

**EFFECTIVENESS OF SWEET RICE FLAKES ON ANAEMIA IN
ADOLESCENT GIRLS AT A SELECTED
RURAL SCHOOL, SALEM.**

By

Mr. ANTO JOBI. T

Reg. No : 30099431

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

APRIL – 2011

CERTIFICATE

Certified that this is the bonafide work of **Mr. Anto Jobi. T**, final year M.Sc. (Nursing) Student, of Sri Gokulam College of Nursing, Salem, submitted in partial fulfilment of the requirement for the Degree of Master of Science in Nursing to The Tamilnadu Dr. M.G.R. Medical University, Chennai, under the Registration Number **30099431**.

College Seal:

Signature:

PROF. A. JAYASUDHA, M.Sc. (N)., Ph.D.,
PRINCIPAL,
SRI GOKULAM COLLEGE OF NURSING,
3/836, PERIYAKALAM,
NEIKKARAPATTI,
SALEM - 636 010.

**EFFECTIVENESS OF SWEET RICE FLAKES ON ANAEMIA IN
ADOLESCENT GIRLS AT A SELECTED
RURAL SCHOOL, SALEM.**

Approved by the Dissertation committee on: 21-12-2010

Signature of the Clinical Specialty Guide:

Mrs. J. KAMINI CHARLES, M.Sc. (N).,
Associate Professor/ Head of the Department,
Department of Community Health Nursing,
Sri Gokulam College of Nursing,
Salem - 636 010.

Signature of the Medical Expert:

Dr. K. SELVA KUMARI, M.D.,
Consultant Physician
Sri Gokulam Hospital,
Salem - 636 004.

.....

.....

**Signature of the Internal Examiner
with date**

**Signature of the External Examiner
with date**

ACKNOWLEDGEMENT

First and the foremost, I thank **God Almighty** for showering his blessings on me during my entire study period. He is the source and inspiration in every walk of my life and the foundation of knowledge and wisdom.

With gratitude, I wish to acknowledge all those who have enabled me to complete my study successfully.

I wish to express my deep sense of gratitude and thanks to **Dr. K. Arthanari, M.S.**, Managing Trustee, Sri Gokulam College of Nursing for the facilities he had provided in the institution which enabled me to do this study.

I would like to express my heartfelt thanks to **Prof. A. Jayasudha, M.Sc.(N), Ph. D.**, Principal, Sri Gokulam College of Nursing, for her full support throughout this study.

I express my appreciation and gratefulness to **Dr. K. Tamizharasi, Ph.D.**, Vice Principal, Sri Gokulam College of Nursing, Salem, for her constant support, suggestions and encouragement at every stage which enabled me to complete this study.

I proudly express my deep sense of gratitude and indebtedness to my clinical speciality guide, **Mrs. J. Kamini Charles, M.Sc. (N)**, H.O.D, Community Health Nursing Department, Sri Gokulam College of Nursing, for laying the strong foundation of research, for his excellent suggestions, valuable guidance, support, ever willing help from time to time, untiring and patient correction which helped me to bring this study a successful one.

I extend my gratitude to **Mr. M. Kandasamy, M.Sc.(N), Ph. D.**, Associate Professor, **Mrs. S. Rajeswari, M.Sc.(N)**, **Mrs. G. Jayanthi, M.Sc.(N)**, and

Ms. D. Akila, M.Sc.(N)., Lecturers, Department of Community Health Nursing, Sri Gokulam College of Nursing, Salem, for their valuable guidance and suggestion towards this study.

I extend my sincere thanks to the **Dissertation Committee** for offering constructive criticism and due sanction for carrying out this research work

I am grateful to the **Medical and Nursing Experts** for validating the content of the tool and content for this study.

I extend my sincere thanks to all the **Faculty Members** of Sri Gokulam College of Nursing, for their kind support during the course of the study.

I wish to convey my special thanks to **Dr. S. Shiva Kumar, M.Sc., M.Phil., Ph.D.**, Biostatistician for his assistance in statistical analysis and presentation of data.

I am pleased to convey my sincere thanks to the librarian **Mr. R. Baskar M.L.I.S.**, for his helping hands in providing all needed literature to complete this research study.

I express my heartiest gratitude to my family members for their strong support and encouragement throughout my carrier. I wish to thank **Ms. R. Darjilin, B.S.W** for her whole hearted co-operation during this course.

I am pleased to convey my sincere thanks to **Mr. L. Periasamy, Mr. R. Manikandan, B.B.A., Mr. R. Karthik, B.E.**, Golden Printers, Salem for typing and printing this dissertation.

My sincere thanks to all the subjects who took part in this study; without them the study would not have been a successful one. I special thank **Mr. A. Gunasekar**, Head Master and all the **Staff Members** of Govt. High School, Varagampadi for their kind co-operation towards this research.

Sincere thanks to my friends **Ms. Johnsy Rani. T., Mr. Dhanasekar, V. M., Mr. Boobalan, P., Ms. P. Malarvizhi, Mr. T. P. Ilango, Mr. D. Krishnamoorthy, Mr. C. Periyasamy, Mr. D. Shanmuga sundaram, Mr. V. Vijayakumar, Mr. Sujin Stephen Lazarus, Mr. Jebin Josewell Lazarus** and my **Department Associates** for their help offered throughout this study.

Last but not the least, I express thanks to all other friends who encouraged and supported me to complete the study fruitfully.

TABLE OF CONTENTS

| CHAPTER | CONTENT | PAGE NO |
|------------|--|---|
| I | INTRODUCTION | 1-11 |
| | <ul style="list-style-type: none"> ➤ Need for the study ➤ Statement of the problem ➤ Objectives ➤ Operational definitions ➤ Assumptions ➤ Hypotheses ➤ Delimitations ➤ Projected outcome ➤ Conceptual framework | <p>4</p> <p>6</p> <p>6</p> <p>6</p> <p>7</p> <p>7</p> <p>7</p> <p>7</p> <p>7</p> |
| II | REVIEW OF LITERATURE | 12-23 |
| | <ul style="list-style-type: none"> ➤ Literature related to prevalence of anaemia ➤ Literature related to cause of anaemia associated with dietary pattern ➤ Literature related to sources of iron rich diet ➤ Literature related to prevention of anaemia by intake of iron rich diet ➤ Literature related to effectiveness of sweet rice flakes on anaemia | <p>12</p> <p>15</p> <p>19</p> <p>19</p> <p>21</p> |
| III | METHODOLOGY | 24-29 |
| | <ul style="list-style-type: none"> ➤ Research approach ➤ Research design ➤ Population ➤ Description of setting ➤ Sampling ➤ Variables ➤ Description of the tool ➤ Validity and Reliability ➤ Pilot study ➤ Method of data collection ➤ Plan for data analysis | <p>24</p> <p>24</p> <p>24</p> <p>24</p> <p>26</p> <p>26</p> <p>26</p> <p>27</p> <p>28</p> <p>28</p> <p>29</p> |
| IV | DATA ANALYSIS AND INTERPRETATION | 30-39 |
| V | DISCUSSION | 40-42 |
| VI | SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS | 43-46 |
| | BIBLIOGRAPHY | 47-50 |
| | APPENDICES | i-xv |

LIST OF TABLES

| SI. NO. | TITLE | PAGE NO. |
|---------|--|----------|
| 3.1 | Score interpretation of level of anaemia | 27 |
| 4.1 | Frequency and percentage distribution of samples according to their selected demographic variables | 31 |
| 4.2 | Frequency and percentage distribution of pre-test and post test level of anaemia | 35 |
| 4.3 | Mean, Standard deviation and mean difference of pre-test and post test level of anaemia | 36 |
| 4.4 | Mean, standard deviation and 't' value of pre-test and post-test level of anaemia | 37 |
| 4.5 | Chi-square test on the level of anaemia with their selected demographic variables | 38 |

LIST OF FIGURES

| Sl. NO. | TITLE | PAGE NO. |
|----------------|--|-----------------|
| 1.1 | Conceptual framework based on Pender's Health Promotion Model | 10 |
| 3.1 | Schematic representation of research methodology | 25 |
| 4.1 | Percentage distribution of samples according to their pre-test level of anaemia | 33 |
| 4.2 | Percentage distribution of samples according to their post test level of anaemia | 34 |

LIST OF APPENDICES

| APPENDIX | TITLE | PAGE NO |
|-----------------|---|----------------|
| A | Letter seeking permission to conduct a Research Study | i |
| B | Tool for data collection | ii |
| C | Letter requesting opinion and suggestions of experts for content validity of the research tools | x |
| D | Certificate of validation | xi |
| E | List of experts for content validity | xii |
| F | Certificate of editing | xiii |
| G | Photos | xiv |

ABSTRACT

Anaemia is a very common problem in Indian Adolescent girls. This study was conducted to evaluate the effectiveness of sweet rice flakes on anaemia in adolescent girls at a selected rural school, Salem. The objectives of the study were to assess the level of anaemia in the adolescent girls, to evaluate the effectiveness of sweet rice flakes on the level of anaemia in the adolescent girls and to associate the level of anaemia in adolescent girls with their selected demographic variables. The investigator conducted this study in the Government High School, Varagampadi, Salem for 4 weeks. Data on demographic variables were collected from all 50 samples. The investigator went to the school every day morning and provided a 100 grams ball of sweet rice flakes at 11 am to all the samples. Then the post-test was conducted after 21 days to reassess the haemoglobin level.

The investigator found that, in pre-test, 2(4%) samples had mild level of anaemia, 24(48%) had moderate level of anaemia and 24(48%) had severe level of anaemia. In post test, 4(8%) samples had no anaemia, highest i.e., 36(72%) samples had mild level of anaemia, 10(20%) samples had moderate level of anaemia and none had severe level of anaemia. The pre-test mean score of haemoglobin level was 8.07 ± 0.76 and it was 9.95 ± 0.78 in post-test. The mean difference was 1.88. It was found that there was a difference in the haemoglobin level before and after administration of sweet rice flakes. The 't' value was 25.613. Thus it became evident that there was an effectiveness of sweet rice flakes on level of anaemia in adolescent girls at $p < 0.05$ level. There was no significant association of the level of anaemia with their selected demographic variables except religion at $p < 0.05$ level.

CHAPTER- I

INTRODUCTION

**“Adolescence is perhaps nature's way of preparing
parents to welcome the empty nest.”**

Adolescence is a very beautiful stage in one's life. Life that was utterly dependent on people around gradually becomes more independent. The child grows into an adult through the adolescence. Even though growth is continuous from time of birth, the beauty of this period in life is that one is suddenly aware of one's own growth; the outlook changes; develops own value systems; starts thinking of future and considers the life's vocation. One becomes capable of living in the adult world. One has new capabilities and skills to control own thoughts and emotions and feel responsible for many actions of self.

Adolescence has been defined by **WHO** as the period of life spanning between 10-19 years and the youth as between 15-24 years. The number of adolescents account for about 10% of all births worldwide. The terms adolescents, youth, young adults and young people can be used interchangeably.

There are 1.2 billion adolescents aged 10-19 in developing nations making up 1/5th to 1/4th of the country's populations. The total population of India is over 1081 million and is the second most populous country in the world. Adolescents (10-19 years) form a large section of population, about 22.5 percent, that is, about 225 million. They have diverse health needs as they are living in diverse circumstances. The total population of young people (10-24 years) is approximately 331 million comprising nearly 30 percent of the total population of India (**Census, 2001**).

The American Society for Nutritional Sciences, 2001, says that during adolescence period, 20% of final adult height and 50% of adult weight are attained.

