EFFECTIVENESS OF ADMINISTRATION OF QUAIL'S EGG ON ANTHROPOMETRIC MEASURES AMONG UNDERWEIGHT PRESCHOOL CHILDREN IN SELECTED VILLAGES, SALEM.

By

Ms. JAYALAKSHMI . C

Reg. No: 30099432

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 bonafied work of **Ms. JAYALAKSHMI. C,** Final Year M.Sc (Nursing) Student of Sri Gokulam College of Nursing, Salem, Submitted in Partial fulfillment of the requirement for the Degree of Master of Science in Nursing to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, under the Registration No. **30099432.**

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 ADMINISTRATION OF QUAIL'S EGG ON ANTHROPOMETRIC MEASURES AMONG UNDERWEIGHT PRESCHOOL CHILDREN IN SELECTED VILLAGES, SALEM.

Approved by the Dissertation Committee on : 21.12.2010

Signature of the Clinical Speciality Guide …..……...……

Mrs. J. KAMINI CHARLES , M.Sc (N).,

Associate Professor,
HOD of Community Health Nursing
Sri Gokulam College of Nursing,
Salem – 636 010.

Signature of the Medical Expert **…….**

Dr. K. SELVAKUMARI, 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

I am immensely pleased to god almighty for his grace, mercy wisdom and blessing throughout this endeavour without which, if would not have been possible.

I express my gratitude for the continuous support of those who have contributed to the successful completion of this study. Although it is not possible to name individually everyone associated with this task, it's my bounden duty to name a few.

As a prelude I offer my 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.

It is my proud privilege to express my profound sense of gratitude and heartful thanks to the great personality, **Prof. A. Jayasudha, M.Sc (N)., Ph.D.,** Principal, Sri Gokulam College of Nursing, for her excellent guidance, valuable suggestion and moral support at every stage of the study.

I express my sincere gratitude to **Dr. K. Tamilarasi, M.Sc (N)., Ph.D.,** Vice Principal, Sri Gokulam College of Nursing, for her able guidance and scholastic suggestions towards this study.

I extend my heartful gratitude and sincere thanks to my Clinical Speciality Guide **Mrs. J. Kamini Charles, M.SC (N).,** Associate Professor, HOD, Community Health Nursing Dept, Sri Gokulam College of Nursing, for laying the strong foundation of research, enhanced my spirit and enthusiasm to go ahead and to accomplish the study successfully.

It is my pleasure to indebt my sincere greatfulness and genuine thanks to **Mr. M. Kandasamy, M.sc (N)., Ph.D.,** Former HOD, Community Health Nursing Dept, for his professional guidance and support , throughout this study.

I extend my sincere gratitude to class coordinator **Mrs. P. Lalitha, M.Sc (N),** Professor, HOD in Mental Health Nursing, for her constant support and valuable guidance towards this study.

My sincere thanks to **Mrs. S. Rajeswari, M.Sc (N).,** Assistant Professor, Community health nursing Dept, Sri Gokulam College of Nursing for her kind support, guidance and encouragement during the course of the study.

I extend my genuine thanks to **Mrs. G. Jayanthi, M.Sc (N).,** Lecturer, and **Ms.D.Akila, M.Sc (N).,** Lecturer., Community Health Nursing Dept, Sri Gokulam college of Nursing for their guidance and suggestion which helped me to bring this study an successful one.

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 extend my sincere gratitude to **Mr.S.Sivakumar, M.Sc, M.Phil., Ph.D.,** Biostatistician for his guidance and help in transferring the raw data of this study in to valuable findings.

My special thanks to all the Subject experts who have contributed with their valuable suggestion in validating my tool.

I am thankful to the **Librarians** of Sri Gokulam College of Nursing, for extending Library facilities throughout the study.

I extend my sincere gratitude to **Medical Officers** of Minnampalli and Karipatty villages for their whole hearted Co-operation during the time of data collection.

It's a great pleasure for me to thank **Mr.A.Natrajan, MBA.,** who has helped me a lot in sculpturing this study.

I wish to convey my sincere thanks to the samples of Minnampalli and Karipatty villages who participated in this study, for their kind Co-operation which helped me to bring this study successful one.

I extend my appreciation to **Krishna Computer center** for helping me in shipping this manuscript.

I thank my loveable parents and beloved brothers for their love, concern and encouragement.

There are several hands behind in giving a shape to this thesis, which would be impossible to mention all by name. These are some whom the investigator would particularly like to thank.

ABSTRACT

A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures among underweight preschool children in selected villages, Salem.

The study was conducted in Karipatty and Minnampalli villages. (experimental and control group respectively). Quasi experimental research design was used for this study. Permission was obtained from the Medical officer of both the villages and data collection was done over a period of 4 weeks. The investigator had selected 60 underweight preschool children, 30 from each village through convenience sampling technique. Oral consent was obtained and then the subjects from the experimental group were provided with 50gms of boiled Quail's egg per day for the period of 30 days. This intervention was not given to control group and post test was done after 30 days for both the groups. Descriptive and inferential statistics were used to analyze the findings of the study.

There was a highly significant difference between pre-test and post-test scores after intervention mean pre-test and post-test score of weight was 12.89 and 13.95, height was 94.98 and 95.41 and mid arm circumference was 14.13 and 14.20 respectively.

There was a significant association between Body Mass Index for age and their selected demographic variables like age and birth order and mid arm circumference and their selected demographic variables like type of family and occupation of father.

The findings of the study showed that supplementation of Quail's egg produced a significant increase in anthropometric measures of underweight preschool children. This study would help the Community health nurse to motivate the consumption of Quail's egg and helps to maintain good nutritional status of preschool children.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

CHAPTER I

INTRODUCTION

Malnutrition is common among Indian population but it's of great consequence in young children. Department of food and dietetics stated that, it is imperative to maintain good nutritional status of preschool children since today's children are the citizens of tomorrow.

The reduction of malnutrition is one of the biggest challenges that India faces in the 21st century. **(Gragnolati, 2005)**

Evidence also suggest that child malnutrition is not only associated with high child morbidity and mortality, but also reduces long term physical development, cognitive skills and likelihood of developing chronic diseases. **(Tarozzi and Mahajan, 2007)**

Ecological factors related to malnutrition are as follows conditioning influences, cultural influences, socio-economic factors, food productions and health and other services

According to Mr.Swaminathan Research Foundation, India is one of the fastest growing countries in terms of population and economics the combination of people living in poverty and recent economic growth of India has led to the co-emergence of 2 types of malnutrition, undernutrition and overnutrition rising the incidence of chronic diseases like heart disease, cancer, type II diabetes and infectious disease like pneumonia and tuberculosis.

According to global hunger index malnourished people in India was 217.05 million. Nearly 47% children are underweight in India. The prevalence of underweight children in India is among the highest in the world. **(FAO, 2001)**

Anthropometric survey of 750 preschool children was conducted in Belize to assess nutritional status and the analysis included the recognition of low arm circumference, weight for age, status for age and weight for stature. Survey results indicate that about 25% of children show evidence of stunting while 2.5% show evidence of wasting.

Children in their second year of life are more likely to be underweight. **(Emily Bloss, Fidelis Wainaina Robert C. Bailey, 2008)**

Being underweight had an inverse relationship with socio-economic position and many other factors like region, religion and caste also affects the nutritional status of Indians.

The aetiology of mortality in underfive child population is a study of the interplay of 3 killer forces namely infection, malnutrition and uncontrolled reproduction out of this infection predisposes to malnutrition and malnutrition aggravates infections. **(GM. Dhaar, J. Robbani, 2008)**

Risk for mortality rate is increased substantially with increase in malnutrition.

Need for the Study

Present study was conducted in a Government General Hospital in South Kolkata to ascertain level of undernutrition and growth pattern among urban infants with low birth weight. Overall prevalence of under weight, stunting and wasting was 36.1%, 22.7% and 3.1% respectively.

WHO stated epidemiological evidence points to a small set of primary causes related to child mortality which includes pneumonia, diarrhoea, low birth weight, asphyxia, HIV and malnutrition that includes all the main killers of children aged less than 5 years. Malnutrition is underlying cause of one out of every two such deaths.

National family health survey found that almost half of the children under three years of age are affected with malnutrition. **(Dept. of Food and Dietetics, 2008)**

One in twelve people worldwide is malnourished including 160 million children under the age of 5 years. **(U.N. Food and Agriculture, 2000)**

Today child malnutrition is prevalent in 7% of children under the age of 5 in China, 28% in sub-saharan Africa compared to prevalence of 43% in India. Undernutrition is found mostly in rural areas and 27-28% of them are underweight children. **(World Food Programme, 2009)**

Epidemiologic evidence of effect of malnutrition demonstrates that mortality increase exponentially with declining weight for age**. (DL Pelletier, E.A. Frongillo, J.R and JP Habicht, 2008)**

Malnutrition can be controlled by regular growth monitoring of children, appropriate modifications in their dietary intake and nutrition supplementation as and when necessary.

Various remedial measures are used in treatment of underweight among that Quail's egg is considered as valuable in the underweight home remedy treatments. Muskmelon, Figs and raisins are also used in increasing weight in case of thinness.

Among that Quail's egg has increase nutritive value and even children who are allergic to hen's egg can tolerate Quail's egg. **(A.S. Kemp, 2007)**

Quail's egg has energy-158 kcal, calcium-59mg, Phosphorus - 220mg, Iron - 3.7mg, Thiamine - 0.12mg, Riboflavin - 0.86mg and Niacin - 0.12mg. Due to the amazing content, Quail's eggs are considered to be the best in treatment of underweight. **(UN, 2008)**

Quail's egg helps to fight against many diseases since it is used in the production of some anti-allergic drugs. Regular consumption of Quail's egg helps to prevent many diseases and overall improvement of health status.

Quail's egg has increase nutritive value 3-4 times greater than chicken's eggs, 13% protein compared to 11% in chicken, and Quail's egg is five times rich in iron and potassium than chicken's egg.

Regular consumption of Quail's egg helps to fight against many diseases, natural combatant against many diseases and increase level of Haemoglobin. It is also resistant to infection, eating 3-5 Quail's eggs each morning promotes a strong immune system and improves metabolism. **(MC Master University, 2000)**

As per the above prevalence the investigator felt the need to assess the anthropometric measures to rule out underweight preschool children. Hence, an experimental study was adopted to elicit the effectiveness of Quail's egg on anthropometric measures of underweight preschool children.

Statement of the Problem

A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures among underweight preschool children in selected villages, Salem.

Objectives

1. To assess the anthropometric measures among preschool children in experimental and control group.
2. To evaluate the effectiveness of administration of Quail's egg on anthropometric measures among underweight preschool children in experimental and control group.
3. To associate the anthropometric measures among preschool children with their selected demographic variables both in experimental and control group.

Operational Definitions

1. Effectiveness :

It refers to the level of improvement in anthropometric measures of preschool children after the oral intake of 50 gms of boiled Quail's egg per day for the period of 21 days.

2. Anthropometric measures:

It refers to the procedure of growth monitoring by measuring the height in centimeters, weight in kilograms and mid arm circumference in centimeters by using the specific bio-physiological measures.

3. Administration of Quail's egg :

It refers to the oral intake of 50 gms of boiled Quail's egg per day for a period of 21 days.

4. Underweight:

It refers to the preschool children who are having anthropometric measures less than normal level as per WHO standard and Government of India growth charts.

5. Preschool children:

They refer to children between 3 and 5 years of age.

Assumptions

1. The prevalence of underweight is more common in preschool children.
2. Anthropometric measures may differ from one individual to other.
3. Underweight preschool children may respond to the specific interventions which promotes the anthropometric measures.
4. Specific and appropriate interventions may promote the health of the preschool children.

Hypotheses

H_1: There will be a significant difference in the anthropometric measures of underweight preschool children in experimental and control group at $p < 0.05$.

H_2: There will be a significant association between the anthropometric measures of underweight preschool children and their selected demographic variables at $p < 0.05$ in experimental and control group.

Delimitations

1. The samples will be limited to underweight preschool children only.
2. The study period is limited only to 4 weeks.
3. The areas of the study will be limited only to Karipatty and Minnampalli.

ProjectedOutcome

? The study will help the mothers to gain adequate knowledge regarding underweight and select appropriate measures in treating them.

? It helps the mothers to adopt Quail's egg in improving the anthropometric measures of their underweight preschool children.

Conceptual Framework

The investigator adopted the Wiedenbach's Theory of Helping Art of Clinical Nursing (1964) for conceptual framework.

Ernestine Wiedenbach proposed a prescriptive theory for nursing which is described as conceiving of a desired situation and the ways to attain it.

According to this theory nursing practice consist of three steps which include

Step - I Identifying the need for help

Step - II Ministering the needed help

Step - III Validating that the need for help was met

This theory views nursing as an art based on a goal or central purpose.

Identification involves the determination of a patient's need for help based on the existence.

Ministration refers to provision of help.

Validation refers to a collection of evidence that shows a patient's needs have been met and the functional ability has been restored.

Application:

Step-I: Identifying the need for help:

This involves determining the need for help. The investigator identified the preschool children with underweight who need appropriate measures for their treatment.

Step-II: Ministering the needed help:

This refers to the provision of required help for the identifying need. It has two components.

