Nutrient mixture was administered to the sample daily in the morning 11 am for a period of 30 days

OUPUT:

Output is the information that leave the system, enters the environment through the system. In this study it refers to. Improvement in Hemoglobin level of Adolescent girls with anemia.