Adolescents are especially vulnerable to anaemia because of this rapid growth. According to WHO, anaemia is a hemoglobin level less than 11 g/dl. The prevalence of anaemia is more than 60% among adolescent girls. An adolescent boy is 10 times less likely to develop anaemia than a girl. Anaemia in our country is essentially due to iron deficiency.

Because of this high prevalence and as nutritional anaemia is one of India's major public health problem, children up to 10 years and adolescents in the age group 11- 18 years are now covered under the anaemia prevention and control program of the Government of India, the RCH programme, in which iron and folic acid tablets are provided. **(Anant Kumar, 2000).**

For the normal functioning of the body, iron is an important mineral. Iron is helpful in carrying oxygen around the body, ensures a healthy immune system and makes energy for the body. When its level becomes low in the body, it makes one tired and apathetic and then it is stated as anaemia and is characterized by low levels of hemoglobin, which cause oxygen starvation in the tissues.

Iron is essential for the formation of hemoglobin, the component of the red blood cell that transports approximately 98.5% of oxygen in the blood. Hemoglobin is composed of heme, the non-protein portion that contains iron, and globin, a simple protein. A person who is anaemic has insufficient hemoglobin to provide oxygen to the cells of the body 75% of the body's iron is in hemoglobin. The greatest amount of the body's iron, about 70% is found in red blood cells as a constituent of hemoglobin. Another 5% of the total body iron is a part of muscle hemoglobin-myoglobin iron **(Sungthong, Mo-suwan, & Chong-suvivatwong, 2002).**

Remember, iron deficiency can cause teenager to do poorly at school. She can suffer from memory loss, show problems with verbal learning, have attention and

alertness problems, end up getting low scores in math and her development is also affected.

One way to prevent anaemia and iron deficiency is by inculcating good eating habits in teenagers. This means not skipping meals, dieting or only eating certain foods. Rather, teenagers should be taught to eat a lot of iron-rich food like green leafy vegetables. Usually this habit should be taught from early childhood.

Rice flakes are tasty flakes that are prepared using rice grains. The preparation of rice flakes begins with parboiling the rice. This softens the grain and prepares it for processing. Once the rice is tender, the cooked grains are rolled and then flattened. The amount of pressure applied decides the thickness of the flattened rice.

Every 100 gm of rice flakes contains 20 mg of iron. A number of rice flake recipes are prepared in Asian cuisine. Often in western countries, rice flakes are used to prepare different types of snacks. Rice flakes with jaggery and coconut scraping is a common practice in Kerala (**Gopalan, et. al., 2001**).

Jaggery is a traditional non-centrifugal unrefined sugar consumed in Asia, Africa, Latin America, and the Caribbean. It is a concentrated product of cane juice without separation of the molasses and crystals, and can vary from golden brown to dark brown in colour.

Jaggery also termed as 'medicinal sugar' contains up to 50% sucrose, up to 20% invert sugars, moisture content of up to 20%, and the remainder is made up of other insoluble matter such as ash, proteins and bagasse fibres. All the essential constituents for the body like proteins, minerals and vitamins are contained in it.

It is also a high source of iron and has more iron and copper contents than white sugar. Jaggery contains about 11.4 grams of iron per 100 grams that is to say 114 grams per kilogram, while only 300 milligrams per kilogram is found in refined

sugar. Jaggery is very rich in iron, which, a composite of hemoglobin prevents anaemia (Swaminathan, 2006).

Need for the Study

Iron deficiency anaemia can result due to a faulty diet having a lot of preserved, processed and junk food, that leads to a deficiency of essential ingredients. Adolescents are more interested in such type of foods and they need to be properly educated (Talim, M., 2007).

Emphasizes that Indian diet contains only 20-30mg of iron and only 5-10% of ingested iron is absorbed ie., about 1-3 mg is absorbed. Thus dietary intake should be 10-20 times higher than absorption. So there is a need to take more iron rich diets daily (Rigaud, D., 2000).

The co-efficient of gastro -intestinal absorption of iron from meat and fish is about 15-20% versus 3-5% from vegetables. There are substances present in meat which promotes iron absorption while in vegetables there are substances which limits iron absorption. The economic status of average Indian families is such that they cannot afford for non-vegetarian items regularly and most of them are vegetarians and they possess a very little absorption. Thus it is mandatory to fulfill the iron requirement through some other iron rich diet (Dahya, P., & Khosla, K., 2002).

Adolescence is the apt period to shape healthy eating and exercise habits which provide physical and psychological benefits during the adolescent period and to reduce the likelihood of nutrition-related chronic diseases in adulthood. Proper nutrition, including adequate iron intake, plays an important part of the teenager's growth and development.

Since anaemia is a serious problem in adolescence girls, the investigator had a special interest to conduct an interventional study to manage the problem of anaemia

in adolescent girls. It is the most important phase of mental and physical growth. During the teenage years that adolescents will acquire the whole of knowledge and skill set that will help them become independent adults and they can be made free from anaemia during this period itself using food fortification and food diversification rather than by iron supplements. This helps to prevent them from complications during their pregnancies for them in the forth coming years and there by maternal and child mortality rates of our country can be reduced.

The investigator had selected two different food items because in considering iron requirements, availability of iron from the composite diet is more important than from the individual food due to its profound interaction between foods in influencing the iron absorption. Rice flakes was selected with view of its cost efficiency, local availability and also acceptability by all groups of people in the community. A variety of dishes can be prepared from it. It is also carbohydrate rich so that it keeps the adolescents active and energetic which is a salient feature of adolescent period.

The investigator thought of mixing rice flakes with some sweetened agent because it will be liked by all adolescents so that the investigator may not face any problem in administering the intervention. It was found that there is difference in composition of iron between sugar and jaggery. Sugar is made only of sucrose, while jaggery is made up of predominantly sucrose, mineral salts, iron and some fiber. Thus, consumption of jaggery is recommended in case of iron deficiency anaemia, and hence the investigator selected jaggery to mix with rice flakes to prepare a delicious diet.

Statement of the Problem

A Study to Evaluate the Effectiveness of Sweet Rice Flakes on Anaemia in Adolescent Girls at a Selected Rural School, Salem.

Objectives

- To assess the level of anaemia in the adolescent girls.
- To evaluate the effectiveness of sweet rice flakes on the level of anaemia in the adolescent girls.
- To associate the level of anaemia in adolescent girls with their selected demographic variables.

Operational Definitions

Effectiveness

It refers to the increase in the hemoglobin level after the administration of sweet rice flakes for a period of 4 weeks which is assessed by Sahli's hemoglobinometer.

Sweet rice flakes

It refers to the preparation of nutritional ball by mixing the 50 gms of rice flakes, 50 gms of jaggery and adequate water. Each ball weighs about 100gms.

Anaemia

Anaemia is the condition in which hemoglobin level is below 11g/dl and which occurs mainly due to the deficiency of iron. In this study, Anaemia refers to Iron deficiency Anaemia.

Adolescent girls

They are the young girls between the age group of 13 and 15 years.

Assumptions

- Most of the adolescent girls may be anemic.
- An appropriate nutritional intervention may prevent most of the health and nutritional problems during adolescent period.
- Nurses have an important role in educating the importance of iron rich diet in preventing anaemia in adolescent girls.

Hypotheses

H₁: There will be a significant difference in the hemoglobin level in adolescent girls after administration of sweet rice flakes at p<0.05 level.

H₂: There will be a significant association between the level of anaemia in adolescent girls with their selected demographic variables at p<0.05 level.

Delimitations

- The study was limited to a period of 4 weeks.
- The study was limited to a selected rural school.
- The study was limited to 50 subjects.
- The study was limited to adolescent girls those who are diagnosed with anaemia.

Projected Outcome

This study would evaluate the effectiveness of sweet rice flakes on the level of anaemia in adolescent girls. Findings of this study would help to practice the intake of sweet rice flakes to prevent anaemia.

Conceptual framework

The conceptual framework selected for the present study was based on Pender's health promotion model. The initial version of the health promotion model appeared in 1980s and later in 2006, it was refined. The health promotion model is a

competence or approach oriented model in which the motivational source for behaviour change is based on the individual's subjective value of the change- that is, how the client perceives the benefits of changing the given health behaviour.

Variables

Individual characteristics and experiences

Personal factors are categorized as biological, psychological and socio-cultural. Some personal factors can influence health behaviours whereas others, such as age, cannot be changed. Prior related behavior includes previous experience, knowledge and skill in health promoting actions.

Behaviour specific cognitions and affect

It constitutes a critical "core" for intervention because they can be modified through nursing interventions. They include the following:

❖ Perceived benefits of action

- ◆ Anticipated benefits or outcomes affect person's plan to participate in health promoting behaviours and may facilitate continued practice.

❖ Perceived barriers to action

- ◆ Perceived barriers to action affect health promoting behaviours by decreasing the individual's commitment to a plan of action.

❖ Perceived self-efficacy

- ◆ It refers to the conviction that a person can successfully carry out the behavior necessary to achieve a desired outcome.

❖ Activity-related affect

- ◆ The subjective feelings that occur before, during, and following an activity can influence whether a person will repeat the behavior again or maintain the behavior.

❖ **Interpersonal influences**

- ◆ They are a person's perceptions concerning the behaviours, beliefs or attitudes of others.

❖ **Situational influences**

- ◆ They include perceptions of available options, demand characteristics, and the aesthetic features of the environment.

Commitment to a plan of action

It involves two processes: commitment and identifying strategies for carrying out and reinforcing the behaviour.

Immediate competing demands and preferences

Competing demands are those behaviours over which an individual has a low level of control. Competing preferences are behaviours over which an individual has a high level of control.

Behavioural outcome

It is directed toward attaining positive health behaviours.