(i) Prescription

(ii) Realities

i . Prescription

It refers to plan of care to achieve the purpose. In this the investigator had assessed the need for preschool children and plans according to it.

ii. Realities

It refers to the factors that come in to play in a situation involving nursing actions. It includes,

Agent : The investigator

Recipient : Underweight preschool children

Goal : Improvement of anthropometric measures

Means & Activities : Oral administration of 50gms of boiled Quail's egg.

Framework & facilities: Home

Step-III: Validating that the need for help was met:

It refers to the collection of evidences that showed the anthropometric measures of the preschool children were improved. The validation was done by analyzing the findings and according to that the investigator categorized preschool children had improvement in anthropometric measures.

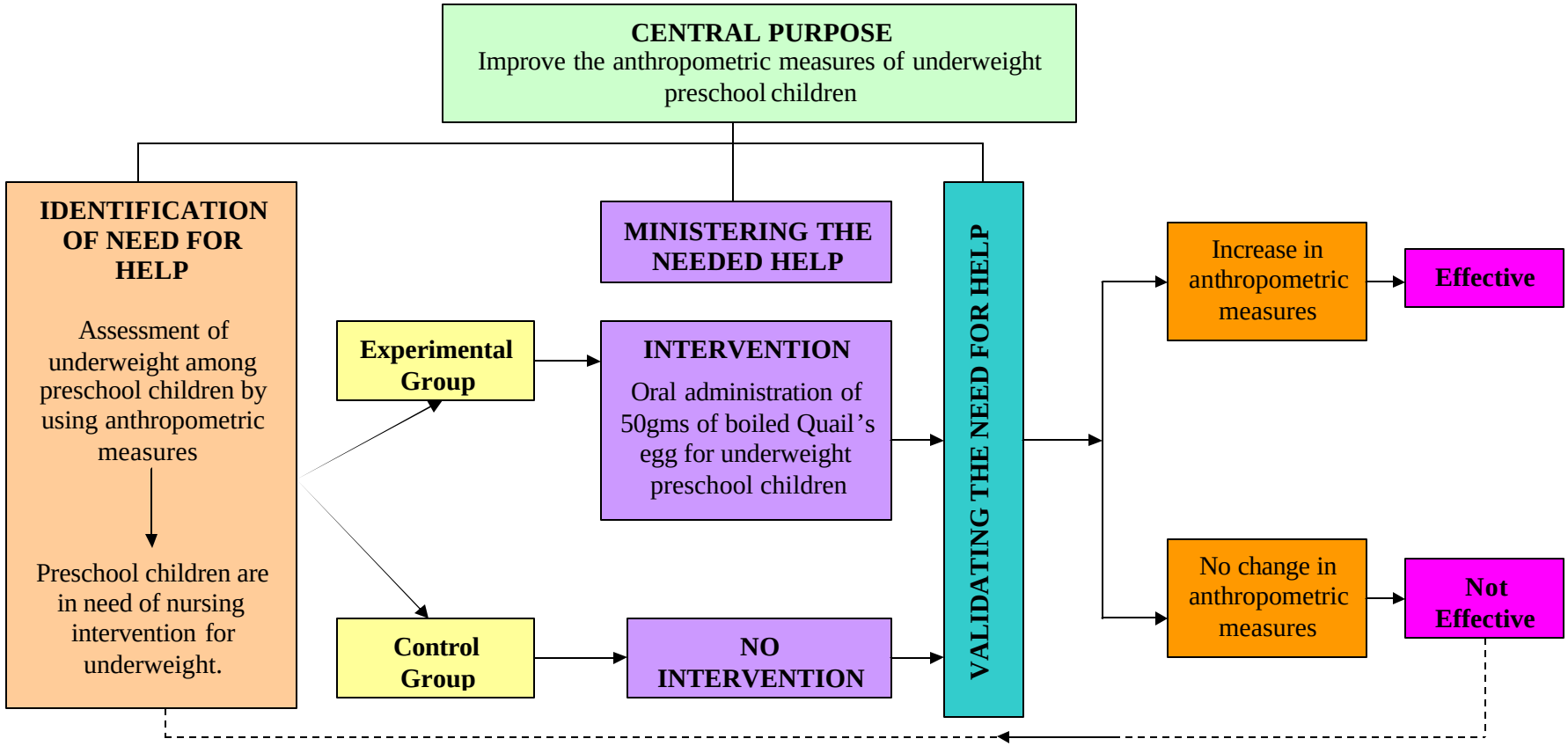


FIG: 1.1 MODIFIED WIEDENBACH'S HELPING ART OF CLINICAL NURSING (1964)

Summary

The first chapter consists of introduction, need for the study, statement of the problem, objectives, operational definition, assumption, hypotheses, delimitation, projected outcome and conceptual frame work.

CHAPTER II

REVIEW OF LITERATURE

Malnutrition is common among Indian population but it is more prevalent among the preschool children. Inadequate and improper food intake leads to poor growth and weight loss in children.

Periodic and systematic assessment of nutritional status and timely interventions can control malnutrition to a greater extent. Improvement of environmental sanitation, provision of safe drinking water, modification of personal hygiene and health seeking behaviors are critical to improve health and nutritional status of preschool children. **(Veena S.Rao, 2009)**

The review of literature is presented in the following sections:

Section-I : Literature related to underweight

Section-II: Literature related to intervention on underweight

Section-I: Literature Related to Underweight

Rajini Peter, etal., (2010) conducted a descriptive study to estimate the prevalence of malnutrition among 100 children aged 1-5 years in Rasoolpura, Hyderabad. Results of the study showed that 69% were undernourished: 61% stunted, 25% severely stunted, 47% underweight, 24% severely underweight and 12% wasted. Also a significant association was found between age and underweight and reverse association exists between age of initiation of weaning and stunting.

Divya Prakash, et.al., (2010) conducted a study to analyze the nutritional status of school children in selected rural and urban schools, Mysore. The findings of the study showed that incidence of mild wasting was higher than moderate wasting

and severe wasting was found to be negligible in all the schools. However severe under nutrition was 14.8% higher in rural when compared to urban.

Zahidi Azhar, et.al., (2010) conducted a study to identify the factors associated with indicators of under nutrition among under five children in Malaysia. A total of 295 children and their care givers were selected, out of which 69% and 31% were stunted and wasted respectively and there was a significant association of underweight with indicators like age, monthly income and birth weight.

Sun Hyekim, et.al., (2010) conducted a cross-sectional study to examine the association between dietary factors, underweight and overweight adults living in the rural areas of Vietnam. 497 subjects aged 19-60 years were selected. General characteristics, dietary intake, anthropometric parameters, blood profiles and eating habits were assessed. The results of the study showed that a high prevalence of both underweight and overweight was observed (14.2% and 21.6% for males and 18.9% and 20.6% for female respectively). The findings focused the need to develop future nutrition and health programs of rural populations in Vietnam.

Spencer Moore, et.al., (2009) done a cross sectional study to examine the association between socioeconomic factors and weight status across 53 countries. 112,625 participants were selected for the study. The results of the study showed that globally 6.7% was underweight, 25.7% overweight and 8.9% obese. The findings pointed towards the need for improvement in the flexibility of international policies in addressing cross-national differences in the socio-economic factors.

V.P.Sapkota and C.K. Gurung, (2009) done a cross-sectional study to determine the prevalence of under-nutrition and the factors associated with it which helps district managers monitor undernutrition and identify different associated factors essential in order to better design and implement the nutritional interventions.

The results of the study showed that the prevalence of underweight, stunting and wasting was 27%, 37% and 11% respectively. Also comparatively, the risk of being underweight in the children from the poor socio-economic status is almost four times than the children from rich socio-economic status and children from joint family were found protective against stunting than from nuclear family.

Vasanthamani. G and Daisy Rani. A, (2009) done a descriptive study to assess the nutritional status of the children living in selected service institutions at Coimbatore. A total of 300 underweight children in the age group of 5-17 years were selected and an interview schedule was administered to them. The findings of the study showed that 20% of them were healthy and the remaining 80% were having one or more clinical signs of nutritional deficiency out of which 56% had anemia, 30% dry skin, 25% discolouration of hair and 21% thin and weak hair.

Eduardo Villamor, et.al., (2008) conducted a study to evaluate the changes in the prevalence of obesity, underweight and wasting in women of reproductive age from Dar Es Salaam, Tanzania during past 10 years. The results of the study showed that the prevalence of obesity rose steadily from 3.6% to 9.1%, underweight showed a decline from 3.3% to 2.6% and no change was observed in the prevalence of wasting. Also, obesity was positively associated with age, parity and socio-economic status of underweight was inversely related to socio-economic status.

Nquyen Ngov Hien and Nquyen Ngoc Hoa, (2007) done a study to assess the nutritional status and to determine potential risk factors of malnutrition in children under three years of age in Nghean, Vietnam. A total of 383 child /mother pairs were selected and a structured questionnaire was administered to mothers in their home setting. The findings of the study indicates that malnutrition is still an important

problem among children and socio-economic, environmental factors and feeding practices are significant risk factors for malnutrition among under three.

Sohinee Bhattacharya, et.al., (2007) conduced a retrospective cohort study to examine the effect of increasing body mass index on pregnancy outcome in nulliparous women delivering Singleton babies. Data were collected from all nulliparous women in Aberdeen between 1976 and 2005. The results of the study showed that morbidly obese women faced the highest risk for pre-eclampsia and induced labour and underweight women had the lowest inc idence. Also, obese women were more likely to have Post Partum Haemorrhage and preterm delivery whereas Low Birth Weight was common among underweight women.

Pramod Singh G.C, etal., (2006) conducted a study to assess the factors associated with underweight and stunting among 443 underweight children aged 6-36 months in rural Terai of eastern Nepal. The findings of the study pointed that low maternal body mass index, child's age, higher birth order, lower standard of living and mother's education were significant risk factors which suggest that underweight and stunting are the result of biological, socio-economic and health care factors.

Sheela Isanaka, et.al, (2006) conducted a survey to determine the socio-demographic and dietary correlates of household and child food insecurity in Bogot and Columbia. Data were collected from 2359 families with 2526 children of 5-12 years of age. The findings of the study showed that food insecure children were three times more likely to be underweight than food secure children. Hunger in the household was significantly associated with maternal underweight and food insecurity was not related to child stunting, child overweight or maternal overweight. The prevalence of food insecurity in Bogota is high and related to poverty.

National Family Health Survey, (2005) conducted a study to investigate the prevalence of malnutrition among young children. It was concluded that 42.5% are underweight, 48% are stunted and 19.8% are wasted. Also the prevalence of underweight among children in India is amongst the highest in the world.

Mittal, et.al., (2004) conducted a cross-sectional study to assess the effect of various maternal factors on the prevalence of underweight and stunting among 482 under five children in three urban slums of Patiala. About 38.3% were found to be underweight in which 26.76, 7.47, 3.32 and 0.83% were classified as Grade-I, II, III, and IV malnutrition respectively as per Indian Academy of Pediatrics classification of malnutrition. The results of the study shows that various factors like low birth weight, maternal health problems, low level of education, less child spacing, early marriage, delay in weaning and faulty child care were responsible for higher prevalence of malnutrition among under five children.

Eyob Zere and Diane Mc Intyre, (2003) done a study to assess and quantity the magnitude of inequalities in child malnutrition among underfives and to consider the policy implications of these findings. Data on 3765 underfive children were derived. The findings of the study showed that stunting was found to be the most prevalent form of malnutrition in South Africa and highest in Eastern Cape. The results of the study pointed towards the need for evaluating policies in terms of improvement in distribution of health services.

Deena Alastoor, et.al., (2002) done a case-control study to assess the factors associated with underweight among 190 children of 6-35 months age in four regions of Oman. The findings of the study concluded that the mothers of short stature and children of low birth weight showed an increased risk for underweight.

Shimokawa, et.al., (2002) conducted a study to investigate the relationship between changes in socio-economic factors and emerging co-existence of under and overweight among adults in China. The results of the study showed that changes in the pattern of job related activity and overall income growth partly explain both increasing overweight and remaining underweight. It also indicates that reduction of underweight can be obtained by direct interventions like micronutrient supplementation and consumption of healthy diets.

Section-II: Literature Related to Intervention on Underweight

Zulfigar A.Bhutta, et.al., (2008) conducted a cohort study to assess the effectiveness of certain interventions to reduce the severity of malnutrition among children of 12-36 months covering a population of about 36 countries. Various interventions like promotion of complementary feeding, vitamin A and zinc supplementation, improvement of hygiene and nutrition education were adopted. The findings of the studies showed that improving nutritional status reduces stunting by 36%, mortality by 25% and micronutrient deficiencies by 25%. Also Daily Adjusted Life Years had significant association with stunting, severe wasting and Intra Uterine Growth Retardation.

Harold Alderman, et.al., (2008) conducted an interventional study in 212 villages, Senegal to improve child nutrition based on randomized community intervention. Various interventions like vitamin A, iron supplementation, exclusive breast feeding, appropriate nutrition, deworming of children were adopted. The results of the study showed that children with longest exposure to program particularly whose mothers were benefitted from the program during their pregnancy show a significant improvement in their nutritional status.