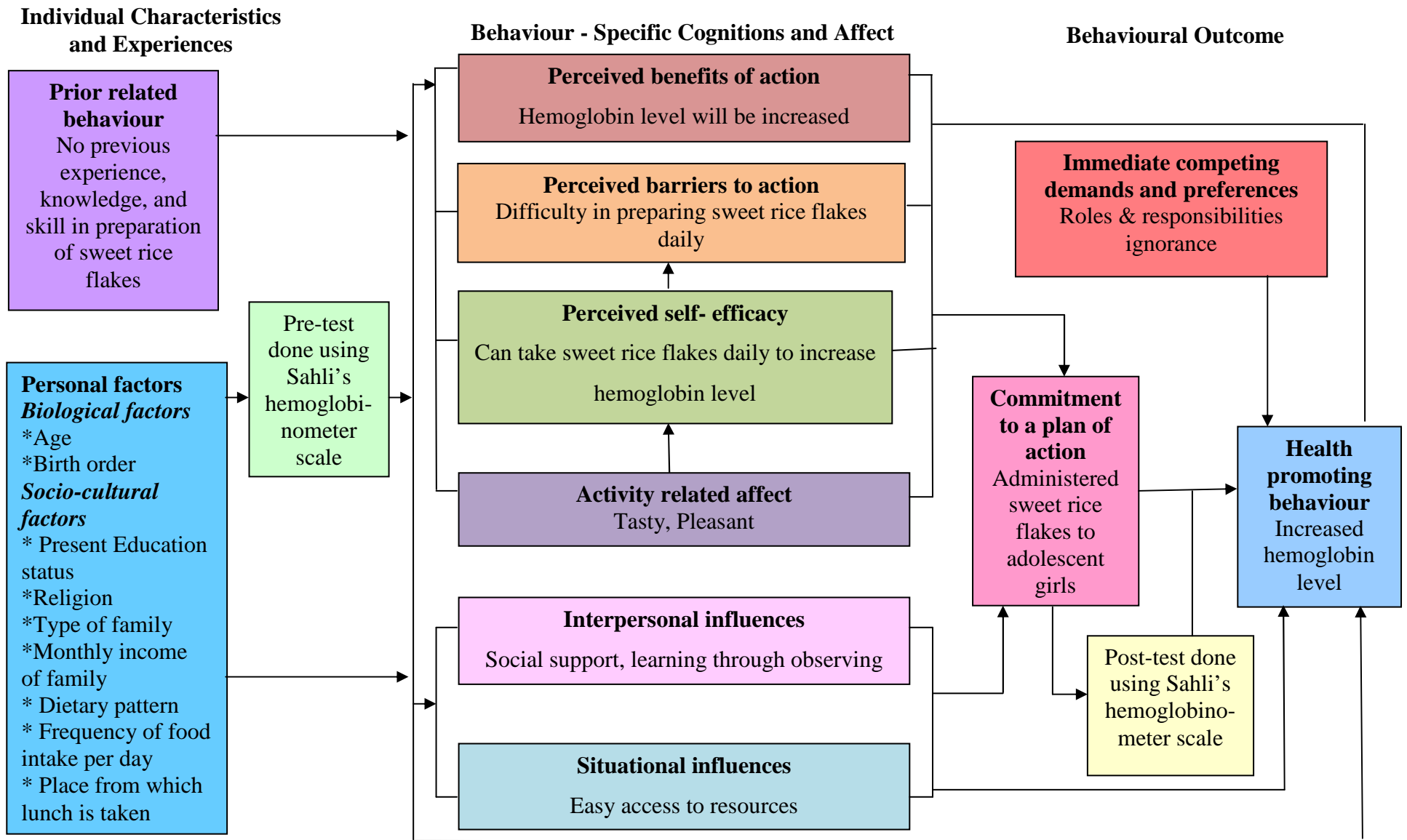


Figure- 1.1: Conceptual Framework Based on Pender's Health Promotion Model

Summary

This chapter dealt with introduction, need for the study, statement of the problem, objectives, operational definitions, assumptions, hypotheses, delimitations, projected outcome and conceptual framework.

CHAPTER - II

REVIEW OF LITERATURE

Review of literature is an important step in the development of the research project, and in broadening the understanding and developing an insight into the problem area. It further helps in developing the broad conceptual context, in which the problem fits, methodology, instruction of tool, development of evaluative approach and analysis of data.

Literature review begins with locating as many relevant materials as possible and ends with writing a summary of the available knowledge (**Judith, 1980**).

Literature review of the present study is organized under the following headings

- Prevalence of anaemia
- Cause of anaemia associated with dietary pattern
- Sources of iron rich diet
- Prevention of anaemia by intake of iron rich diet
- Effectiveness of sweet rice flakes on anaemia

Literature Related to Prevalence of Anaemia

Baral, K. P., & Onta, S. R., (2009), conducted a community based study in rural and urban areas of Morang District to assess the prevalence of anaemia amongst adolescents in Nepal. Sahli's method was used to determine the hemoglobin level. 308 adolescents (127 urban, 181 rural in terms of location and 151 male, 157 female in terms of sex) participated in the study. The overall prevalence of iron deficiency anaemia among adolescent population was 65.6% with the distribution of rural 62.4%, urban 70.0%, male 52.3% and female 78.3%. Sufficiency or deficiency of iron makes

the living of adolescents different as it affects their growth requirement and cognitive performance. Iron reserve in female result better reproductive outcome.

Gupta, K., & Bains, K., (2006), conducted a study to assess the status of anaemia among pregnant women and adolescent girls from 16 districts of 11 states of India. 30 clusters were selected using a two-stage random sampling method. Anaemia was diagnosed by indirect cyanomethemoglobin method. The survey data showed that 84.9% of pregnant women (n = 6,923) were anaemia (hemoglobin < 110 g/L); 13.1% had severe anaemia (hemoglobin < 70 g/L), and 60.1% had moderate anaemia hemoglobin < 70 to 100 g/L). The overall prevalence of anaemia was 90.1%, with 7.1% having severe anaemia (hemoglobin < 70 g/L).

Malini, et.al., (2003), conducted a study on Iron deficiency anaemia among antenatal women, adult male and school children in different districts, India, selected samples 400 samples of antenatal women, adult male and school children by convenience sampling method. Iron deficiency anaemia was assessed from the hospital investigation from different districts. The iron deficiency anaemia was found 57% among school age children, 35% in non-pregnant women and 18% of adult males.

WHO, (2003), denotes, Iron deficiency anaemia is due to nutritional disorders in the world. The sample size was from 4 to 5 billion people, 66 to 80% of the world population was anemic due to iron deficiency; 2 billion people over 30% of the world population are anaemic due to nutritional deficit.

Mekasha, A., & Zerfu, M., (2003), studied the prevalence of anaemia among school children in Addis Ababa. Three schools were selected in which one is primary school and two are high schools. A cross sectional survey was undertaken in all the three schools in May. A calculated sample of 707 was taken. Socio-demographic data

and health related information were collected using a pre-tested structured questionnaire. Anthropometry was taken in standard ways. Hemoglobin was measured using HaemoCue. The mean age was 14.96 years. Females accounted for 52.8% of the subjects. The mean hemoglobin level was 15.4 gm/dl (SD 2.4). The prevalence rate of anaemia was 5.83% and the highest rate was noted among children aged 8 years. Among the selected variables none were predictors of anaemia. Anaemia is a common problem among school children in Addis Ababa.

Pala, K., & Dundar, N., (2000), studied the prevalence and risk factors of anaemia among women of reproductive age in Bursa, Turkey. In this cross-sectional study, 530 women were selected using stratified random sampling among 6,506 women in 15-49 years age group and 488 women (92.1%) participated in the study. The data collected were analyzed by multivariate logistic regression analysis to determine the risk factors related to anaemia. The prevalence of anaemia was 32.8 per cent (hemoglobin level < 12 g/dl). Usage of more than 2 sanitary pads in a day during menstruation (OR=3.67, 95% CI 2.30-5.88; P=0.000) and duration of menstrual bleeding more than 5 days (OR=3.01, 95% CI 1.94-4.66; P=0.000) were found to be risk factors for anaemia. Approximately 1 of 3 women in the study area was diagnosed to be anemic.

Nojilana, B. et. al, (2000), estimated the extent of disease attributable to iron deficiency anaemia among children aged 0-4 years and pregnant women aged 15-49 years, in South Africa. The setting and subjects were South Africa and children under 5 years and pregnant women of 15 - 49 years. It is estimated that 5.1% of children and 9 - 12% of pregnant women had IDA and that about 7.3% of perinatal deaths and 4.9% of maternal deaths were attributed to IDA in 2000. Overall, about 174,976

healthy years of life lost (YLLs), or between 0.9% and 1.3% of all DALYs in South Africa in 2000, were attributable to IDA.

Literature Related to Cause of Anaemia Associated with Dietary Pattern

Hashizume, M., (2004), studied anaemia in relation to low bioavailability of dietary iron among school-aged children in the Aral Sea region, Kazakhstan. He conducted a cross-sectional study of 97 school-aged children living in Kzyl-Orda. Dietary intake data were obtained from 24 hours dietary recalls. Iron bioavailability was estimated with absorption enhancers (meat, fish and poultry, and vitamin C) and inhibitors (tea and phytates) consumed in the same meal. It suggested an association between bioavailable iron intake after adjustment of absorption enhancers and inhibitors (odds ratio, 0.43; 95% confidence interval, 0.18-1.01; P=0.053). In conclusion, low bioavailability of dietary iron seems to be related to anaemia in the region.

Sangram, (2004), says that the adolescents often have disordered eating patterns that do not follow dietary recommendations. Fewer than 2% of adolescents eat enough of all the food groups, and almost 20% of females do not eat enough of even one of the food groups. Frequent dieting or restricted eating, skipping meals, vegetarian eating styles are all risk factors for anaemia in adolescents. Many adolescents, especially females, do not get enough iron from their diets in spite of increased iron needs. About 75% teen aged girls, do not meet their dietary requirements for iron, compared to only 17% of teen aged boys

El-Sahn, F. F., (2003), studied anaemia, parasitic infections and some risk factors among physical education female students in Alexandria. The present study was a cross-sectional one. A pre-designed questionnaire was completed by the researchers through face-to-face meetings to collect data concerning age,

menstruation history and some dietary habits. Blood samples were taken to estimate hemoglobin (Hb) concentration level (gm/dl). Stool samples were collected and examined for the presence of intestinal parasites using formal ether concentration technique. Mild anaemia was found among 12.4% of the studied female students. Mean hemoglobin level was 13.3 g/dl (SD \pm 1.03). Anaemia rate is increased in those drinking tea immediately after meals and in those not drinking tea indicating poor iron reserves. Taking iron supplements, having a history of anaemia, increased amount and duration of menstruation were associated with anaemia.

Agarwal, M., (2002), denoted an evaluative study on insufficient dietary intake of iron rich diet among antenatal women in rural area, Pune. 200 samples were selected by randomized sampling method. Questionnaire method was used in this study and 50% of the samples were found to be anemic due to hook worm infestation, mal-absorption of food and infection.

Hallberg, L., & Hulthén, L., (2002), analyzed the perspectives on iron absorption. This study shows strong relationship between iron requirements, bioavailability of dietary iron, and amounts of stored iron. He observed that a reduction in iron stores and a calculated decrease of hemoglobin iron had the same increasing effect on iron absorption. Nutritional iron deficiency is especially common in menstruating women, in the latter third of pregnancy, during adolescence for both girls and boys, and in the weaning period from 4 to 6 months to 2 years of age. The body possesses remarkable, potential control systems of probable very ancient origin capable of preventing both iron deficiency and iron overload. Adding powdered red meat to weaning foods increased iron absorption three times and up to the level required to meet the high iron requirements during weaning.

Manios, Y., et. al., (2001), analyzed the Iron deficiency prevalence and dietary patterns in Istanbul. The study population consisted of 504 school children attending three primary schools, located in two districts of Istanbul with higher and lower socio-economic level (SEL) respectively. Biochemical and hematological indices of iron status were measured. Dietary intake was estimated using the 24-hours recall technique and a food frequency questionnaire. The prevalence of iron deficiency in the lower SEL school district was twice that of the higher SEL school district (42% and 21.2% respectively). Consumption of tea, cola beverages and dairy products was more frequent by children living in the lower than in the higher SEL school district. Furthermore, consumption of red meat and citrus fruits was less frequent by students in the lower than in the higher SEL school district. The consumption of foods and beverages pattern differs and that inhibit or enhance intestinal iron absorption between children in the two school districts provides some explanation for the observed differences in the prevalence of iron deficiency.

Farrell, M. L., & Nicoteri, J. A. L., (2001), states that adolescence is a time of busy schedules and high stress. The adolescent is highly influenced by the media, fads, and peers. The adolescent's active lifestyle may alter food selection. This is the age of "pricky eaters", especially in girls

Gershoff, S. N., (2001), found out that one of the major risk factors of anaemia due to iron deficiency is experiencing heavy menstrual bleeding. Usually teenage girls do not have sufficient iron intake to compensate for the loss that occurs during menstruation this is because they are more concerned about how they look and what they eat. Moreover, woman in Indian families are very much vulnerable for malnutrition due to certain cultural taboos like females having food after males and children.

Rigard, D., (2000), did a comparative study on iron deficiency anaemia between intake of vegetarian and non-vegetarian diet among antenatal women in selected urban area, Chandigarh. 30 samples from each group were selected by convenience sampling method. The study was evaluated by interview method about dietary habits. Among the detected, 18 samples were of iron deficit in vegetarian and 10 samples were of iron deficit in non-vegetarian.

Dub, S., (1999), conducted a descriptive study on anaemia among the antenatal women in rural area, Shimla. 50 samples were selected by convenience sampling method. Anemic samples were investigated by history collection regarding their nutritional intake. The study was concluded that 42 samples were found to be anemic due to poor nutritional intake.

In a perspective study, 110 adolescent girls between ages of 13-16 years and low socio-economic group of district Kurukshetra, Haryana were screened out for their hemoglobin level and for nutritional as well as socio-economic status. Pre-structured questionnaire cum interview method was used to collect the data about socio-economic status. Nutritional status was adjudged by their anthropometric measurements (height, weight and BMI) and dietary intake. Dietary intake of selected subjects was assessed 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 Sahli's technique. Out of 110 girls, more than $\frac{2}{3}^{\text{rd}}$ (81.81 per cent) girls were suffering from various degree of anaemia as their hemoglobin level ranges between 6.6 g/dl to 11.0 g/dl. 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 anaemia was directly

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

Literature Related to Sources of Iron Rich Diet

Agarwal, M., (2001), presented in his article “There are two types of dietary iron- haem iron and non haem iron. Haem iron is found in foods of animal origin (e.g.) meat fish, poultry. Its bioavailability is high with absorption being 20 to 30%. Non haem iron is found in foods of plant origin like green leafy vegetables, whole grain cereals, tubers and pulses. Its bioavailability is lower and is determined by presence of enhancing and inhibiting factors consumed in some meal”.

Williams, S. R., (2000), found that the rich non-vegetarian sources of iron are egg yolk, liver and meat. Vegetarian sources of iron are cereals, pulses, and green leafy vegetable of the cereal grains and millets, bajra and rice flakes are very good sources of iron. Other better sources of iron are jaggery, raisins, and dried dates.

Talim, M., (1999), stated that, “Rich sources of iron are mainly available in bajra, ragi, green leafy vegetables, millets, pulses, rice flakes, rice bran, cauliflower greens, asafoetida, cloves, cumin seeds and tamarind pulp. Fruits like pomegranate, figs, raisins, peaches, strawberries, mulberries and watermelon are also rich sources, increases the hemoglobin level 80%”.

Literature Related to Prevention of Anaemia by Intake of Iron Rich Diet

Laskar, A. R., (2007), conducted an intervention study among pregnant women in urban slum of East Delhi regarding intake of ragi items. 150 samples were selected who are pregnant and in the age group 19-25 years. Prevalence of anaemia was assessed by history, physical examination and hemoglobin estimation (Sahli's method). The study findings assessed after 8 weeks, showed a 71% rise of $1 < 2$ gm% of hemoglobin level and > 3 gm % rise was observed at the end of 16th week.

Kamalam, S., (2005), conducted a structured teaching programme about intake of ragi items among pregnant women in urban and rural areas. 300 pregnant women were chosen in the age group between 19-25 years. Out of the 300 samples, 150 were from urban and 150 from rural area. Among which, 75 are experimental and 75 are controls in both the areas respectively. This study findings indicated that the planned teaching programme was effective in increasing knowledge about anaemia and for improving the hemoglobin level, a combination of health teaching and intake of ragi items were more effective which was statistically found significant.

Dewan, A., (2004), conducted a comparative study on iron supplement and iron rich diet among pregnant women in hospital in the age group of 15-35 years. hemoglobin estimation was done by Sahli's hemoglobinometer. The experimental group was further divided into two sub-groups 1 and 2. Subgroup 1(44) were supplemented with iron (200mg) and folic acid (0.5mg)/ day and sub-group 2 (44) were provided with ragi items (300mg) /day for a period of 150 days. There was a considerable improvement in the hemoglobin status on supplementation with iron and folate alone. It was also observed that there was a rise in hemoglobin percentage, but it is lower in iron rich diet, because it takes more time for absorbance of iron rich diet.

Deeb, S., (1999), conducted an evaluative study of iron rich diet among pregnant women and non-pregnant women in urban area, Arunachal Pradesh. Pre-experimental one group pre-test post-test design was used. 50 samples were selected by randomized sampling method; the study was evaluated by questionnaire method. 70% of pregnant women were anemic and 50% of non-pregnant women were anemic in the pre-test. In the post-test, 90% of anaemia was reduced by supplementation of iron, and iron rich diet in pregnant women and 60% of anaemia was reduced in non-pregnant women.

Literature Related to Effectiveness of Rice Flakes on Anaemia

Rice flakes is known by a variety of names: Poha or Pauwa in Hindi, Baji in Newari language of Kathmandu, Pohe in Marathi, Chinde in Bengali, Chira in Assamese, Phovu in Konkani, Chudaa in Oriya and parts of Bihar and Jharkhand, Atukulu in Telugu, Bajeel or Bajil in Tulu, Chudwey in Urdu, Aval in Malayalam and Tamil, Avalakki in Kannada, Pauaa/ Paunva in Gujarati and Chiura in Nepali, Bhojpuri and Chhattisgarhi.

Sangeetha, N., & Premakumari, S., (2009), studied the effect of micronutrient supplementation on the nutritional and immune status of school-going children with iron deficiency anaemia. The present study was aimed to reduce the prevalence of iron deficiency anaemia 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 age group of 7-9 years (N: 1675) 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 anaemia. 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 anaemia 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 supplementation study was for a period of six months. The impact of supplementation was studied initially and at the end of 6 months in terms of

anthropometric measurements, morbidity pattern, dietary assessment and biochemical analysis. The results revealed that, supplementation in the food form resulted in significant improvement in the parameters studied. The findings of this research lead 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.

Agarwal, et. al., (2008), studied the impact of iron supplementation on anaemia during Pregnancy. Salty rice flakes preparation (mixing 25 g of ground nut, 25g of roasted Bengal gram and 5 g of mango powder in 50g of fried rice flakes) was prepared. Sixty volunteered pregnant women in their III trimester of pregnancy, who were visiting L.N.J.P. hospital regularly, undergo experimental trial. Ten non anemic pregnant women were included in control group. A questionnaire regarding general information was filled up. Hemoglobin was measured by Sahli's technique. All the subjects were showing symptoms of anaemia but signs were not same. Majority (90 %) were showing paleness of eyes. Hemoglobin values of group B and C were more than the control group A and were found significant in comparison with group A. Thus iron supplementation in both forms (Tablet as well as Food) is helpful in managing anaemia during pregnancy.

Sood, M., & Sharada, D., (2002), developed iron food supplement with locally available foods and to test its feasibility in school going children (7-9 years) belonging to low income families. From the upper primary school in Rajendranagar children were screened for hemoglobin levels and 36 children having hemoglobin levels below 11gm/dl were selected. Based on their hemoglobin levels, age, and gender, 24 children were grouped as experimental and the rest as control. A supplement food (laddoo) was developed using locally available foods like jaggery,

processed rice flakes, garden cress seeds and amaranth seeds (45:40:10:5). In the experimental group, children were given one laddoo per day for a period of 60 days. Effect of supplement on hemoglobin levels was assessed. A significant increase in hemoglobin levels was observed in both the boys and girls after 30 days of supplementation only. The increase was comparatively more in the first 30 days than the second 30 days. Thus the product efficiency as an iron rich supplement in combating iron deficiency anaemia is reflected in the results obtained.

Summary

This chapter dealt with the review of literature related to prevalence of anaemia, cause of anaemia associated with dietary pattern, sources of iron rich diet, prevention of anaemia by intake of iron rich diet and effectiveness of sweet rice flakes on anaemia.

CHAPTER - III

METHODOLOGY

This chapter deals with a brief description of methodology which was undertaken by investigator for the research study.

Research Approach

Quantitative evaluative approach was used in this study.

Research Design

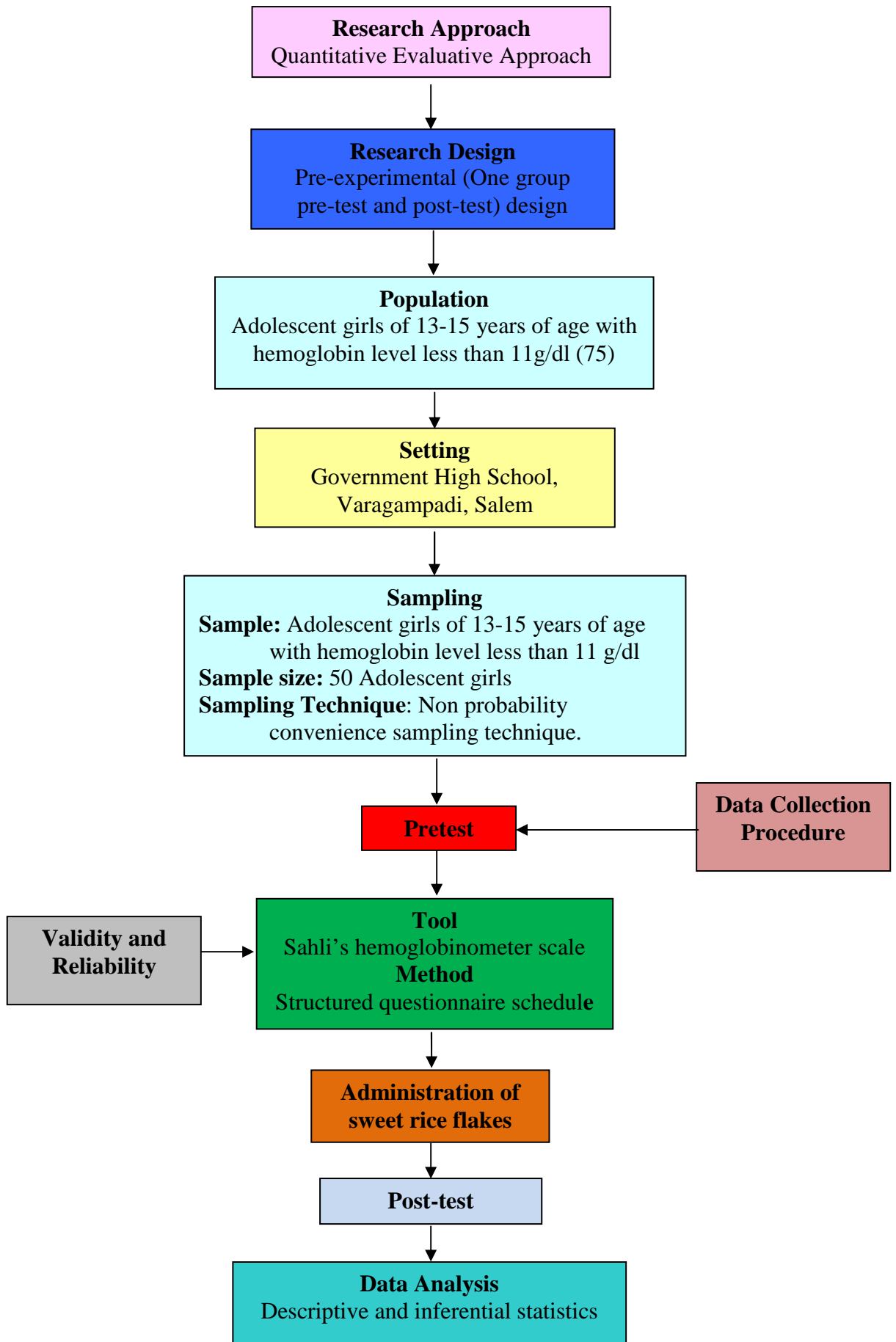
Pre-experimental (One group pre-test and post-test) design was used in this study.

Population

92 Adolescent girls of 13-15 years of age were screened for anaemia and 75 of them were found to be anemic. Hence the population of this study was 75.