Albert Westergren, et.al., (2007) conducted a cross sectional survey to assess the effect of various interventions among underweight in nine hospitals which was divided into large, middle and small sized hospitals. The results of the study showed that prevalence of underweight was about 34%, 26% and 22% in large, middle, and small sized hospitals respectively. About 7-17% got protein-energy enriched food, 43-54% got oral supplements, 8-22% got artificial nutrition and 14-20% received assistance in eating. The findings of the study pointed that greater efforts should be taken to increase the use of protein energy food and oral supplement for patient with eating problems in order to treat and prevent under nutrition.

Gakidou. E, et.al., (2007) conducted a study to estimate the reduction in child mortality as a result of interventions related to the environment and nutritional Millennium Development Goals (MDG). Data was collected in 42 countries on hazardous effects of each MDG related risk factor from systematic reviews and meta-analyses of epidemiological studies among underfive children. The results of the study showed that the MDGs had an annual reduction in child's deaths of 49700(14%) in Latin America and the Caribbean, 0.80 million (24%) in South Asia and 1.47 million (31%) in Sub Saharan Africa.

Saradha Ramadas, et.al., (2007) conducted an experimental study to assess the effectiveness of quail's egg on malnourished preschool children at Coimbatore.100 subjects were selected and 50 grams of boiled quail's egg was given for a period of 8 weeks. The findings of the study showed that there is a significant change in the anthropometric measures of the preschool children and also the incidence of protein energy malnutrition has decreased.

Bannerjee, et.al., (2005) conducted a community based intervention study to assess the impact of nutrition advice given to mothers of severely malnourished infants in Midnapore district of west Bengal. 300 infants were selected from 6 subcentres, out of which 50.67% of them had severe malnutrition. The findings of the study showed that there was an average increase of 80.81 grams of the weight of their infants, over the expected weight gain.

Beverly J. Lange, et.al., (2005) conducted a comparative study to assess the survival rates in children with acute myeloid leukemia who at diagnosis are underweight, overweight and middleweight. 768 children and young adults between 1-20 years of age were included for the study. The results of the study showed that 84(10.9%) were underweight and 114(14.8%) were overweight. After adjustment of confounding variables of age, race, leukocyte count, bone-marrow transplantation underweight and overweight patients were less likely to survive and more likely to experience treatment related mortality when compared to middle weight children.

Since very few literatures were found supporting quail's egg, the investigator was very much interested in conducting research based on this intervention

Hence, an effort was undertaken to improve the nutritional status of preschool children through supplementing quail's egg.

Summary

This chapter contains literature related to underweight and intervention on underweight.

CHAPTER III

METHODOLOGY

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

Research Approach

Quantitative evaluative approach was considered as an appropriate research approach to evaluate the outcome of Planned Nursing Intervention on anthropometric measures among underweight preschool children.

Research Design

Quasi experimental design was used for this study.

E	**O_1**	**X**	**O_2**
C	**O_1**		**O_2**

E - Experimental group

C - Control group

X - Intervention

O_1 - Pre-test

O_2 - Post-test

Intervention – 50 gms of quail's egg per day for 30 days

Quail's egg has energy-158 kcal, calcium-59mg, Phosphorus -220mg, Iron–3.7 mg, Thiamine-0.12mg, Riboflavin-0.86mg and Niacin -0.12mg. Due to the amazing content, Quail's eggs are considered to be the best in treatment of underweight.

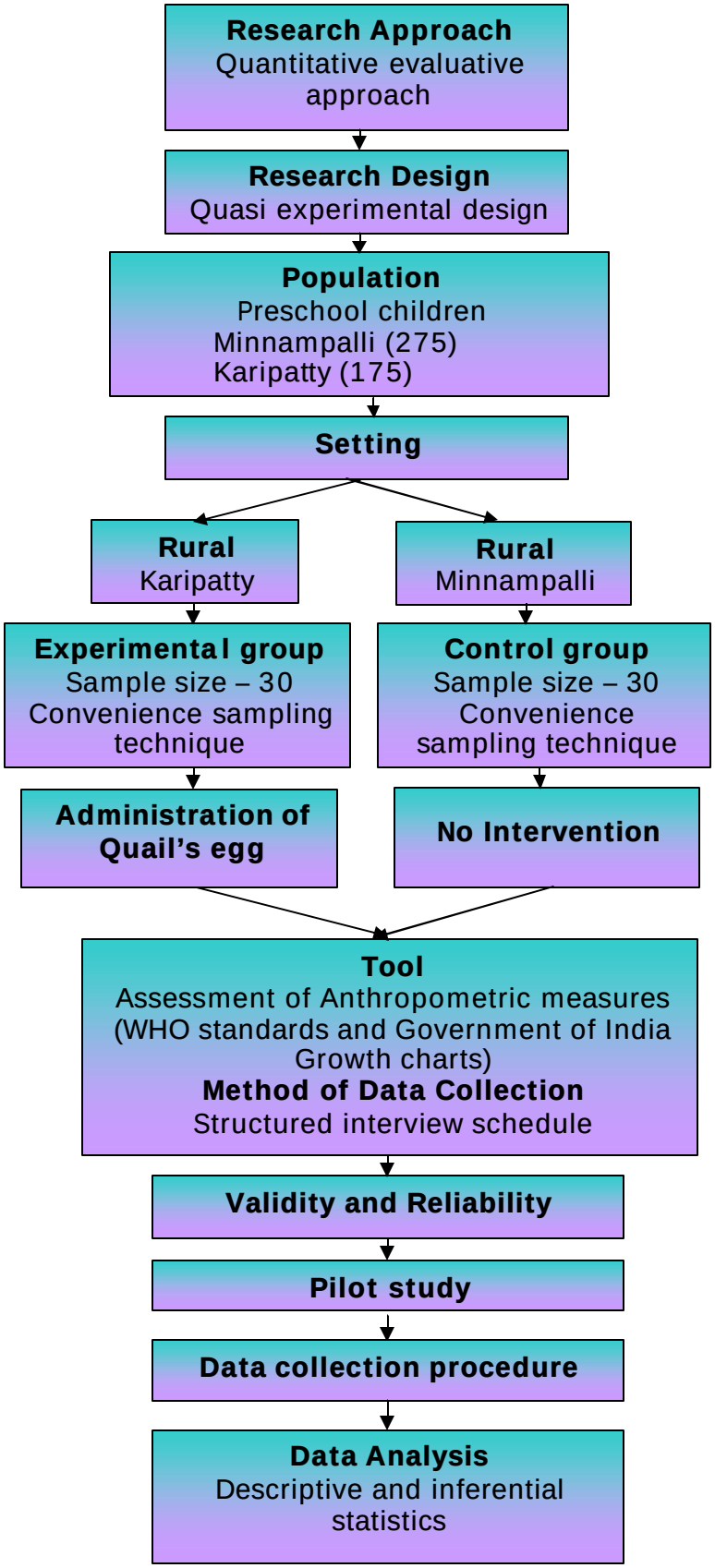


Figure -3.1: Schematic Representation of Research Methodology

Population

The population of this study was underweight preschool children in rural communities, Salem. Karipatty has a total population of about 4200 in which 400 belongs to underfive group out of which 175 are preschool children. Minnampalli comprises of 7000 population in which 625 belongs to underfive group out of which 275 are preschool children.

Description of Setting

The study was conducted in Karipatty and Minnampalli Villages under Karipatty and Minnampalli Panchayat, which is about 15kms kilometers from Sri Gokulam College of Nursing, Salem.

Sampling

Sample:

The sample of this study was underweight preschool children who are present at Karipatty and Minnampalli, Salem, during the study period and those who meet the inclusion criteria.

Sample size:

The investigator had selected 60 underweight preschool children. Among them 30 were in experimental group and 30 were in control group.

Sampling technique:

Non probability convenience sampling technique was adopted.

Criteria for the sample selection:

Inclusion criteria:

1. Preschool children with underweight.
2. Those who are willing to participate in this study.
3. Those who are between the age of 3 and 5 years

Exclusion criteria:

1. Preschool children who are having major health problems.
2. Preschool children who are taking any other intervention for malnutrition.
3. Those who are pure vegetarian.

Variables

Independent variable: Oral administration of Quail's egg.

Dependent variable : Anthropometric measures.

Description of the Tool

Section-A: Demographic variables:

A structured interview schedule was used to assess the demographic data like age, sex, birth order, type of family, educational status of mother, occupation of the father, occupation of the mother, family income, child is attending any clinic, duration of breast feeding, initiation of weaning and immunization status. No score was allotted for this section and it was used for descriptive analysis.

Section-B: Anthropometric measures (Ht, Wt, MAC):

Height: Standing height can be measured against a wall, while the child stands in bare feet on the floor surface, arms hang by side and occiput, upper back, buttocks and heels touch the wall along with straight head in parallel vision. A flat object is placed at top of the head and height is then marked and measured using simple tape measure.

Weight: Place weighing machine in flat surface. Adjust zero error and ask the child to stand in straight posture without slipper and look straight the investigator should stand in front of the child and look down to note the reading.

MAC: The arm is measured with the hand left hang freely and measurement is taken at midpoint of the upper arm between the tip of acromion process of scapula and olecranon process of ulna using a simple measuring tape.

Interpretation: Comparison of height, weight and mid arm circumference with WHO standards and Government of India Growth charts were used to assess the underweight.

Validity and Reliability

Content validity of the tool was obtained on the basis of opinion of Medical and Nursing Experts (one Medical Expert, two Community Health Nursing Specialists, two Pediatric Nursing Specialists and one Nutritionist). The tools were found adequate and minor suggestions like duration of breast feeding and initiation of weaning given by experts were incorporated. The tools were translated into Tamil.

Reliability of the tool was checked by inter-rater reliability method and the reliability coefficient was r' = 1, which showed that the tools were reliable.

Pilot Study

The pilot study was conducted from 07.06.2010 to 12.06.2010 in Poolavari, Salem. It was conducted after the tool presentation and approval by college of nursing faculty and dissertation committee. Validity and reliability of the tool were tested during this time. 6 underweight preschool children were selected through Non probability convenience sampling technique. The tools were administered and checked for its feasibility, language and appropriateness. The underweight preschool children chosen were similar to characteristics to those of the population under study. The tool was found feasible, practicable and it helped to select suitable statistical method.

Method of Data Collection

Ethical consideration:

Formal permission was obtained from the medical officers of Karipatty and Minnampalli villages and Informed consent was obtained from the parents of underweight preschool children.

Period of data collection:

Data collection was done over a period of 4 weeks from 05.07.2010 to 31.07.2010.

Data collection procedure :

The investigator had visited the villages and identified the children who met the inclusion criteria. The investigator had assigned Karipatty and Minnampalli as experimental and control group respectively. The investigator had assessed the anthropometric measures of preschool children and selected 60 under weight preschool children from the above settings (30 from each village) through Non probability convenience sampling technique , then the underweight preschool children from the experimental group was provided with 50gms of boiled Quail's egg per day for the period of 21 days. This intervention was not given to control group and post-test was done on 31.7.2010 for both the groups.

Plan for Data Analysis

Descriptive statistics will be used for categorizing data. Independent 't' test will be used to determine the effectiveness of Quail's egg and Chi-square test will be used to associate the anthropometric measures of underweight preschool children with their selected demographic variables.

Summary

This chapter dealt with 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

Research data must be processed and analyzed in an orderly fashion so that patterns and relationship can be discerned and validated, and hypotheses can be tested. Quantitative data analyzed through statistical analysis includes simple procedures as well as complex and sophisticated methods. **(Polit , 2004)**

Presentation of Data:

The data collected were organized as per the following sections,

Section-A: Distribution of underweight preschool children according to their demographic variables in experimental and control group.

Section-B: i) Classification of underweight preschool children according to pre test scores on anthropometric measures.

ii) Classification of underweight preschool children according to post test scores on anthropometric measures.

Section-C: Comparison of pre test and post test scores on anthropometric measures of underweight preschool children in experimental and control group.

Section-D: Hypotheses Testing

i) Effectiveness of Quail's egg on anthropometric measures among Underweight Preschool Children in experimental and control group.

ii. Association between Anthropometric measures among underweight preschool children and their selected demographic variables in experimental and control group.

Section -A

Distribution of Underweight Preschool Children According to their Selected Demographic Variables in experimental and control group

Table – 4.1 :

Frequency and percentage distribution of underweight preschool children according to their biographic variables in experimental and control group

n=60

S. No	Biographic variables	Experimental group (n = 30)		Control group (n = 30)	
		f	%	f	%
1.	**Age**				
	a. 3 years	12	40.00	16	53.33
	b. 4 years	17	56.66	12	40.00
	c. 5 years	1	3.33	2	6.66
2.	**Sex**				
	a. Male	12	40.00	16	53.33
	b. Female	18	60.00	14	46.66
3.	**Birth order**				
	a. First	9	30.00	12	40.00
	b. Second	14	46.66	10	33.33
	c. Third and above	7	23.33	8	26.66
4.	**Type of family**				
	a. Nuclear	22	73.33	19	63.33
	b. Joint	8	26.66	11	36.66
5.	**Educational status of mother**				
	a. No formal education	3	10.00	-	-
	b. Primary school (1^{st} – 5^{th} Std)	8	26.66	16	53.33
	c. Secondary school (6^{th} – 10^{th} Std)	12	40.00	7	23.33
	d. Higher secondary (11^{th} – 12^{th} Std)	7	23.33	5	16.66
	e. Graduate	-	-	2	6.66

According to biographic variables, in experimental group 56.66% of them were in 4 years of age, 60% were female, 46.66% were second birth order, 73.33% belongs to nuclear family and 40% of mothers had secondary school education and in control group 53.33% of them were in 3 years of age, 53.33% were male, 40% were first birth order, 63.33% belongs to nuclear family and 53.33% of mothers had primary school education.