Description of the Setting

The study was conducted in Government High School, Varagampadi, Salem, which was started in the year 1995. It is located in the rural area near Ayothiapattanam. It is 15 kms from the New Bus stand. There are about 388 students in this school with an average of 35-40 students in each class. Among them 111 were males and all other were females. There are 10 faculties employed in this school.



Figure– 3.1: Schematic Representation of Research Methodology

Sampling

❖ Sample

Adolescent girls of 13-15 years of age with hemoglobin level less than 11g/dl.

❖ Sample size

Sample size was 50.

❖ Sampling technique

Non probability convenience sampling technique was used in this study.

❖ Criteria for sample selection

Inclusion criteria

- The adolescent girls who are in the age group of 13-15 years.
- The adolescent girls whose hemoglobin levels are <11 g/dl.

Exclusion criteria

- The adolescent girls who are not willing to participate in the study.
- The adolescent girls who have any systemic diseases.

Variables

- ❖ Independent variable : Administration of sweet rice flakes
- ❖ Dependent variable : Level of anaemia

Description of the tool

This tool consists of two sections.

Section- A: Structured questionnaire schedule was used to assess the demographic variables.

Section- B: Sahli's hemoglobinometer scale was used to check the hemoglobin level.

Section -A

Demographic variables included in this study were age, present educational status, birth order, type of family, religion, dietary pattern, frequency of food intake per day, monthly income of family and place from which lunch is taken. No score was allotted but data of this section was used for descriptive analysis.

Section -B

This section deals with the hemoglobinometer scale. The hemoglobin was measured using the Sahli's hemoglobinometer scale. The materials used for the assessment of hemoglobin includes the Sahli's a hemoglobinometer, Sahli's pipette (graduated to 20cumm), small glass rod, dropping pipette, 0.1 M (N/10) hydrochloric acid (HCl), Sahli's pipette is used to aspirate blood up to 0.02 ml, small glass rod is used to stir it, dropping pipette is used to add the sterile water drop by drop.

Table- 3.1:

Score interpretation of level of anaemia (According to WHO)

| Level of Hemoglobin | Level of Anaemia |
|----------------------------|--------------------------|
| >10.9 gm/dl | No anaemia |
| 9.5-10.9gm/dl | Mild anaemia |
| 8.0-9.4gm/dl | Moderate anaemia |
| 6.5-7.9gm/dl | Severe anaemia |
| <6.5 gm/dl | Life threatening anaemia |

Validity and Reliability

Content validity of the tool was established in consultation with 6 experts from different fields like Community Health Nursing, Obstetrics and Gynecology Nursing and Medicine. Minor modifications given by the experts were incorporated in the demographic variables.

Reliability is the degree of consistency or dependability with which an instrument measures an attribute (Polit, D. F., & Beck, 2008). Reliability of the tool was established by inter-rater method and it was found to be $r^1=0.9$ which indicates that the tool was reliable. Hence the tool was considered for proceeding.

Pilot Study

- The pilot study was conducted from 07.06.2010 to 12.06.2010 in the Government High school, Poolavari after obtaining permission from the headmaster of the school. It was conducted after the tool presentation and approval by the college of nursing faculty and dissertation committee. Validity and reliability of the instrument were tested during this time. 5 adolescent girls were selected for pilot study through non probability convenience sampling technique. The tools were administered and checked for its feasibility, language and appropriateness. The samples chosen were similar in characteristics to those of the population under study. The tool was found feasible and practicable. It also helped to select suitable statistical method. Due to short duration of intervention, there was no change in the hemoglobin level.

Method of Data Collection

Ethical considerations

Prior to collection of data formal permission was obtained from the A.E.E.O., Maasinaayakanpatty and the Headmaster of the Government High School, Varagampadi, Salem.

Informed consent was obtained from all 50 samples' parents.

Period of data collection

The data collection period was 4 weeks from 05.07.2010 to 31.07.2010.

Data collection procedure

The investigator screened 92 adolescent girls of 13-15 years of age for their hemoglobin levels and found 75 of them were with a hemoglobin level of 7-11g/dl. From this, 50 samples were selected through non probability convenience sampling technique. Pre-test was done on 05-07-2010. Data on demographic variables were collected from all 50 samples. The investigator went to the school every day morning and provided a 100 grams ball of sweet rice flakes at 11 am to all the samples. In case of holidays and absenteeism, the investigator visited their houses and distributed the balls of sweet rice flakes. Thus the investigator ensured that the intervention was administered for all 21 days to all the 50 samples. Then the post-test was conducted on 31-07-2010.

Plan for Data Analysis

The data will be collected, arranged and tabulated. Descriptive statistics like frequency, percentage, mean and standard deviation will be used for categorical data. Inferential statistics like paired 't' test will be used to find the effectiveness of sweet rice flakes on level of anaemia and chi-square test will be used to associate the level of anaemia in adolescent girls with their selected demographic variables.

Summary

This chapter dealt with methodology. It consists of research approach, research design, population, description of the setting, sampling, variables, description of the tool, validity and reliability, pilot study, method of data collection and plan for data analysis.

CHAPTER- IV

DATA ANALYSIS AND INTERPRETATION

Analysis is the process of the organizing and synthesizing data in such a way that question can be answered and hypothesis tested (**Polit, D. F., & Hungler, 2003**).

This chapter deals with the description of sample characteristics, analysis and interpretation of data collected from 50 Adolescent Girls in a Selected Rural School, Salem.

Data Analysis

The details of the data analyzed and the findings were presented under the following sections:

Section- A: Distribution of samples according to their selected demographic variables.

Section- B: Distribution of samples according to their pre-test level of anaemia.
Distribution of samples according to their post test level of anaemia.

Section- C: a) Comparison of samples according to their pre-test and post test level of anaemia in adolescent girls
b) Comparison of mean, standard deviation and mean difference of pre-test and post-test level of anaemia.

Section-D: Hypotheses testing

- a) Effectiveness of sweet rice flakes on level of anaemia in adolescent girls.
- b) Association of the level of anaemia in adolescent girls with their selected demographic variables.

Section- A

Distribution of Samples According to their Selected Demographic Variables

Table- 4.1:

Frequency and percentage distribution of samples according to their selected demographic variables

n = 50

| Sl.No. | Demographic Variables | | f | % |
|--------|----------------------------------|------------------------|----|----|
| 1. | Age | 13years | 20 | 40 |
| | | 14 years | 17 | 34 |
| | | 15 years | 13 | 26 |
| 2. | Present education status | 8 th std | 25 | 50 |
| | | 9 th std | 16 | 32 |
| | | 10 th std | 9 | 18 |
| 3. | Birth order | 1 | 15 | 30 |
| | | 2 | 13 | 26 |
| | | 3 | 12 | 24 |
| | | Above 3 | 10 | 20 |
| 4. | Type of family | Nuclear family | 27 | 54 |
| | | Joint family | 17 | 34 |
| | | Extended family | 4 | 8 |
| | | Broken family | 2 | 4 |
| 5. | Religion | Hindu | 48 | 96 |
| | | Christian | 1 | 2 |
| | | Muslim | 1 | 2 |
| | | Others | - | - |
| 6. | Dietary pattern | Vegetarian | 8 | 16 |
| | | Non-vegetarian | 38 | 76 |
| | | Ovo-vegetarian | 4 | 8 |
| 7. | Frequency of food intake per day | Two times | - | - |
| | | Three times | 45 | 90 |
| | | More than 3 times | 5 | 10 |
| 8 | Monthly income of family | Less than Rs.3000 | 7 | 14 |
| | | Rs. 3001-5000 | 19 | 38 |
| | | Rs.5001-10000 | 18 | 36 |
| | | Above Rs.10000 | 6 | 12 |
| 9. | Lunch taken from | Mid-Day Meal | 46 | 92 |
| | | Packed lunch from home | 4 | 8 |

The above table shows that, 20(40%) samples were in the age of 13 years in educational status; 25(50%) were in 8th standard and 16(32%) were in 9th standard; 15(30%) were in first birth order and 27(54%) belonged to nuclear family. Among the 50 samples, almost all of them, i.e., 48(96%) were Hindus and majority, i.e., 38(76%) of them, were non-vegetarians. Almost all, 45(90%) of them, have their food thrice daily. 19(38%) of their family's monthly income was between Rs.3001-5000 and 18(36%) of their family's monthly income was Rs. 5001-10000. Majority, 46(92%) of them take lunch through the mid day meal scheme.

Section- B

Distribution of Samples According to their Pre-test Level of Anaemia

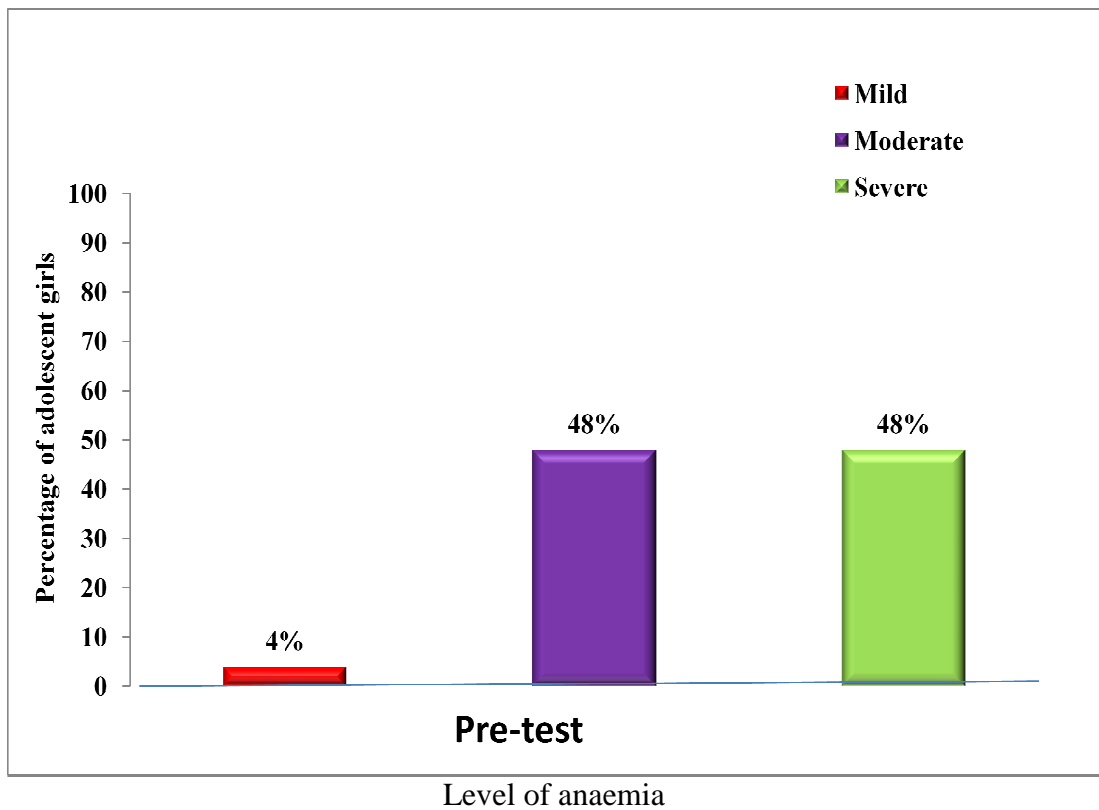


Figure 4-1: Percentage distribution of samples according to their pre-test level of anaemia

The above figure shows that, in pre-test, 2(4%) samples had mild level of anaemia, 24(48%) had moderate level of anaemia and 24(48%) had severe level of anaemia. None of them had no anaemia and life threatening level of anaemia.