Table – 4.2 :

Frequency and percentage distribution of underweight preschool children according to their economic variables in experimental and control group

n=60

S. No	Economic variables	Experimental group (n = 30)		Control group (n = 30)	
		f	%	f	%
1.	**Occupation of the father**				
	a. Private employee	14	46.66	17	56.66
	b. Govt. Employee	3	10.00	4	13.33
	c. Business man	13	43.33	9	30.00
2.	**Occupation of the mother**				
	a. Home maker	13	43.33	16	53.33
	b. Private employee	11	36.66	6	20.00
	c. Business man	6	20.00	8	26.66
3.	**Family income**				
	a. Less than Rs.3000	4	13.33	6	20.00
	b. Rs. 3001 – 5000	17	56.66	13	43.33
	c. Above Rs.5000	9	30.00	11	36.66

According to economic variables, in experimental group, 46.66% of fathers were having private job, 43.33% of mothers were homemakers, 56.66% of them were having family income of Rs.3001-5000 and in control group, 56.66% of fathers were having private job, 53.33% of mothers were homemakers and 43.33% of them were having family income of Rs.3001-5000.

Table – 4.3:

Frequency and percentage distribution of underweight preschool children according to their practice related variables in experimental and control group

n=60

S. No	Practice related variables	Experimental group (n = 30)		Control group (n = 30)	
		f	%	f	%
1.	**Child is attending**				
	a. Anganwadi	16	53.33	11	36.66
	b. Primary school	-	-	2	6.66
	c. At home	14	46.66	17	56.66
2.	**Duration of breast feeding**				
	a. 6 months	4	13.33	3	10.00
	b. 1 year	8	26.66	6	20.00
	c. 1 ½ years	11	36.66	12	40.00
	d. 2 years	7	23.33	9	30.00
3.	**Initiation of weaning**				
	a. 4 months	28	93.33	27	90.00
	b. 8 months	2	6.66	3	10.00
4.	**Immunization status immunized up-to date**				
	a. Yes	23	76.00	19	63.33
	b. No	7	23.33	11	36.66

According to practice related variables, in experimental group, about 53.33% were attending Anganwadi, 36.66% were breast fed for 1 ½ years, 93.33% were initiated with weaning foods at 4 months and 76% of them were immunized till date and in control group, about 56.66% of child are at home, 40% of them were breast fed for 1½ years, 90% of them were initiated with weaning foods at 4 months and 63.33% of them were immunized till date.

Section-B

Classification of Underweight Preschool Children According to pre test scores on Anthropometric measures.

Table-4.4:

Frequency and percentage distribution of underweight preschool children according to pre test scores on Body Mass Index for age, weight for age, degree of malnutrition and mid arm circumference in experimental and control group.

n=60

S. No	Variables	Classification	Experimental group (n = 30)		Control group (n = 30)	
			f	%	f	%
1	BMI for age	Underweight	25	83.33	26	86.66
		At risk for underweight	5	16.66	4	13.33
2	Weight for age	At risk for underweight	12	40	13	43.33
		Underweight	14	46.66	17	56.66
		Wasting	4	13.33	-	-
3	Degree of malnutrition	1st degree	26	86.66	21	70.0
		2nd degree	4	13.33	9	30.0
4	Mid arm circumference	Mild	22	73.33	25	83.33
		Moderate	8	26.66	5	16.66

The above table shows that;

According to Body mass index for age, in experimental group 83.33% were underweight preschool children and 16.66% were at risk for underweight and in control group 86.66% were underweight and 13.33% were at risk for underweight.

According to weight for age, in experimental group 40% were at risk for underweight, 46.66% were underweight preschool children and 13.33% were wasting and in control group 43.33% were at risk for underweight, 56.66% were underweight preschool children.

According to degree of malnutrition, in experimental group 86.66% were classified under first degree malnutrition and 13.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

According to mid arm circumference, in experimental group 73.33% and 26.66% of them belongs to mild and moderate underweight and in control group 83.33% and 16.66% of them belongs to mild and moderate underweight respectively.

Classification of Underweight Preschool Children According to post test scores on Anthropometric measures.

Table-4.5:

Frequency and percentage distribution of underweight preschool children according to post test scores on Body Mass Index for age, weight for age, degree of malnutrition and mid arm circumference in experimental and control group.

n=60

S. No	Variables	Classification	Experimental group (n = 30)		Control group (n = 30)	
			f	%	f	%
1	BMI for age	Underweight	16	53.33	26	86.66
		At risk for underweight	6	20	4	13.33
		Normal	8	26.66	-	-
2	Weight for age	At risk for underweight	15	50	13	43.33
		Underweight	3	10	17	56.66
		Normal	12	40	-	-
3	Degree of malnutrition	Normal	17	56.66	-	-
		1st degree	13	43.33	21	70.0
		2nd degree	-	-	9	30.0
4	Mid arm circumference	Mild	25	83.33	25	83.33
		Moderate	5	16.66	5	16.66

The above table shows that;

According to Body mass index for age, in experimental group 53.33% were underweight, 20% were at risk for underweight, 8% were normal and in control group 86.66% were underweight and 13.33% were at risk for underweight.

According to weight for age, in experimental group 50% were at risk for underweight, 10% were underweight, 40% were normal and in control group 43.33% were at risk for underweight, 56.66% were underweight.

According to degree of malnutrition, in experimental group 56.66% were classified normal and 43.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

According to mid arm circumference, in experimental group 83.33% and 16.66% of them belongs to mild and moderate underweight and in control group 83.33% and 16.66% of them belongs to mild and moderate underweight respectively.

Section -C

Comparison of pre test and post test scores on anthropometric measures of Underweight Preschool Children in Experimental and Control Group.

Table-4.6:

Comparison of frequency and percentage distribution according to pre test and post test scores on anthropometric measures of Underweight Preschool Children in Experimental and Control Group. **n = 60**

S. No	Variables	Classification	Experimental group (n = 30)		Control group (n = 30)		Experimental group (n = 30)		Control group (n = 30)	
			Pre test				Post test			
			f	%	f	%	f	%	f	%
1	BMI for age	Underweight	25	83.33	26	86.66	16	53.33	26	86.66
		At risk for underweight	5	16.66	4	13.33	6	20	4	13.33
		Normal	-	-	-	-	8	26.66	-	-
2	Weight for age	At risk for underweight	12	40	13	43.33	15	50	13	43.33
		Underweight	14	46.66	17	56.66	3	10	17	56.66
		Wasting	4	13.33	-	-	-	-	-	-
		Normal	-	-	-	-	12	40	-	-
3	Degree of malnutrition	Normal	-	-	-	-	17	56.66	-	-
		1st degree	26	86.66	21	70	13	43.33	21	70.0
		2nd degree	4	13.33	9	30	9	30.0	9	30.0
		Mild	22	73.33	25	83.33	25	83.33	25	83.33
		Moderate	8	26.66	5	16.66	5	16.66	5	16.66

The above table shows that, in pre test,

According to Body mass index for age, in experimental group 83.33% were underweight preschool children and 16.66% were at risk for underweight and in control group 86.66% were underweight and 13.33% were at risk for underweight.

According to weight for age, in experimental group 40% were at risk for underweight, 46.66% were underweight preschool children and 13.33% were wasting and in control group 43.33% were at risk for underweight, 56.66% were underweight preschool children.

According to degree of malnutrition, in experimental group 86.66% were classified under first degree malnutrition and 13.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

According to mid arm circumference, in experimental group 73.33% and 26.66% of them belongs to mild and moderate underweight and in control group 83.33% and 16.66% of them belongs to mild and moderate underweight respectively.

In post test,

According to Body mass index for age, in experimental group 53.33% were underweight, 20% were at risk for underweight, 8% were normal and in control group 86.66% were underweight and 13.33% were at risk for underweight.

According to weight for age, in experimental group 50% were at risk for underweight, 10% were underweight, 40% were normal and in control group 43.33% were at risk for underweight, 56.66% were underweight.

According to degree of malnutrition, in experimental group 56.66% were classified normal and 43.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

According to mid arm circumference, in experimental group 83.33% and 16.66% of them belongs to mild and moderate underweight and in control group 83.33% and 16.66% of them belongs to mild and moderate underweight respectively.

Table-4.7:

Comparison of Mean, SD, Mean difference according to pre test and post test scores on anthropometric measures of Underweight Preschool Children in Experimental and Control Group.

n=60

S. No	Variables	Experimental group				Mean difference	Control group				Mean difference
		Pre-test		Post-test			Pre-test		Post-test		
		Mean	SD	Mean	SD		Mean	SD	Mean	SD	
1	Weight	12.89	1.12	13.95	1.08	1.06	12.35	1.11	12.36	1.11	0.006
2	Height	94.98	5.77	95.41	5.79	0.43	94.11	6.05	94.13	6.06	0.02
3	Mid arm circumference	14.13	0.33	14.20	0.34	0.07	14.05	0.31	14.07	0.30	0.02

The above table shows that;

According to weight, in experimental group the mean pre-test score was 12.89± 1.12 and mean post- test score was 13.95 ? 1.08 with mean difference 1.06. In control group the mean pre-test score was 12.35 ± 1.11 and mean post-test score was 12.36 ? 1.11 with mean difference 0.006.

According to height, in experimental group the mean pre-test score was 94.98 ± 5.77 and mean post- test score was 95.41 ? 5.79 with mean difference 0.43. In control group the mean pre-test score was 94.11 ± 6.05 and mean post-test score was 94.13 ? 6.06 with mean difference 0.02.

According to mid arm circumference, in experimental group the mean pre-test score was 14.13 ± 0.33 and mean post- test score was 14.20 ? 0.34 with mean difference 0.07. In control group the mean pre-test score was 14.05 ± 0.31 and mean post-test score was 14.07 ? 0.30 with mean difference 0.02 and 't' value – 2.06.

Section – D

Hypotheses testing

Effectiveness of Quail's egg on anthropometric measures among Underweight Preschool Children in experimental and control group.

Table-4.8:

Mean, SD and 't' value according to post test scores on anthropometric measures of underweight preschool children in experimental and control group.

S. No	Variables	Post-test				't value
		Experimental group		Control group		
		Mean	SD	Mean	SD	
1	Weight	13.95	1.08	12.36	1.11	6.4*
2	Height	95.41	5.79	94.13	6.06	2.10*
3	Mid arm circumference	14.20	0.34	14.07	0.30	2.06*

Significance at p<0.05 level; table value– 1.96

The above table shows that according to weight, in experimental group the mean post- test score was 13.95 ? 1.08 and in control group the mean post-test score was 12.36 ? 1.11 and 't' value – 6.4 shows effectiveness in experimental group.

According to height, in experimental group the mean post- test score was 95.41 ? 5.79 and in control group the mean post-test score was 94.13 ? 6.06 and 't' value – 2.10 shows effectiveness in experimental group.

According to mid arm circumference, in experimental group the mean post-test score was 14.20 ? 0.34 and in control group the mean post-test score was 14.07 ? 0.30 and 't' value – 2.06 shows effectiveness in experimental group.

Association between Anthropometric measures among underweight preschool children and their selected demographic variables in experimental and control group.

Table-4.9:

Association between weight for age among underweight preschool children and their selected biographic variables in experimental and control group

n=60

Biographic variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	df	$?^2$
Age	4	5.13	2	4.54
Sex	2	2.75	1	0.475
Birth order	4	3.42	2	2.240
Type of family	2	2.16	1	0.88
Educational status of mother	6	2.65	3	0.97

*** significant at p<0.05 level**

The above table showed that there was no association between weight for age among underweight preschool children and their selected biographic variables in both experimental and control group. Hence hypothesis H_2 was rejected to biographic variables.

Table-4. 10:

Association between weight for age among underweight preschool children and their selected economic variables in experimental and control group

n=60

Economic variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	df	$?^2$
Occupation of the father	4	2.08	2	1.12
Occupation of the mother	4	3.90	2	2.43
Family income	4	5.27	2	1.04

*** significant at p<0.05 level**

The above table showed that there was no association between weight for age among underweight preschool children and their selected economic variables in both experimental and control group. Hence hypothesis H_2 was rejected to economic variables.

Table-4.11:

Association between weight for age among underweight preschool children and their selected practice related variables in experimental and control group

n=60

Practice related variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	**df**	$?^2$
Child is attending	2	0.639	2	0.08
Duration of breast feeding	6	4.24	3	0.24
Initiation of weaning	2	0.33	1	0.13
Immunization status immunized up to date	2	1.62	1	0.81

*** significant at p<0.05 level**

The above table showed that there was no association between weight for age among underweight preschool children and their selected practice related variables in both experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

Table-4.12:

Association between Body Mass Index for age among underweight preschool children and their selected biographic variables in experimental and control group

n=60

Biographic variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	df	$?^2$
Age	2	7.976*	2	15.57*
Sex	1	1.00	1	0.87
Birth order	2	7.829*	2	0.216
Type of family	1	0.286	1	2.921
Educational status of mother	3	1.414	3	0.515

*** significant at p<0.05 level**

The above table showed that there was association between Body Mass Index for age among underweight preschool children and their selected biographic variables like age and birth order in experimental and age in control group. Hence hypothesis H_2 was retained to biographic variables like age and birth order and hypothesis H_2 was rejected to other biographic variables.

Table-4.13:

Association between Body Mass Index for age among underweight preschool children and their selected economic variables in experimental and control group

n=60

Economic variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	df	$?^2$
Occupation of the father	2	0.673	2	1.267
Occupation of the mother	2	1.972	2	2.776
Family income	2	0.412	2	4.301

*** significant at p<0.05 level**

The above table showed that there was no association between Body Mass Index for age among underweight preschool children and their selected economic variables in both experimental and control group. Hence hypothesis H_2 was rejected to economic variables.

Table-4.14:

Association between Body Mass Index for age among underweight preschool children and their selected practice relatedvariables in experimental and control group

n=60

Practice relatedvariables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	df	$?^2$
Child is attending	1	0.429	2	3.367
Duration of breast feeding	3	4.847	3	1.394
Initiation of weaning	1	1.714	1	0.513
Immunization status immunized up to date	1	0.037	1	0.433

*** significant at p<0.05 level**

The above table showed that there was no association between Body Mass Index for age among underweight preschool children and their selected practice related variables in both experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

Table-4.15:

Association between mid-arm circumference among underweight preschool children and their selected biographic variables in experimental and control group

n=60

Biographic variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	**df**	$?^2$
Age	2	0.722	2	0.450
Sex	1	0.28	1	1.714
Birth order	2	0.414	2	1.080
Type of family	1	2.078	1	4.852*
Educational status of mother	3	3.884	3	2.679

*** significant at p<0.05 level**

The above table showed that there was association between mid arm circumference among underweight preschool children and their selected biographic variables like type of family in control group and no association was found in experimental group. Hence hypothesis H_2 was retained to biographic variables like type of family and H_2 was rejected to biographic variables.

Table-4.16:

Association between mid-arm circumference among underweight preschool children and their selected economic variables in experimental and control group

n=60

Economic variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	**df**	$?^2$
Occupation of the father	2	2.212	2	8.400*
Occupation of the mother	2	2.161	2	3.750
Family income	2	5.033	2	1.670

*** significant at p<0.05 level**

The above table showed that there was association between mid arm circumference among underweight preschool children and their selected economic variables like occupation of the father in control group and no association was found in experimental group. Hence hypothesis H_2 was retained to economic variables like occupation of the father and H_2 was rejected to other economic variables.

Table-4.17:

Association between mid-arm circumference among underweight preschool children and their selected practice relatedvariables in experimental and control group

n=60

Practice related variables	Experimental group (n=30)		Control group (n=30)	
	df	$?^2$	df	$?^2$
Child is attending	2	1.779	2	1.431
Duration of breast feeding	3	3.722	3	1.400
Initiation of weaning	1	0.076	1	0.667
Immunization status immunized up to date	1	0.028	1	0.000

*** significant at p<0.05 level**

The above table showed that there was no association between mid arm circumference among underweight preschool children and their selected practice related variables in experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

Summary

This chapter dealt with data analysis and interpretation in the form of statistical values based on the objectives. Frequency and percentage distribution of underweight among preschool children with their selected demographic variables.

The 't' value was used a determine the effectiveness of Quail's egg an Anthropometric measures among underweight preschool children. Chi-square test was used to find out the association between the Anthropometric measures among underweight preschool children with their selected demographic variables in both experimental and control group.

CHAPTER-V

DISCUSSION

A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures among underweight preschool children in selected villages, Salem.

In experimental group, according to biographic variables, 56.66% of them were in 4 years of age, 60% were female, 46.66% were second birth order, 73.33% belongs to nuclear family and 40% of mothers had secondary school education. According to economic variables, 46.66% of fathers were having private job, 43.33% of mothers were homemakers, 56.66% of them were having family income of Rs.3001-5000. Based on practice related variables, about 53.33% were attending Anganwadi, 36.66% were breast fed for 1 ½ years, 93.33% were initiated with weaning foods at 4 months and 76% of them were immunized till date.

In control group, according to biographic variables, 53.33% of them were in 3 years of age, 53.33% were male, 40% were first birth order, 63.33% belongs to nuclear family and 53.33% of mothers had primary school education. According to economic variables, 56.66% of fathers were having private job, 53.33% of mothers were homemakers and 43.33% of them were having family income of Rs.3001-5000. Based on practice related variables, about 56.66% of child are at home, 40% of them were breast fed for 1½ years, 90% of them were initiated with weaning foods at 4 months and 63.33% of them were immunized till date.

V.P.Sapkota and C.K. Gurung, (2009) done a cross-sectional study to determine the prevalence of under-nutrition and the factors associated with it. The demographic results showed that, the risk of being underweight in the children from the poor socio-economic status is almost four times than the children from rich socio-

economic status and children from joint family were found protective against stunting than from nuclear family. It reveals the fact that underweight is common among underfive children and also it is more prevalent among the poor socio economic category.

Objective-1: To assess the Anthropometric Measures among Preschool Children in experimental and control group

Pre test shows that,

In experimental group according to Body Mass Index for age, 25(83.33%) were underweight and 5(6.66%) were at risk for underweight. As per weight for age criteria, 12(40%) were at risk for underweight, 14(46.66%) were underweight and 4(13.33%) were wasting. About 26(86.66%), 4(13.33%) were classified as first and second degree malnutrition according to Government of India Growth charts. As per Mid arm circumference 22(73.33%) and 8(26.66%) belongs to mild and moderate underweight respectively.

In control group 4(13.33%) were at risk for underweight and 86.66% were underweight according to Body Mass Index for age classification. 13(43.33%) were at risk for underweight and 17(56.66%) were underweight as per weight for age classification. 21(70%), 9(30%) subjects belongs to first and second degree malnutrition according to Government of India Growth charts. As per Mid arm circumference 25(83.33%) and 5(16.66%) belongs to mild and moderate underweight respectively.

Post test shows that,

According to Body mass index for age, in experimental group 83.33% were underweight preschool children and 16.66% were at risk for underweight and in control group 86.66% were underweight and 13.33% were at risk for underweight.

According to weight for age, in experimental group 40% were at risk for underweight, 46.66% were underweight preschool children and 13.33% were wasting and in control group 43.33% were at risk for underweight, 56.66% were underweight preschool children.

According to degree of malnutrition, in experimental group 86.66% were classified under first degree malnutrition and 13.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

According to mid arm circumference, in experimental group 73.33% and 26.66% of them belongs to mild and moderate underweight and in control group 83.33% and 16.66% of them belongs to mild and moderate underweight respectively. This study was supported by,

National Family Health Survey (2005) conducted a study to investigate the prevalence of malnutrition among young children. It was concluded that 42.5% are underweight, 48% are stunted and 19.8% are wasted. Also the prevalence of underweight among children in India is amongst the highest in the world.

V.P.Sapkota and C.K. Gurung, (2009) done a cross-sectional study to determine the prevalence of under-nutrition which helps district managers monitor under-nutrition in order to better design and implement the nutritional interventions. The results of the study showed that the prevalence of underweight, stunting and wasting was 27%, 37% and 11% respectively.

This study supports the fact that prevalence of underweight is common among under-five population and there is a need to take necessary steps to reduce it's impact on the health of the children.

Objective-2: To Evaluate the Effectiveness of Administration of Quail's Egg on Anthropometric Measures among Underweight Preschool Children in experimental and control group.

There was a highly significant difference between pre-test and post-test scores after intervention mean pre-test and post-test score of weight was 12.89 and 13.95 respectively and height was 94.98 and 95.41 and mid arm circumference was 14.13 and 14.20 respectively. Hence hypothesis H_1 was retained.

This result was supported by,

Mr. Saradha Ramadas, et.al., (2007) conducted a study to assess the effectiveness of Quail's egg on malnourished preschool children at Coimbatore. 100 subjects were selected and 50 grams of boiled Quail's egg was given for a period of 8 weeks. The findings of the study showed that there is a significant change in the anthropometric measures of preschool children.

The overall findings of the study showed that the oral supplementation of Quail's egg was effective to the underweight preschool children and has brought excellent changes at the anthropometric measures.

Objective-3: To Associate the Anthropometric Measures among underweight Preschool Children with their Selected Demographic Variables both in experimental and control group.

There was no association between weight for age among underweight preschool children and their selected biographic variables in both experimental and control group. Hence hypothesis H_2 was rejected to biographic variables.

There was no association between weight for age among underweight preschool children and their selected economic variables in both experimental and control group. Hence hypothesis H_2 was rejected to economic variables.

There was no association between weight for age among underweight preschool children and their selected practice related variables in both experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

There was association between Body Mass Index for age among underweight preschool children and their selected biographic variables like age and birth order in experimental and control group. Hence hypothesis H_2 was retained to biographic variables like age and birth order and hypothesis H_2 was rejected to other biographic variables.

There was no association between Body Mass Index for age among underweight preschool children and their selected economic variables in both experimental and control group. Hence hypothesis H_2 was rejected to economic variables.

There was no association between Body Mass Index for age among underweight preschool children and their selected practice related variables in both experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

There was association between mid arm circumference among underweight preschool children and their selected biographic variables like type of family in control group and no association was found in experimental group. Hence hypothesis H_2 was retained to biographic variables like type of family and H_2 was rejected to biographic variables.

There was association between mid arm circumference among underweight preschool children and their selected economic variables like occupation of the father in control group and no association was found in experimental group. Hence

hypothesis H_2 was retained to economic variables like occupation of the father and H_2 was rejected to other economic variables.

There was no association between mid arm circumference among underweight preschool children and their selected practice related variables in experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

Beverly J. Lange, et.al, (2005) conducted a comparative study to assess the survival rates in children with acute myeloid leukemia who at diagnosis were underweight, overweight and middle weight. 768 children and young adults between 1-20 years of age were included for the study. The results of the study showed that 84(10.9%) were underweight and 114(14.8%) were overweight. After adjustment of confounding variables of age, race, leukocyte count, bone-marrow transplantation underweight and overweight patients were less likely to survive and more likely to experience treatment related mortality when compared to middle weight children.

This shows that the age, type of family and the occupation of the father has effects on the growth and nutritional status of the underweight preschool children.

Summary

This chapter dealt with the discussion of the study with reference to the objective and supportive studies. All the three objectives and two hypotheses are retained in this study.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with summary, conclusion, implications for nursing practice and recommendations for further research.

Summary

The purpose of this study was to determine the effectiveness of Quail's egg on Anthropometric measures of underweight preschool children in selected villages, Salem.

A Quasi experimental design was chosen for the study. The conceptual framework for the study was based on Wiedenbach's Theory of Helping Art of Clinical Nursing. Demographic information was assessed using a structured interview schedule. The sample consisted of 60 preschool children, 30 in experimental and 30 in control group each from rural communities, Salem.

The data were analysed using descriptive and inferential statistics to test the hypothesis, independent 't' test and chi-square was used. The $p<0.05$ level of significance was used to test the hypothesis.

Main findings of the study includes;

- In experimental group, according to biographic variables, 56.66% of them were in 4 years of age, 60% were female, 46.66% were second birth order, 73.33% belongs to nuclear family and 40% of mothers had secondary school education. According to economic variables, 46.66% of fathers were having private job, 43.33% of mothers were homemakers, 56.66% of them were having family income of Rs.3001-5000. Based on practice related variables, about 53.33% were attending Anganwadi, 36.66% were breast fed for 1 ½

years, 93.33% were initiated with weaning foods at 4 months and 76% of them were immunized till date.

- In control group, according to biographic variables, 53.33% of them were in 3 years of age, 53.33% were male, 40% were first birth order, 63.33% belongs to nuclear family and 53.33% of mothers had primary school education. According to economic variables, 56.66% of fathers were having private job, 53.33% of mothers were homemakers and 43.33% of them were having family income of Rs.3001-5000. Based on practice related variables, about 56.66% of child was at home, 40% of them were breast fed for 1½ years, 90% of them were initiated with weaning foods at 4 months and 63.33% of them were immunized till date.

Pre test shows that,

- According to Body Mass Index for age , in experimental group 16.66% were at risk for underweight and 83.33% were underweight preschool children and in control group 13.33% were at risk for underweight and 86.66% were underweight preschool children.
- According to weight for age, in experimental group 40% were at risk for underweight, 46.66% were underweight preschool children and 13.33% were wasting and in control group 43.33% were at risk for underweight, 56.66% were underweight preschool children.
- According to degree of malnutrition, in experimental group 86.66% were classified under first degree malnutrition and 13.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

? According to mid arm circumference, in experimental group 22(73.33%) and 8(26.66%) of them belongs to mild and moderate underweight and in control group 25(83.33%) and 5(16.66%) of them belongs to mild and moderate underweight respectively.

Post test shows that,

? According to Body mass index for age, in experimental group 53.33% were underweight, 20% were at risk for underweight, 8% were normal and in control group 86.66% were underweight and 13.33% were at risk for underweight.