Distribution of Samples According to their Post-test Level of Anaemia

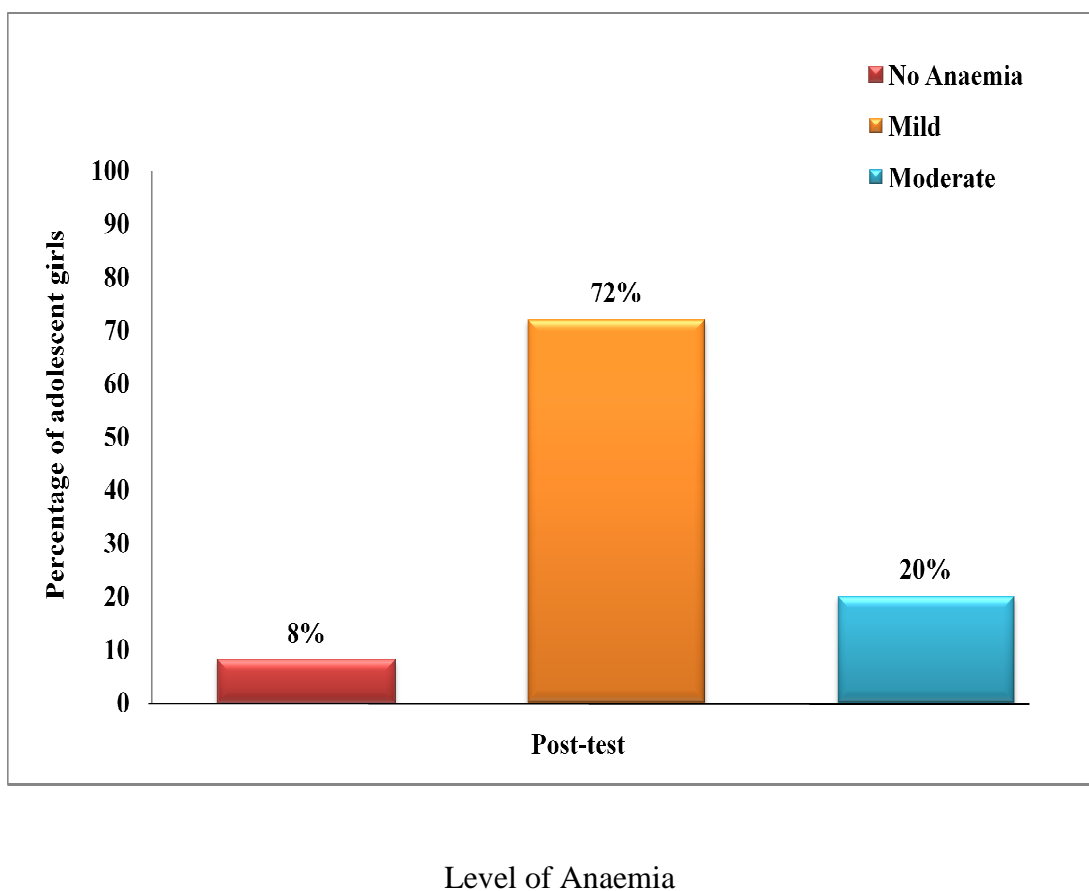


Figure- 4.2: Percentage Distribution of Samples according to their post-test level of anaemia

The above figure shows that, in post-test, 4(8%) samples had no anaemia, 36(72%) had mild level of anaemia, 10(20%) had moderate level of anaemia and none of them were in severe and life threatening level of anaemia.

Section-C

Comparison of Pre-test and Post-test Level of Anaemia in Adolescent Girls

Table- 4.2:

Frequency and percentage distribution of pre-test and post test level of anaemia

n=50

| Sl. No. | Level of Anaemia | Pre-test | | Post-test | |
|---------|--------------------------|----------|----|-----------|----|
| | | f | % | f | % |
| 1. | No anaemia | - | - | 4 | 8 |
| 2. | Mild anaemia | 2 | 4 | 36 | 72 |
| 3. | Moderate anaemia | 24 | 48 | 10 | 20 |
| 4. | Severe anaemia | 24 | 48 | - | - |
| 5. | Life threatening anaemia | - | - | - | - |

The above table shows that, in pre-test, 2(4%) samples had mild level of anaemia, 24(48%) had moderate level of anaemia and 24(48%) had severe level of anaemia. None of them had no anaemia and life threatening level of anaemia.

In post-test, 4(8%) samples had no anaemia, 36(72%) had mild level of anaemia, 10(20%) had moderate level of anaemia and none were in severe and life threatening level of anaemia.

**Comparison of Mean Standard Deviation and Mean Difference of Pre-test and
Post-test Level of Anaemia**

Table - 4.3:

**Mean, standard deviation and mean difference of pre-test and post-test
level of anaemia**

n=50

| Sl. No. | Level of anaemia | Mean | S.D | Mean difference |
|----------------|-------------------------|-------------|------------|----------------------------|
| 1. | Pre-test | 8.07 | 0.76 | 1.88 |
| 2. | Post-test | 9.95 | 0.78 | |

The above table shows that, the pre-test mean score on level of anaemia was 8.07 ± 0.76 and it was 9.95 ± 0.78 in post-test. The mean difference was 1.88. Thus it became evident that there was a difference in the pre-test and post-test level of anaemia.

Section-D

Hypotheses Testing

Effectiveness of Sweet Rice Flakes on Level of Anaemia in Adolescent Girls

Table- 4.4:

Mean, standard deviation and 't' value of pre-test and post-test level of anaemia

n=50

| Sl. No. | Level of anaemia | Mean | SD | 't' value |
|---------|------------------|------|------|-----------|
| 1. | Pre-test | 8.07 | 0.76 | 25.613* |
| 2. | Post-test | 9.95 | 0.78 | |

* significant ($p < 0.05$)

The above table shows that, the pre-test mean score on level of anaemia was 8.07 ± 0.76 and it was 9.95 ± 0.78 in post-test. The 't' value was 25.613. Thus it became evident that there was an effectiveness of sweet rice flakes on level of anaemia in adolescent girls at $p < 0.05$ level. Hence the formulated research hypothesis H_1 was retained.

Association of the Level of Anaemia in Adolescent Girls with their Selected Demographic Variables

Table- 4.5:

Chi-square test on the level of anaemia with their selected demographic variables

n = 50

| Sl. No. | Demographic Variables | | Level of anaemia | | | | | | df | χ^2 |
|---------|----------------------------------|------------------------|------------------|---|----------|----|--------|----|----|----------|
| | | | Mild | | Moderate | | Severe | | | |
| | | | f | % | f | % | f | % | | |
| 1. | Age | 13 yrs | 1 | 2 | 8 | 16 | 11 | 22 | 4 | 3.468 |
| | | 14 yrs | 1 | 2 | 7 | 14 | 9 | 18 | | |
| | | 15 yrs | - | - | 9 | 18 | 4 | 8 | | |
| 2. | Present education status | 8 th std | 1 | 2 | 10 | 20 | 13 | 26 | 4 | 4.115 |
| | | 9 th std | 1 | 2 | 7 | 14 | 8 | 16 | | |
| | | 10 th std | - | - | 7 | 14 | 3 | 6 | | |
| 3. | Birth Order | 1 | 1 | 2 | 4 | 8 | 7 | 14 | 6 | 4.188 |
| | | 2 | - | - | 9 | 18 | 5 | 10 | | |
| | | 3 | 1 | 2 | 6 | 12 | 8 | 16 | | |
| | | Above 3 | - | - | 5 | 10 | 4 | 8 | | |
| 4. | Type of Family | Nuclear family | - | - | 14 | 28 | 13 | 26 | 6 | 15.051 |
| | | Joint family | 1 | 2 | 6 | 12 | 10 | 20 | | |
| | | Extended family | - | - | 3 | 6 | 1 | 2 | | |
| | | Broken family | 1 | 2 | 1 | 2 | - | - | | |
| 5. | Religion | Hindu | 1 | 2 | 23 | 46 | 24 | 48 | 4 | 25.564* |
| | | Christian | - | - | 1 | 2 | - | - | | |
| | | Muslim | 1 | 2 | - | - | - | - | | |
| | | Others | - | - | - | - | - | - | | |
| 6. | Dietary pattern | Vegetarian | 1 | 2 | 4 | 8 | 2 | 4 | 4 | 8.274 |
| | | Non-vegetarian | - | - | 19 | 38 | 19 | 38 | | |
| | | Ovo-vegetarian | 1 | 2 | 1 | 2 | 3 | 6 | | |
| 7. | Frequency of food intake per day | Two times | - | - | - | - | 1 | 2 | 4 | 1.534 |
| | | Three times | 2 | 4 | 21 | 42 | 21 | 42 | | |
| | | More than 3 times | - | - | 3 | 6 | 2 | 4 | | |
| 8. | Monthly income of family | Less than ₹ 3000 | - | - | 4 | 8 | 3 | 6 | 6 | 15.713 |
| | | ₹ 3001-5000 | - | - | 10 | 20 | 9 | 18 | | |
| | | ₹ 5001-10000 | - | - | 8 | 16 | 10 | 20 | | |
| | | Above ₹ 10000 | 2 | 4 | 2 | 4 | 2 | 4 | | |
| 9. | Lunch taken from | Mid-Day Meal | 2 | 4 | 23 | 46 | 21 | 42 | 2 | 1.313 |
| | | Packed lunch from home | - | - | 1 | 2 | 3 | 6 | | |

* significant (p<0.05)

The above table shows that, there was a significant association between the level of anaemia and their selected demographic variable, religion. Hence the formulated research hypothesis H₂ was retained only to this variable.

Summary

This chapter dealt with data analysis and interpretation in the form of statistical values based on the objectives. Here the frequency and percentage were used to distribute the adolescent girls according to their demographic variables and level of anaemia. The paired 't' test was used to evaluate the effectiveness of sweet rice flakes on level of anaemia. The chi-square test was used to associate the level of anaemia with their selected demographic variables.

CHAPTER – V

DISCUSSION

This pre experimental study was done to evaluate the effectiveness of sweet rice flakes on level of anaemia in adolescent girls at a selected rural school, Salem.

Description of the Demographic Variables

- The demographic profile reveals that, 20(40%) samples were in the age of 13 years and 17(34%) samples were in the age of 14 years.
- In educational status, 25(50%) were in 8th standard and 16(32%) were in 9th standard.
- 15(30%) of them were in first birth order and 13(26%) of them were in second birth order. **Ms. Ovammal, (2002)**, conducted a study to evaluate the effectiveness of structured teaching program on prevention of nutritional disorders among school children at Vivekananda Vidhya Bhavan girl's higher secondary school, Elayampalayam and found that among the 60 samples, most of the children, 38.4% were in second and 6.6% were in third birth order.
- 27(54%) samples belonged to nuclear family.
- Among the samples, majority i.e., 48(96%) of them were Hindus and 38(76%) were non-vegetarians. This study was supported by **Andaal (2005)**, who conducted a study on effectiveness of spirulin administration upon stress and anaemia among late adolescent girls including 30 samples. In her study, among the 30 samples, 14 were Hindus and all 30 were non-vegetarians.
- Majority, i.e., 45(90%) of them have their food thrice daily.
- 19(38%) of their family's monthly income was Rs. 3001-5000 and 18(36%) of their family's monthly income was Rs. 5001-10000.
- Most of them, 46(92%) take lunch through the mid day meal scheme.

The First Objective of the Study was to Assess the Level of Anaemia in the Adolescent Girls

In the pre-test, among the 50 samples, 2(4%) samples had mild level of anaemia, 24(48%) had moderate level of anaemia and 24(48%) had severe level of anaemia. In post-test, 4(8%) samples had no anaemia, 36(72%) samples had mild level anaemia, 10(20%) samples had moderate level anaemia and none had severe level of anaemia.