? According to weight for age, in experimental group 50% were at risk for underweight, 10% were underweight, 40% were normal and in control group 43.33% were at risk for underweight, 56.66% were underweight.

? According to degree of malnutrition, in experimental group 56.66% were classified normal and 43.33% under second degree malnutrition and in control group 70% were classified under first degree malnutrition and 30% under second degree malnutrition.

? According to mid arm circumference, in experimental group 83.33% and 16.66% of them belongs to mild and moderate underweight and in control group 83.33% and 16.66% of them belongs to mild and moderate underweight respectively.

? According to weight, in experimental group the mean pre-test score was 12.89± 1.12 and mean post- test score was 13.95 ? 1.08 with mean difference 1.06. In control group the mean pre-test score was 12.35 ± 1.11 and mean post-test score was 12.36 ? 1.11 with mean difference 0.006 and 't' value – 6.4 shows effectiveness in experimental group.

? According to height, in experimental group the mean pre-test score was 94.98 ± 5.77 and mean post- test score was 95.41 ? 5.79 with mean difference 0.43. In control group the mean pre-test score was 94.11 ± 6.05 and mean post-test score was 94.13 ? 6.06 with mean difference 0.02 and 't' value – 2.10 shows effectiveness in experimental group.

? According to mid arm circumference, in experimental group the mean pre-test score was 14.13 ± 0.33 and mean post- test score was 14.20 ? 0.34 with mean difference 0.07. In control group the mean pre-test score was 14.05 ± 0.31 and mean post-test score was 14.07 ? 0.30 with mean difference 0.02 and 't' value – 2.06 shows effectiveness in experimental group.

? There was no association between weight for age among underweight preschool children and their selected biographic variables in both experimental and control group. Hence hypothesis H_2 was rejected to biographic variables.

? There was no association between weight for age among underweight preschool children and their selected economic variables in both experimental and control group. Hence hypothesis H_2 was rejected to economic variables.

? There was no association between weight for age among underweight preschool children and their selected practice related variables in both experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

? There was association between Body Mass Index for age among underweight preschool children and their selected biographic variables like age and birth order in experimental and control group. Hence hypothesis H_2 was retained to biographic variables like age and birth order and hypothesis H_2 was rejected to other biographic variables.

- There was no association between Body Mass Index for age among underweight preschool children and their selected economic variables in both experimental and control group. Hence hypothesis H_2 was rejected to economic variables.
- There was no association between Body Mass Index for age among underweight preschool children and their selected practice related variables in both experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.
- There was association between mid arm circumference among underweight preschool children and their selected biographic variables like type of family in control group and no association was found in experimental group. Hence hypothesis H_2 was retained to biographic variables like type of family and H_2 was rejected to biographic variables.
- There was association between mid arm circumference among underweight preschool children and their selected economic variables like occupation of the father in control group and no association was found in experimental group. Hence hypothesis H_2 was retained to economic variables like occupation of the father and H_2 was rejected to other economic variables.
- There was no association between mid arm circumference among underweight preschool children and their selected practice related variables in experimental and control group. Hence hypothesis H_2 was rejected to practice related variables.

Conclusion

The results of the study showed that quails egg was effective in improving the anthropometric measures among underweight preschool children. Also there was association between anthropometric measures with their selected demographic variables like age, birth order and type of family.

Implications

There are several important implications for nursing practice.

Nursing service:

The community health nurse plays an important role in health care delivery system.

- ? Regular screening of preschool children to detect underweight and control it's complications.
- ? Educate the benefits of Quail's egg and it's role in prevention of protein energy malnutrition
- ? Conduction of camps in schools in order to rule out underweight among children at an earlier stage.

Nursing administration:

- ✍ The nurse administrator should check about relevant industrial policies aiming at supplementation of Quail's egg at Anganwadi, Primary Health Centre and Schools for better promotion of health of the young children.
- ✍ Organize in-service education regarding underweight for community health workers and reduce it's impact on health status of children.
- ✍ Plan policies and guidelines on practice of home based interventions in treating disease conditions.

Nursing education:

- ✍ Education can be given regarding the use of cheap and available resources at the community setup.
- ✍ Motivate the students to update the knowledge on various innovational approaches in treatment modalities.

Nursing research:

- ✍ Nursing research is to be done to find out the use of Quail's egg in treatment of various other conditions.
- ✍ Research can be conducted on various populations at various settings.

Recommendations

Recommendations for further research include:

1. A similar study can be done on a large sample.
2. An extensive descriptive study can be conducted to assess the health status of the preschool children.
3. A similar study can be done for children's of other age groups.
4. A study could be done to determine the effectiveness of Quail's egg among underweight children with various disorders.

BIBLIOGRAPHY

? Achar's, (1995). *Textbook of Pediatrics.* (3rd edition). New Delhi. Orient Longman Publishers.

? Basavanthappa. B.T., (2000). *Community Health Nursing*. (2nd edition). New Delhi. Jaypee Brothers.

? Basavanthappa. B.T., (2003). *Nursing Research*. (1st edition). New Delhi: Jaypee Brothers Medical Publishers. Reprint.

? Datta Parul. (2008). *Pediatric Nursing.* (1st edition). New Delhi. Jaypee Brothers Medical Publishers.

? Dhaar GM, and Robbani, I., (2008). *Foundations of Community Medicine*. (2nd edition). Noida, Elsevier Publications.

? Gupta, M.C., (2003). *Textbook of Preventive and Social Medicine*. (3rd edition). New Delhi, Jaypee Brothers Medical Publishers.

? Marlow R. Dorothy, (2006). *Textbook of Paediatric Nursing*. (6th edition). New Delhi. W.B.Saunders Company Publishers.

? Parker, E. Marlyn, (2007). *Nursing Theories and Nursing Practice*. (2nd edition). New Delhi. Jaypee Brothers Medical Publishers.

? Park. K, (2007). *Textbook of preventive and social medicine.* (19th edition). Jabalpur. Banarsidas Bhanot Publishers.

? Parthasarathy, (2003). *IAP Textbook of Pediatric*. (2nd edition). New Delhi, Jaypee Brothers.

? Swaminathan. M, (1986). *Hand book of food and nutrition.* (5th edition). Bangalore Printing and Publishing.

Journals

? Gopal Chandra Mandal. Assessment of undernutrition of mid-upper arm circumference among pre-school children of Arambag, Hooghly District, West Bengal, India: *The Internet Journal of Pediatrics and Neonatology*, ISSN: 1528-8374.

? Ramadas.V. Saradha, et.al., (Mar,2008). Effect of supplementation of Quail's egg on selected malnouished preschool children. *The Indian Journal of Nutrition and Dietetics*. 45(3): 84-88.

? Singh Shashi, et.al, (July, Dec, 2005). Trend of growth in midarm and head circumference of pre-school children. *Indian Journal of preventive and social medicine*. 36(324): 145-146.

? Rao S. Veena, (Jan, 2010). Assessing the Nutritional status of children. *Nightingale Nursing Times*. 5(10): 12-16.

Net References

1. www.Quailsegg.com
2. www.ISPUB.com
3. www.WHOgrowthstandards.com
4. www.nutritionfoundationofindia.com
5. www.nutritiondata.com

ANNEXURE - A

LETTER SEEKING PERMISSION TO CONDUCT A RESEARCH STUDY

SRI GOKULAM COLLEGE OF NURSING
3/836, Periyakalam, Neikkarapatti, Salem - 636 010.
Phone : 0427 - 6544550 Fax : 0427 - 2270200, 2447077
Email : sgcon2001@yahoo.com, sgcon2001@gmail.com

Date : 03-07-2010

To

The President,
The Village Panchayat Office,
Karipatti,
Salem.

Respected Sir,

Sub: Permission to conduct a Research Study request reg.

This is to introduce Ms.Jayalakshmi.C. (M.Sc.Nursing) student of our college. She is to conduct Research project which is to be submitted to the Tamilnadu Dr.M.G.R.Medical University,Chennai in partial fulfillment of University requirement for the award of M.Sc.(Nursing)Degree.

Topic: A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures of underweight preschool children in selected villages, Salem.

I request you to kindly permit her to conduct the study in your esteemed Organisation from 05.07.10.to 31.07.10. She will adhere to the village policies and regulations.

Thanking you.

Yours Sincerely,

3/7/10

(Prof. A. Jayasudha)

PRINCIPAL
Sri Gokulam College of Nursing
3/836, Periakalam, Neikkarapatti
SALEM - 636 010

SRI GOKULAM COLLEGE OF NURSING
3/836, Periyakalam, Neikkarapatti, Salem - 636 010.
Phone : 0427 - 6544550 Fax : 0427 - 2270200, 2447077
Email : sgcon2001@yahoo.com, sgcon2001@gmail.com

Date : 03-07-2010

To

The President,
The Village Panchayat Office,
Minnampalli,
Salem.

Respected Sir,

Sub: Permission to conduct a Research Study request reg.

This is to introduce Ms.Jayalakshmi.C. (M.Sc.Nursing) student of our college. She is to conduct Research project which is to be submitted to the Tamilnadu Dr.M.G.R.Medical University,Chennai in partial fulfillment of University requirement for the award of M.Sc.(Nursing)Degree.

Topic: A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures of underweight preschool children in selected villages, Salem.

I request you to kindly permit her to conduct the study in your esteemed Organization from 05.07.10.to 31.07.10. She will adhere to the village policies and regulations.

Thanking you.

Yours Sincerely,

2/7/10

(Prof. A. Jayasudha)

PRINCIPAL
Sri Gokulam College of Nursing
3/836, Periakalam, Neikkarapatti
SALEM - 636 010

ANNEXURE - B

SECTION-I

STRUCTURED INTERVIEW SCHEDULE TO ASSESS THE DEMOGRAPHIC DATA

Instruction:

Read the questions carefully, place a tick mark (✍) against the correct response. Each question should be given one answer. Answer the all questions.

Sample No: | | |

Date

1. Age

a. 3 years |

b. 4 years |

c. 5 years |

2. Sex

a. Male |

b. Female |

3. Birth order

a. First |

b. Second |

c. Third and above |

4. Type of family

a. Nuclear |

b. Joint |

5. Educational status of mother

a. No formal education |

b. Primary school (1^{st} – 5^{th} Std) |

c. Secondary school (6^{th} – 10^{th} Std) |

d. Higher secondary (11^{th} – 12^{th} Std) |

e. Graduate |

6. Occupation of the father

a. Unemployed
b. Private employee
c. Govt. Employee
d. Business man

7. Occupation of the mother

a. Home maker
b. Private employee
c. Govt. Employee
d. Business man

8. Family income

a. Less than Rs.3000
b. Rs. 3001 – 5000
c. Above Rs.5000

9. Child is attending

a. Anganwadi
b. Kinder garden
c. Primary school
d. At home

10. Duration of breast feeding

a. 6 months
b. 1 year
c. 1 ½ years
d. 2 years

11. Initiation of weaning

a. Before 4 months
b. 4 months
c. 8 months
d. 10 months

12. Immunization status immunized upto date

a. Yes
b. No

SECTION II

BIOPHYSIOLOGICAL MEASURES TO ASSESS THE ANTHROPOMETRIC MEASURES

Sample No: | | |

Date :

Height in cms.	Weight in kgs.	Mid Arm Circumference in cms.	Signature of the investigator

PART - A

MEASUREMENT OF HEIGHT

Definition

It refers to the measurement of increase in the size of whole body, interms of vertical position and it is measured in centimetres.

Equipment needed

Inch tape, scale, pencil and pen.

Procedure

- Make the child to stand against the wall with bare foot.
- The occiput, upper back, buttocks and heels should touch the wall.
- The arms should hang by the side.
- Child's head should be straight with parallel vision.
- Place a scale at the top of the head and mark it using a pencil.
- Measure the length using an inch tape from the mark to the floor and record it.

PART – B

Measurement of Weight

Definition

It refers to the measurement of total body mass which includes both vertical and horizontal growth of the body and it is measured in kilograms.

Equipment needed

Digital Weighing Machine and pen.

Procedure

- Place the weighing machine in a flat surface.
- Adjust the reading to zero.
- Ask the child to stand in a straight posture without slipper.
- Make the child to look straight.
- Read the weight of the child and record it.

Interpretation of Height and Weight

1. **Body Mass Index for age**

Based on WHO standards, Body Mass Index can be calculated using the following formula.

$$\text{Body Mass Index} = \frac{\textbf{Weight}}{\textbf{Height in m}^2}$$

Based on the calculated BMI children will be classified as follows.

- $< 5^{th}$ percentile : underweight
- 5^{th} - 15^{th} percentile : at risk for underweight
- $> 15^{th} – 85^{th}$ percentile : Normal weight
- $> 85^{th} – 95^{th}$ percentile : At risk for over weight
- $> 95^{th}$ percentile : Over weight

2. Weight for Age

i. The weight for age will be measured through the "WHO weight for age growth standards for boys and girls".

Based on that children are classified as follows;

- < -2 SD : Under weight
- < -3 SD : Wasting
- Median value : Normal
- > + 2 SD : Over weight
- > +3 SD : Obese

ii. The degree of malnutrition will be assessed by using the growth chart of Government of India.