Simone, et.al, (2003), conducted a study among adolescent girls in rural areas of Bihar and found that 48% of the adolescent girls were having moderate anaemia and 35% were having mild anaemia. He found that adolescent girls with moderate anaemia were suffering more from worm infestation than adolescent girls with mild anaemia.

The Second Objective of the Study was to Evaluate the Effectiveness of Sweet Rice Flakes on the Level of Anaemia in the Adolescent Girls

The pre-test mean score on level of anaemia was 8.07 ± 0.76 and it was found to be to 9.95 ± 0.78 in post-test. The mean difference was 1.88. It was found that there was a difference in the anaemia level before and after the administration of sweet rice flakes. The 't' value was 25.613. Thus it became evident that there was an effectiveness of sweet rice flakes on level of anaemia in adolescent girls at $p < 0.05$ level.

The Third Objective of the Study was to associate the Level of Anaemia in Adolescent Girls with their Selected Demographic Variables

There was a significant association between the level of anaemia and their selected demographic variable, religion at $p < 0.05$ level.

Summary

The discussion was made in this chapter based on the objectives of the study and its relation with similar studies conducted by other investigators. All the three objectives have been obtained and the two formulated research hypotheses were retained in this study.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

In this chapter, summary, conclusion, implications to nursing practice and recommendations for further study are presented.

Summary

The purpose of this study was to evaluate the effectiveness of sweet rice flakes on anaemia in adolescent girls at a selected rural school, Salem. Pre experimental (one group pre-test post-test design) was chosen for this study. The conceptual frame work selected for the present study was based on Pender's Health Promotion Model. The tool used in this study consisted of two sections.

Section - A Structured questionnaire schedule was used to assess the demographic variables.

Section - B Sahli's hemoglobinometer scale was used to measure the hemoglobin level.

The data were analyzed using descriptive and inferential statistics. To test the hypotheses, paired 't' test and chi-square test were used.

- 20(40%) samples were in the age of 13 years and 17(34%) samples were in the age of 14 years.
- 25(50%) were in 8th standard and 16(32%) were in 9th standard.
- 15(30%) were in first birth order and 27(54%) belonged to nuclear family.
- Almost all of them, 48(96%) were Hindus.
- Majority 38(76%) of them were non-vegetarians.
- Almost all, 45(90%) of them have their food thrice daily.
- 19(38%) of their family's monthly income was between Rs. 3001-5000 and 18(36%) of their family's monthly income was Rs. 5001-10000.

- Almost all of them, 46(92%) take lunch through the mid day meal scheme.
- In pre-test, 2(4%) samples had mild level of anaemia, 24(48%) had moderate level of anaemia and 24(48%) had severe level of anaemia. In post-test, 4(8%) samples had no anaemia, highest i.e., 36(72%) samples had mild level of anaemia, 10(20%) samples had moderate level of anaemia and none had severe level of anaemia.
- The pre-test mean score on level of anaemia was 8.07 ± 0.76 and it was found to be to 9.95 ± 0.78 in post-test. The mean difference was 1.88. It was found that there was a difference in the anaemia level before and after the administration of sweet rice flakes. The 't' value was 25.613. Thus it became evident that there was an effectiveness of sweet rice flakes on level of anaemia in adolescent girls at $p < 0.05$ level. Hence the formulated research hypothesis H_1 was retained.
- There was a significant association of the level of anaemia with their selected demographic variable religion at $p < 0.05$ level. Hence the formulated research hypothesis H_2 was retained only to this variable.

Conclusion

Level of anaemia is high among adolescent girls. They require some interventions to be relieved from anaemia. There are so many modes of interventions available for the treatment of a health problem and most effective among them is the primary intervention. Among the primary intervention, the nutritional interventions are the most safe and cost effective method. So the investigator implemented the administration of sweet rice flakes to reduce the level of anaemia.

Implications

Nursing service

- ❖ Nutritional interventions can be introduced as a primary mode of intervention by the nurses.
- ❖ The school health nurses can arrange nutritional sessions, for school children especially for girls.
- ❖ Continuous nutritional programs are necessary for reducing the prevalence of malnutrition including iron deficiency anaemia.
- ❖ Regular nutritional assessment should be arranged by the school health nurse to rule out any nutritional problems in the adolescent girls.

Nursing education

- ❖ It is important to have educational program on nutritional interventions for all nursing students.
- ❖ Staff development program need to be arranged.

Nursing administration

- ❖ The nursing administrator can supervise the nutritional sessions.
- ❖ Nursing administrator can organize in-service education programs for staff nurses regarding nutritional interventions.

Nursing research

- ❖ Nursing research can be done to find out various nutritional methods to reduce the prevalence of anaemia among adolescents.
- ❖ Research can be done on various populations at various settings.

Recommendations

- ❖ A similar study can be conducted with antenatal mothers

- ❖ A similar study can be conducted with large sample size to generalize the results of the study.
- ❖ A similar study can be conducted using experimental and control groups.
- ❖ A similar study can be conducted in urban schools.
- ❖ A similar study can be conducted with different nutritional preparations.

BIBLIOGRAPHY

Books

- Antia, F. P., & Abram, P. (1992). *Clinical Dietetics and Nutrition*. (14th ed.). Calcutta: Oxford University Press.
- Basavanthappa, B. T. (2001). *Nursing Research*. (1st ed.). New Delhi: Jaypee brother publishers Ltd.
- Burns, N., & Grove. (2001). *The practice of nursing research*. (4th ed.). Philadelphia: W. B. Saunders Company.
- David, H. (1995). *Manual of nutritional therapeutics*. (3rd ed.). New York: Little brown company.
- Ghosh, S. (1998). *A Practical Guide in Nutrition and Child Care*. (2nd ed.). New Delhi: Jaypee Brothers.
- Gopalan, G., et. al. (1996). *Nutritive value of Indian foods*. (2nd ed.). Hyderabad: Indian Council of Medical Research.
- Gupta, M. C., & Mahajan, B. K. (2003). *Text book of preventive and social medicine*. (3rd ed.). New Delhi: Jaypee Brothers.
- Hans, E. (2000). *Nutrients in food*. (3rd ed.). Philadelphia: Lippincott Williams & wilkins.
- Indrani, T. K. (2005). *Nursing manual of nutrition and therapeutic diet*. New Delhi: Jaypee brothers medical publishers (P) Ltd.
- Joshi, V. (1994). *Hand book of nutirion and dietetics*. (1st ed.). Bombay: Vora medical publication.
- Kothari, C. R. (1900). *Research methodology*. (2nd ed.). New Delhi: Jaypee Brothers.

- Lawrence, S., & Neinstein, M. D. (1996). *Adolescent health care: a practical guide*. (3rd ed.). Philadelphia: Williams & Wilkins.
- McIntosh. (1996). *Text book of pediatrics*. (6th ed.). New York: Churchill Livingstone company.
- Morlow, D., & Radding, B. (1999). *Text book of pediatric nursing*. (6th ed.). Philadelphia: W. B. Saunders company.
- Park, K. (1991). *Textbook of preventive and social medicine*. (20th ed.). Jabalpur: Banarasidas Bhanot Publishers.
- Parthasarathy. (2003). *IAP Text book of pediatrics*. (2nd ed.). New Delhi: Jaypee Brothers.
- Polit, D. F., & Hungler. (2003). *Essential of Nursing*. (4th ed.). Philadelphia: Lippincott Publishers.
- Rao, S. (1996). *An introduction to Biostatistics*. (3rd ed.). Delhi: Prentice hall of India private limited.
- Sri Lakshmi, B. (1993). *Nutrition and Dietetics*. (1st ed.). Chennai: New Age International (P) Ltd.
- Swaminathan, M. (1993). *Hand book of food and nutrition*. (5th ed.). Bangalore: Jaypee Brothers.
- Vijay, E. (2002). *Community medicine*. (2nd ed.). Chennai: Bea Conzen.
- Wong, D. A. (2002). *Essentials of pediatric nursing*. (6th ed.). New York: Mosby westline.

Journals

- Agarwal. (2002). Iron deficiency anaemia. *American Journal of Clinical Nutrition*. 72(12), 212-240.
- Bansu, R., et. al. (1973). Clinical Nutrition. *American Medical Journal*. 26(3), 591.

- Choudhary, A., et. al. (2006). Prevalence of anaemia among adolescent girls in the urban slums of Vellore. *Tropical doctor*. 36(3), 167-169.
- Deep, S. (1999). A Look at Anaemia related to Nutritional Issues. *Acute care medicine*. 7(2), 10-15.
- Derman, O., et. al. (2005). Iron deficiency anaemia in a group of adolescents. *International Journal of adolescent health*. 17(2), 96-97.
- Devadas, R. P. (2002). Nutrition and growth of Indian girls. *European Journal of clinical nutrition*. 56(11), 1119-1125.
- Gupta, S., et. al. (2001). Iron deficiency anaemia: management and prevention in children. *JK Science*. 3, 160-165.
- Gupta, S., et. al. (2000). Iron deficiency Anaemia: A Diagnostic Approach in Children. *JK Science*. 2(4), 175-179..
- Hereberg, S., & Favier, I. (2005). Iron deficiency in France: prevalence and prevention. *Bulletin academy of medicine*. 189(8), 1623-1630.
- Kapil, U. (2003). Prevention and control of iron deficiency anaemia amongst young children. *Indian Pediatrics*. 40(5), 293-295.
- Patterson, A. J., et. al. (2001). Dietary & supplement of iron deficiency results in improvement in general health and fatigue in Australian women of childbearing age. *JAM Coll Nutr*. 20(4), 337-342.
- Pawashe, A. B., & Chen, W. W. (2005). Perceived problem solving: stress among college students. *American journal of health behavior*. 29(4), 360-370.
- Rigaud, D. (2000). Iron Deficiency due to Inadequate Dietary Intake. *American Journal of Clinical Nutrition*. 66(2). 147-156.
- Sachdev, H. P., & Geva, T. (2002). Effect of iron supplementation on incidence infectious illness in children. *Journal of pediatrics*. 142(5), 588.

Smetselaar, L., et. al. (2004). Adolescent eating diets rich in either lean beef or lean poultry & fish reduced fat & saturated fat intake & those eating beef maintained serum ferritin status. *JAM*. 104(3), 424-428.

Unpublished Thesis

Bhuvaneswari. (2010). A study to evaluate the effectiveness of ragi porridge in management of anaemia among antenatal women at selected maternity center, Salem.

Chaudhary, M. W. (2001). Clinico- hematological study of nutritional anaemia in young children. Delhi University.

Santhosh, M. (1993), Nursing intervention strategies for prevention of anaemia in adolescent girls. Chennai.

Net References

Introduction to pregnancy_pregnancy.mht

<http://dictionary.infoplease.com>

<http://mofpi.nic.in/ED11-AHMD/Ceral-pulse>

http://pregnancy.blogspot.com.2006/04/nachni_ragi_fingermillet.html

<http://www.indianpediatrics.net.htm>.

<http://www.internethealthlibrary.com/Health-problems/anaemia-research-ayurvedic.htm>

<http://www.tarladalal.com/hrcalcium.asp>

www.ajcn.org.

www.healthline.com

www.highriskpregnancy.com

www.ragiporridge.htm

APPENDIX- A

Letter Seeking Permission to Conduct a Research Study

03.07.2010

To

The A.E.E.O.,
Maasinaayakanpatty,
Ayyothiapattanam,
Salem.

Respected Sir,

Sub: Permission to conduct Research study - reg.