Based on that the children are classified as follows;

Weight for age below,

- 1st Reference Curve : I degree
- 2nd Reference Curve : II degree
- 3rd Reference Curve : III degree
- 4th Reference Curve : IV degree

PART – C

MEASUREMENT OF MID ARM CIRCUMFERENCE

Definition

It is measurement of total muscle mass of the upper arm, it is direct indicator of malnurtrition and is measured in centimeters.

Equipment needed

Inch tape and pen.

Procedure

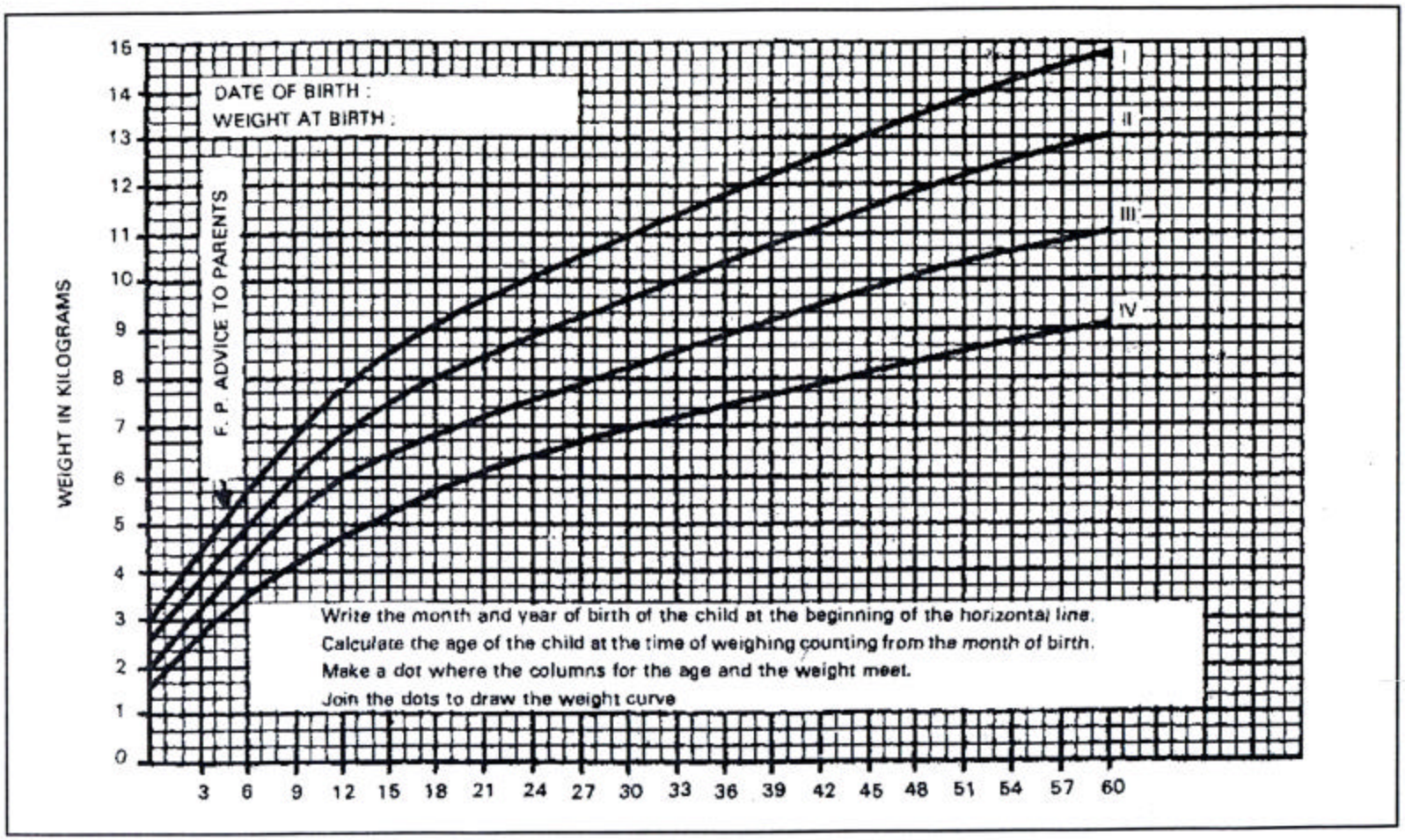
- Make the child to stand straight.
- Ask the child to leave the hands freely.
- Measure the arm from Acromion process and Olecranon process.
- Note the midpoint.
- Measure the upper arm circumference at the midpoint.
- Note the reading and record it.

Interpretation

Based on WHO child growth standards, children are classified as follows;

- <-1 SD : Mild
- <-2 SD : Moderate
- <-3 SD : Severe

GOVERNMENT OF INDIA GROWTH CHART



AGE IN MONTHS

Weight-for-age GIRLS

Birth to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (weight in kg)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
0: 0	0	0.3809	3.2322	0.14171	2.0	2.4	2.8	3.2	3.7	4.2	4.8
0: 1	1	0.1714	4.1873	0.13724	2.7	3.2	3.6	4.2	4.8	5.5	6.2
0: 2	2	0.0962	5.1282	0.13000	3.4	3.9	4.5	5.1	5.8	6.6	7.5
0: 3	3	0.0402	5.8458	0.12619	4.0	4.5	5.2	5.8	6.6	7.5	8.5
0: 4	4	-0.0050	6.4237	0.12402	4.4	5.0	5.7	6.4	7.3	8.2	9.3
0: 5	5	-0.0430	6.8985	0.12274	4.8	5.4	6.1	6.9	7.8	8.8	10.0
0: 6	6	-0.0756	7.2970	0.12204	5.1	5.7	6.5	7.3	8.2	9.3	10.6
0: 7	7	-0.1039	7.6422	0.12178	5.3	6.0	6.8	7.6	8.6	9.8	11.1
0: 8	8	-0.1288	7.9487	0.12181	5.6	6.3	7.0	7.9	9.0	10.2	11.6
0: 9	9	-0.1507	8.2254	0.12199	5.8	6.5	7.3	8.2	9.3	10.5	12.0
0:10	10	-0.1700	8.4800	0.12223	5.9	6.7	7.5	8.5	9.6	10.9	12.4
0:11	11	-0.1872	8.7192	0.12247	6.1	6.9	7.7	8.7	9.9	11.2	12.8
1: 0	12	-0.2024	8.9481	0.12268	6.3	7.0	7.9	8.9	10.1	11.5	13.1
1: 1	13	-0.2158	9.1699	0.12283	6.4	7.2	8.1	9.2	10.4	11.8	13.5
1: 2	14	-0.2278	9.3870	0.12294	6.6	7.4	8.3	9.4	10.6	12.1	13.8
1: 3	15	-0.2384	9.6008	0.12299	6.7	7.6	8.5	9.6	10.9	12.4	14.1
1: 4	16	-0.2478	9.8124	0.12303	6.9	7.7	8.7	9.8	11.1	12.6	14.5
1: 5	17	-0.2562	10.0226	0.12306	7.0	7.9	8.9	10.0	11.4	12.9	14.8
1: 6	18	-0.2637	10.2315	0.12309	7.2	8.1	9.1	10.2	11.6	13.2	15.1
1: 7	19	-0.2703	10.4393	0.12315	7.3	8.2	9.2	10.4	11.8	13.5	15.4
1: 8	20	-0.2762	10.6464	0.12323	7.5	8.4	9.4	10.6	12.1	13.7	15.7
1: 9	21	-0.2815	10.8534	0.12335	7.6	8.6	9.6	10.9	12.3	14.0	16.0
1:10	22	-0.2862	11.0608	0.12350	7.8	8.7	9.8	11.1	12.5	14.3	16.4
1:11	23	-0.2903	11.2688	0.12369	7.9	8.9	10.0	11.3	12.8	14.6	16.7
2: 0	24	-0.2941	11.4775	0.12390	8.1	9.0	10.2	11.5	13.0	14.8	17.0

Weight-for-age GIRLS

Birth to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (weight in kg)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
2: 1	25	-0.2975	11.6864	0.12414	8.2	9.2	10.3	11.7	13.3	15.1	17.3
2: 2	26	-0.3005	11.8947	0.12441	8.4	9.4	10.5	11.9	13.5	15.4	17.7
2: 3	27	-0.3032	12.1015	0.12472	8.5	9.5	10.7	12.1	13.7	15.7	18.0
2: 4	28	-0.3057	12.3059	0.12506	8.6	9.7	10.9	12.3	14.0	16.0	18.3
2: 5	29	-0.3080	12.5073	0.12545	8.8	9.8	11.1	12.5	14.2	16.2	18.7
2: 6	30	-0.3101	12.7055	0.12587	8.9	10.0	11.2	12.7	14.4	16.5	19.0
2: 7	31	-0.3120	12.9006	0.12633	9.0	10.1	11.4	12.9	14.7	16.8	19.3
2: 8	32	-0.3138	13.0930	0.12683	9.1	10.3	11.6	13.1	14.9	17.1	19.6
2: 9	33	-0.3155	13.2837	0.12737	9.3	10.4	11.7	13.3	15.1	17.3	20.0
2:10	34	-0.3171	13.4731	0.12794	9.4	10.5	11.9	13.5	15.4	17.6	20.3
2:11	35	-0.3186	13.6618	0.12855	9.5	10.7	12.0	13.7	15.6	17.9	20.6
3: 0	36	-0.3201	13.8503	0.12919	9.6	10.8	12.2	13.9	15.8	18.1	20.9
3: 1	37	-0.3216	14.0385	0.12988	9.7	10.9	12.4	14.0	16.0	18.4	21.3
3: 2	38	-0.3230	14.2265	0.13059	9.8	11.1	12.5	14.2	16.3	18.7	21.6
3: 3	39	-0.3243	14.4140	0.13135	9.9	11.2	12.7	14.4	16.5	19.0	22.0
3: 4	40	-0.3257	14.6010	0.13213	10.1	11.3	12.8	14.6	16.7	19.2	22.3
3: 5	41	-0.3270	14.7873	0.13293	10.2	11.5	13.0	14.8	16.9	19.5	22.7
3: 6	42	-0.3283	14.9727	0.13376	10.3	11.6	13.1	15.0	17.2	19.8	23.0
3: 7	43	-0.3296	15.1573	0.13460	10.4	11.7	13.3	15.2	17.4	20.1	23.4
3: 8	44	-0.3309	15.3410	0.13545	10.5	11.8	13.4	15.3	17.6	20.4	23.7
3: 9	45	-0.3322	15.5240	0.13630	10.6	12.0	13.6	15.5	17.8	20.7	24.1
3:10	46	-0.3335	15.7064	0.13716	10.7	12.1	13.7	15.7	18.1	20.9	24.5
3:11	47	-0.3348	15.8882	0.13800	10.8	12.2	13.9	15.9	18.3	21.2	24.8
4: 0	48	-0.3361	16.0697	0.13884	10.9	12.3	14.0	16.1	18.5	21.5	25.2

Weight-for-age GIRLS

Birth to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (weight in kg)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
4: 1	49	-0.3374	16.2511	0.13968	11.0	12.4	14.2	16.3	18.8	21.8	25.5
4: 2	50	-0.3387	16.4322	0.14051	11.1	12.6	14.3	16.4	19.0	22.1	25.9
4: 3	51	-0.3400	16.6133	0.14132	11.2	12.7	14.5	16.6	19.2	22.4	26.3
4: 4	52	-0.3414	16.7942	0.14213	11.3	12.8	14.6	16.8	19.4	22.6	26.6
4: 5	53	-0.3427	16.9748	0.14293	11.4	12.9	14.8	17.0	19.7	22.9	27.0
4: 6	54	-0.3440	17.1551	0.14371	11.5	13.0	14.9	17.2	19.9	23.2	27.4
4: 7	55	-0.3453	17.3347	0.14448	11.6	13.2	15.1	17.3	20.1	23.5	27.7
4: 8	56	-0.3466	17.5136	0.14525	11.7	13.3	15.2	17.5	20.3	23.8	28.1
4: 9	57	-0.3479	17.6916	0.14600	11.8	13.4	15.3	17.7	20.6	24.1	28.5
4:10	58	-0.3492	17.8686	0.14675	11.9	13.5	15.5	17.9	20.8	24.4	28.8
4:11	59	-0.3505	18.0445	0.14748	12.0	13.6	15.6	18.0	21.0	24.6	29.2
5: 0	60	-0.3518	18.2193	0.14821	12.1	13.7	15.8	18.2	21.2	24.9	29.5