This is to introduce **Mr. Anto Jobi. T.**, a final year M.Sc., (Nursing) student of our College. He is conducting a research study to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the University requirement for the award of M.Sc. (Nursing) degree.

Topic: “A Study to Evaluate the Effectiveness of Sweet Rice Flakes on Anemia in Adolescent Girls at a Selected Rural School, Salem.”

I kindly request you to permit him to conduct the Research Study in your esteemed institution from 05.07.2010 to 31.07.2010. He will adhere to the institutional policies and regulations.

Thanking you.

Yours sincerely,

Place: Salem

(Prof. A. Jayasudha)

APPENDIX- B

Tool for Data Collection

Section- A: Structured Questionnaire Schedule to assess the Demographic Variables

Instructions

Read the questions listed below carefully and place a tick mark (✓) against the appropriate response

Date :.....

Sample No.:.....

1. Age

- a) 13 years
- b) 14 years
- c) 15 years

2. Present Education Status

- a) 8th std
- b) 9th std
- c) 10th std

3. Birth order

- a) 1
- b) 2
- c) 3
- d) Above 3

4. Type of Family

- a) Nuclear family
- b) Joint family
- c) Extended family
- d) Broken family

5. Religion

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

6. Dietary pattern

- a) Vegetarian
- b) Non- Vegetarian
- c) Ovo – Vegetarian

7. Frequency of food intake per day

- a) Two times
- b) Three times
- c) More than 3 times

8. Monthly income of the family

- a) Less than Rs. 3000
- b) Rs. 3001- 5000
- c) Rs. 5001- 10,000
- d) More than Rs.10,000

9. Lunch taken from

- a) Mid day meal
- b) Packed lunch from home

Section- B : Sahli's Hemoglobinometer Scale

Date :

Sample No.:

Hemoglobin level : gm/dl.

Score interpretation of level of anaemia (According to WHO)

| Level of Hemoglobin | Level of Anaemia |
|----------------------------|--------------------------|
| >10.9 gm/dl | No anaemia |
| 9.5-10.9gm/dl | Mild anaemia |
| 8.0-9.4gm/dl | Moderate anaemia |
| 6.5-7.9gm/dl | Severe anaemia |
| <6.5 gm/dl | Life threatening anaemia |

பகுதி- I

கவனிக்க வேண்டியவைகள் (குறிப்புகள்)

1. கீழே கொடுக்கப்பட்டுள்ள கேள்விகளை கவனமாக படித்து அதன் அருகில் உள்ள கட்டங்களில் சரி (✓) என்ற குறி இடுக.
2. எல்லா கேள்விகளுக்கும் விடையளிக்க வேண்டும்.
3. ஒரு கேள்விக்கு ஒரு சரியான பதிலை மட்டும் தருக.

தேதி :

பங்கேற்பவர் எண் :

1. வயது
அ. 13 வயது
ஆ. 14 வயது
இ. 15 வயது
2. கல்வி பயிலும் நிலை
அ. 8-ம் வகுப்பு
ஆ. 9-ம் வகுப்பு
இ. 10-ம் வகுப்பு
3. பிறப்பு வரிசை
அ. முதல் குழந்தை
ஆ. இரண்டாவது குழந்தை
இ. மூன்றாவது குழந்தை
ஈ. மூன்றிற்கு மேல்
4. குடும்ப அமைப்பு
அ. சிறு குடும்பம்
ஆ. கூட்டுக் குடும்பம்
இ. பெரிய குடும்பம்
ஈ. பிரிந்த குடும்பம்
5. மதம்
அ. இந்து
ஆ. கிறிஸ்தவம்
இ. இஸ்லாம்
ஈ. மற்றவை

6. எந்த வகை உணவு உட்கொள்வீர்கள்
- அ. சைவம்
- ஆ. அசைவம்
- இ. முட்டை சைவம்
7. தினமும் எத்தனை முறை உணவு உட்கொள்வீர்கள்
- அ. ஒரு முறை
- ஆ. இரண்டு முறை
- இ. மூன்று முறை
- ஈ. 3 முறைக்கு மேல்
8. குடும்பத்தின் மாத வருமானம்
- அ. 3000 ரூபாய் குறைவாக
- ஆ. 3000–5000 ரூபாய்
- இ. 5001–10000 ரூபாய்
- ஈ. 10000 ரூபாய்க்கு மேல்
9. மதிய உணவு எடுக்கும் இடம்
- அ. மதிய உணவு திட்டம்
- ஆ. வீட்டில் இருந்து

Procedure for Sahli's Method of Estimation of Hemoglobin Level

Definition

It is a method of hemoglobin estimation in which the hemoglobin is converted to acid hematin and then visually matching its colour against a solid glass standard.

Preparation of the patient

Explain the procedure and tell the subjects how they can co-operate in the procedure.

Equipment needed

- ◆ Sahli's hemoglobinometer (solid glass standard and a calibrated graduated cylinder)
- ◆ Sahli's blood pipette (calibrated to 0.02 ml)
- ◆ Small glass rod for stirring
- ◆ Dropper for adding the distilled water
- ◆ Dilute 0.1 M hydrochloric acid (N/10)
- ◆ Spirit
- ◆ Cotton balls
- ◆ Lancet
- ◆ K- basin

Procedure

- ♣ Wash hands thoroughly with soap and water.
- ♣ Fill the Sahli's graduated cylinder to the 2 g mark with dilute 0.1 M hydrochloric acid (N/10-approximately 0.15 ml).
- ♣ Clean the fingertip of the subject with spirit cotton. Allow spirit to dry.
- ♣ Obtain a drop of blood by puncturing the fingertip with a sterile lancet.
- ♣ Wipe away the first drop of blood.

- ♣ Draw the blood to the 0.02 ml mark using the Sahli's blood pipette.
- ♣ Wipe any residual blood from the exterior of the pipette.
- ♣ Recheck that the blood still reaches the 0.02 ml mark.
- ♣ Add the blood to the dilute 0.1M hydrochloric acid (N/10) in the graduated cylinder.
- ♣ Mix the blood and acid thoroughly by flushing the pipette several times.
- ♣ Allow the acid-blood mixture to stand for five minutes.
- ♣ Place the tube into the tube holder of the coloured scale.
- ♣ Hold the scale up to the light.
- ♣ If the colour of the solution is the same or lighter than that of the coloured standard, read the hemoglobin level.
- ♣ If the colour of the solution is darker than the coloured standard, continue to add distilled water drop by drop.
- ♣ Stir the solution with the glass rod after each drop is added, and compare the solution to the coloured glass standard.
- ♣ Keep adding the distilled water until the colour of the solution matches the colour of the glass standard.
- ♣ Hold the scale up to the light when assessing the colour match.
- ♣ Once the colours match, hold the instrument at eye level and record the value of percent hemoglobin indicated on the side of the tube by the level of fluid.

After care

- Wash and replace the articles.
- Dispose off the lancets in a puncture-proof container.
- Wash hands.
- Record the hemoglobin level.

Preparation of Sweet Rice Flakes

Definition

It refers to the preparation of a nutritional ball by mixing rice flakes and jaggery with hot water.

Ingredients

| | | |
|-------------|---|------------|
| Rice flakes | : | 2.5 kg |
| Jaggery | : | 2.5 kg |
| Hot water | : | 1.25 litre |

Equipments needed

| | | |
|---------------------------|---|---|
| ➤ Stainless steel vessels | : | 2 |
| ➤ Tea filter | : | 1 |
| ➤ Hotbox | : | 1 |
| ➤ Measuring jar | : | 1 |
| ➤ Food Measuring scale | : | 1 |
| ➤ Stove | : | 1 |
| ➤ Lighter | : | 1 |
| ➤ Spoon | : | 1 |

Method of Preparation

- ◆ Boil 1.25 litres of water.
- ◆ Crush 2.5 kgs of jaggery and mix it into the boiled water and stir it for 5 minutes to make the jaggery syrup.
- ◆ Filter the jaggery syrup to remove the dust particles.
- ◆ Add the 2.5 kgs rice flakes to the jaggery syrup and make it into 50 balls.

Each ball contains

✦ Rice flakes : 50 gms

✦ Jaggery : 50 gms

Nutritive value of 100 gms of sweet rice flakes ball contains:

Energy : 364.5 KCal

Carbohydrate : 86.25 gms

Protein : 3.5 gms

Fat : 0.62 gms

Iron : 9.7 mg

Calcium : 0.05 gms

Carotene : 84 μ gm

Thiamine : 0.23 mg

Niacin : 4.5 mg

Riboflavin : 0.19 mg

APPENDIX- C

Letter Requesting Opinion and Suggestions of Experts for Content Validity of the Research Tools

From

Mr. Anto Jobi .T.,
Final Year M.Sc., (N)
Sri Gokulam College of Nursing,
Salem, Tamil Nadu.

To

Respected Sir/ Madam,

Sub: Requesting opinion and suggestions of experts for establishing content validity of the tools.

I, **Mr. Anto Jobi .T.**, a Final Year M.Sc., (Nursing) student of Sri Gokulam College of Nursing, Salem, in partial fulfillment of Master's Degree in Nursing, have selected the topic mentioned below for the research project to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai.

Topic: "A Study to Evaluate the Effectiveness of Sweet Rice Flakes on Anemia in Adolescent Girls at a Selected Rural School, Salem."

I kindly request you to validate the tool and content and give your expert opinion for necessary modification. I will be grateful to you for this.

Thanking you.

Place : Salem

Yours' sincerely,

Date :

(Anto Jobi.T)

Enclosed:

1. Tool for collection of data
2. Content of Intervention (Preparation of Sweet Rice Flakes and procedure for Sahli's method of estimation of Hemoglobin level).
3. Certificate of validation

APPENDIX- D

Certificate of Validation

This is to certify that the tool developed by **Mr. Anto Jobi .T.**, Final Year M.Sc. (N) Student, Sri Gokulam College of Nursing, Salem, (Affiliated to The Dr. M.G.R. Medical University) is validated and can proceed with this tool and conduct the main study for dissertation entitled “**A Study to Evaluate the Effectiveness of Sweet Rice Flakes on Anemia in Adolescent Girls at a Selected Rural School, Salem**”.

Date:

Signature:

Name and designation:

APPENDIX- E

List of Experts for Content Validity

- 1. Dr. K. Selvakumari, M.D.,**
Consultant Physician,
Sri Gokulam Hospital,
Salem.
- 2. Mr. K. Kannan, M.Sc., (F&N)**
Consultant Dietitian
Sri Gokulam Hospital,
Salem.
- 3. Mr. M. Kandasamy, M.Sc.(N), Ph.D.,**
Associate Professor
Sri Gokulam College of Nursing,
Salem.
- 4. Mrs. A. Amutha, M.Sc.(N),**
Associate Professor,
Sri Gokulam College of Nursing,
Salem.
- 5. Mrs. M. Sumathy, M.Sc.(N),**
Associate Professor,
Community health nursing,
Vinayaka Mission Annapoorna College of Nursing,
Salem.
- 6. Mrs. T. Suja, M.Sc.(N),**
Lecturer,
Community Health Nursing,
Sree Mookambika College of Nursing,
Kulsekharan

APPENDIX- F

Certificate of Editing

CERTIFICATE

Certified that the dissertation paper titled **‘Effectiveness of Sweet Rice Flakes on Anemia in Adolescent Girls at a selected Rural School, Salem’** by **Mr. Anto Jobi, T**, has been checked for accuracy and correctness of English language usage. The language used in presenting the paper is lucid, unambiguous, free of grammatical / spelling errors and apt for the purpose.

Signature:

Date:

Name and designation:

APPENDIX - G