Weight-for-age BOYS

Birth to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (weight in kg)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
0: 0	0	0.3487	3.3464	0.14602	2.1	2.5	2.9	3.3	3.9	4.4	5.0
0: 1	1	0.2297	4.4709	0.13395	2.9	3.4	3.9	4.5	5.1	5.8	6.6
0: 2	2	0.1970	5.5675	0.12385	3.8	4.3	4.9	5.6	6.3	7.1	8.0
0: 3	3	0.1738	6.3762	0.11727	4.4	5.0	5.7	6.4	7.2	8.0	9.0
0: 4	4	0.1553	7.0023	0.11316	4.9	5.6	6.2	7.0	7.8	8.7	9.7
0: 5	5	0.1395	7.5105	0.11080	5.3	6.0	6.7	7.5	8.4	9.3	10.4
0: 6	6	0.1257	7.9340	0.10958	5.7	6.4	7.1	7.9	8.8	9.8	10.9
0: 7	7	0.1134	8.2970	0.10902	5.9	6.7	7.4	8.3	9.2	10.3	11.4
0: 8	8	0.1021	8.6151	0.10882	6.2	6.9	7.7	8.6	9.6	10.7	11.9
0: 9	9	0.0917	8.9014	0.10881	6.4	7.1	8.0	8.9	9.9	11.0	12.3
0:10	10	0.0820	9.1649	0.10891	6.6	7.4	8.2	9.2	10.2	11.4	12.7
0:11	11	0.0730	9.4122	0.10906	6.8	7.6	8.4	9.4	10.5	11.7	13.0
1: 0	12	0.0644	9.6479	0.10925	6.9	7.7	8.6	9.6	10.8	12.0	13.3
1: 1	13	0.0563	9.8749	0.10949	7.1	7.9	8.8	9.9	11.0	12.3	13.7
1: 2	14	0.0487	10.0953	0.10976	7.2	8.1	9.0	10.1	11.3	12.6	14.0
1: 3	15	0.0413	10.3108	0.11007	7.4	8.3	9.2	10.3	11.5	12.8	14.3
1: 4	16	0.0343	10.5228	0.11041	7.5	8.4	9.4	10.5	11.7	13.1	14.6
1: 5	17	0.0275	10.7319	0.11079	7.7	8.6	9.6	10.7	12.0	13.4	14.9
1: 6	18	0.0211	10.9385	0.11119	7.8	8.8	9.8	10.9	12.2	13.7	15.3
1: 7	19	0.0148	11.1430	0.11164	8.0	8.9	10.0	11.1	12.5	13.9	15.6
1: 8	20	0.0087	11.3462	0.11211	8.1	9.1	10.1	11.3	12.7	14.2	15.9
1: 9	21	0.0029	11.5486	0.11261	8.2	9.2	10.3	11.5	12.9	14.5	16.2
1:10	22	-0.0028	11.7504	0.11314	8.4	9.4	10.5	11.8	13.2	14.7	16.5
1:11	23	-0.0083	11.9514	0.11369	8.5	9.5	10.7	12.0	13.4	15.0	16.8
2: 0	24	-0.0137	12.1515	0.11426	8.6	9.7	10.8	12.2	13.6	15.3	17.1

Weight-for-age BOYS

Birth to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (weight in kg)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
2: 1	25	-0.0189	12.3502	0.11485	8.8	9.8	11.0	12.4	13.9	15.5	17.5
2: 2	26	-0.0240	12.5466	0.11544	8.9	10.0	11.2	12.5	14.1	15.8	17.8
2: 3	27	-0.0289	12.7401	0.11604	9.0	10.1	11.3	12.7	14.3	16.1	18.1
2: 4	28	-0.0337	12.9303	0.11664	9.1	10.2	11.5	12.9	14.5	16.3	18.4
2: 5	29	-0.0385	13.1169	0.11723	9.2	10.4	11.7	13.1	14.8	16.6	18.7
2: 6	30	-0.0431	13.3000	0.11781	9.4	10.5	11.8	13.3	15.0	16.9	19.0
2: 7	31	-0.0476	13.4798	0.11839	9.5	10.7	12.0	13.5	15.2	17.1	19.3
2: 8	32	-0.0520	13.6567	0.11896	9.6	10.8	12.1	13.7	15.4	17.4	19.6
2: 9	33	-0.0564	13.8309	0.11953	9.7	10.9	12.3	13.8	15.6	17.6	19.9
2:10	34	-0.0606	14.0031	0.12008	9.8	11.0	12.4	14.0	15.8	17.8	20.2
2:11	35	-0.0648	14.1736	0.12062	9.9	11.2	12.6	14.2	16.0	18.1	20.4
3: 0	36	-0.0689	14.3429	0.12116	10.0	11.3	12.7	14.3	16.2	18.3	20.7
3: 1	37	-0.0729	14.5113	0.12168	10.1	11.4	12.9	14.5	16.4	18.6	21.0
3: 2	38	-0.0769	14.6791	0.12220	10.2	11.5	13.0	14.7	16.6	18.8	21.3
3: 3	39	-0.0808	14.8466	0.12271	10.3	11.6	13.1	14.8	16.8	19.0	21.6
3: 4	40	-0.0846	15.0140	0.12322	10.4	11.8	13.3	15.0	17.0	19.3	21.9
3: 5	41	-0.0883	15.1813	0.12373	10.5	11.9	13.4	15.2	17.2	19.5	22.1
3: 6	42	-0.0920	15.3486	0.12425	10.6	12.0	13.6	15.3	17.4	19.7	22.4
3: 7	43	-0.0957	15.5158	0.12478	10.7	12.1	13.7	15.5	17.6	20.0	22.7
3: 8	44	-0.0993	15.6828	0.12531	10.8	12.2	13.8	15.7	17.8	20.2	23.0
3: 9	45	-0.1028	15.8497	0.12586	10.9	12.4	14.0	15.8	18.0	20.5	23.3
3:10	46	-0.1063	16.0163	0.12643	11.0	12.5	14.1	16.0	18.2	20.7	23.6
3:11	47	-0.1097	16.1827	0.12700	11.1	12.6	14.3	16.2	18.4	20.9	23.9
4: 0	48	-0.1131	16.3489	0.12759	11.2	12.7	14.4	16.3	18.6	21.2	24.2

Weight-for-age BOYS

Birth to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (weight in kg)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
4: 1	49	-0.1165	16.5150	0.12819	11.3	12.8	14.5	16.5	18.8	21.4	24.5
4: 2	50	-0.1198	16.6811	0.12880	11.4	12.9	14.7	16.7	19.0	21.7	24.8
4: 3	51	-0.1230	16.8471	0.12943	11.5	13.1	14.8	16.8	19.2	21.9	25.1
4: 4	52	-0.1262	17.0132	0.13005	11.6	13.2	15.0	17.0	19.4	22.2	25.4
4: 5	53	-0.1294	17.1792	0.13069	11.7	13.3	15.1	17.2	19.6	22.4	25.7
4: 6	54	-0.1325	17.3452	0.13133	11.8	13.4	15.2	17.3	19.8	22.7	26.0
4: 7	55	-0.1356	17.5111	0.13197	11.9	13.5	15.4	17.5	20.0	22.9	26.3
4: 8	56	-0.1387	17.6768	0.13261	12.0	13.6	15.5	17.7	20.2	23.2	26.6
4: 9	57	-0.1417	17.8422	0.13325	12.1	13.7	15.6	17.8	20.4	23.4	26.9
4:10	58	-0.1447	18.0073	0.13389	12.2	13.8	15.8	18.0	20.6	23.7	27.2
4:11	59	-0.1477	18.1722	0.13453	12.3	14.0	15.9	18.2	20.8	23.9	27.6
5: 0	60	-0.1506	18.3366	0.13517	12.4	14.1	16.0	18.3	21.0	24.2	27.9

Arm circumference-for-age BOYS

3 months to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (arm circumference in cm)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
0: 3	3	0.3928	13.4817	0.07475	10.7	11.6	12.5	13.5	14.5	15.6	16.7
0: 4	4	0.3475	13.8097	0.07523	10.9	11.8	12.8	13.8	14.9	16.0	17.2
0: 5	5	0.3092	14.0585	0.07566	11.1	12.0	13.0	14.1	15.2	16.3	17.5
0: 6	6	0.2755	14.2389	0.07601	11.3	12.2	13.2	14.2	15.4	16.5	17.8
0: 7	7	0.2453	14.3678	0.07629	11.4	12.3	13.3	14.4	15.5	16.7	18.0
0: 8	8	0.2179	14.4591	0.07650	11.4	12.4	13.4	14.5	15.6	16.8	18.1
0: 9	9	0.1925	14.5245	0.07665	11.5	12.4	13.4	14.5	15.7	16.9	18.2
0:10	10	0.1690	14.5733	0.07676	11.5	12.5	13.5	14.6	15.7	17.0	18.3
0:11	11	0.1469	14.6119	0.07683	11.6	12.5	13.5	14.6	15.8	17.0	18.3
1: 0	12	0.1261	14.6449	0.07689	11.6	12.5	13.6	14.6	15.8	17.1	18.4
1: 1	13	0.1064	14.6758	0.07694	11.6	12.6	13.6	14.7	15.8	17.1	18.4
1: 2	14	0.0876	14.7063	0.07699	11.6	12.6	13.6	14.7	15.9	17.1	18.5
1: 3	15	0.0697	14.7380	0.07703	11.7	12.6	13.6	14.7	15.9	17.2	18.5
1: 4	16	0.0526	14.7723	0.07707	11.7	12.7	13.7	14.8	16.0	17.2	18.6
1: 5	17	0.0362	14.8095	0.07710	11.7	12.7	13.7	14.8	16.0	17.3	18.6
1: 6	18	0.0204	14.8496	0.07713	11.8	12.7	13.7	14.8	16.0	17.3	18.7
1: 7	19	0.0051	14.8926	0.07717	11.8	12.8	13.8	14.9	16.1	17.4	18.8
1: 8	20	-0.0097	14.9388	0.07721	11.9	12.8	13.8	14.9	16.1	17.4	18.8
1: 9	21	-0.0239	14.9883	0.07725	11.9	12.8	13.9	15.0	16.2	17.5	18.9
1:10	22	-0.0378	15.0410	0.07731	11.9	12.9	13.9	15.0	16.3	17.6	19.0
1:11	23	-0.0512	15.0964	0.07738	12.0	12.9	14.0	15.1	16.3	17.6	19.1
2: 0	24	-0.0643	15.1536	0.07746	12.0	13.0	14.0	15.2	16.4	17.7	19.2
2: 1	25	-0.0770	15.2115	0.07755	12.1	13.0	14.1	15.2	16.4	17.8	19.2
2: 2	26	-0.0894	15.2693	0.07767	12.1	13.1	14.1	15.3	16.5	17.9	19.3
2: 3	27	-0.1014	15.3259	0.07780	12.2	13.1	14.2	15.3	16.6	17.9	19.4

Arm circumference-for-age BOYS

3 months to 5 years (z-scores)

World Health Organization

Year: Month	Month	L	M	S	Z-scores (arm circumference in cm)						
					-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
2: 4	28	-0.1132	15.3808	0.07794	12.2	13.2	14.2	15.4	16.6	18.0	19.5
2: 5	29	-0.1248	15.4336	0.07810	12.3	13.2	14.3	15.4	16.7	18.1	19.6
2: 6	30	-0.1360	15.4839	0.07827	12.3	13.3	14.3	15.5	16.8	18.1	19.7
2: 7	31	-0.1470	15.5317	0.07846	12.3	13.3	14.4	15.5	16.8	18.2	19.7
2: 8	32	-0.1578	15.5771	0.07866	12.4	13.3	14.4	15.6	16.9	18.3	19.8
2: 9	33	-0.1684	15.6201	0.07887	12.4	13.4	14.4	15.6	16.9	18.3	19.9
2:10	34	-0.1788	15.6611	0.07909	12.4	13.4	14.5	15.7	17.0	18.4	20.0
2:11	35	-0.1890	15.7003	0.07933	12.4	13.4	14.5	15.7	17.0	18.4	20.0
3: 0	36	-0.1989	15.7380	0.07956	12.5	13.5	14.5	15.7	17.1	18.5	20.1
3: 1	37	-0.2087	15.7745	0.07981	12.5	13.5	14.6	15.8	17.1	18.6	20.2
3: 2	38	-0.2184	15.8101	0.08006	12.5	13.5	14.6	15.8	17.1	18.6	20.2
3: 3	39	-0.2278	15.8450	0.08032	12.5	13.5	14.6	15.8	17.2	18.7	20.3
3: 4	40	-0.2372	15.8793	0.08058	12.6	13.6	14.7	15.9	17.2	18.7	20.4
3: 5	41	-0.2463	15.9132	0.08085	12.6	13.6	14.7	15.9	17.3	18.8	20.4
3: 6	42	-0.2553	15.9467	0.08112	12.6	13.6	14.7	15.9	17.3	18.8	20.5
3: 7	43	-0.2642	15.9797	0.08139	12.6	13.6	14.7	16.0	17.4	18.9	20.6
3: 8	44	-0.2730	16.0124	0.08166	12.6	13.6	14.8	16.0	17.4	18.9	20.6
3: 9	45	-0.2816	16.0447	0.08194	12.7	13.7	14.8	16.0	17.4	19.0	20.7
3:10	46	-0.2901	16.0767	0.08222	12.7	13.7	14.8	16.1	17.5	19.0	20.8
3:11	47	-0.2985	16.1085	0.08250	12.7	13.7	14.8	16.1	17.5	19.1	20.8
4: 0	48	-0.3067	16.1400	0.08278	12.7	13.7	14.9	16.1	17.6	19.1	20.9
4: 1	49	-0.3149	16.1714	0.08307	12.7	13.8	14.9	16.2	17.6	19.2	21.0
4: 2	50	-0.3229	16.2027	0.08335	12.7	13.8	14.9	16.2	17.6	19.2	21.0
4: 3	51	-0.3309	16.2340	0.08364	12.8	13.8	14.9	16.2	17.7	19.3	21.1

Arm circumference-for-age BOYS

3 months to 5 years (z-scores)

World Health Organization

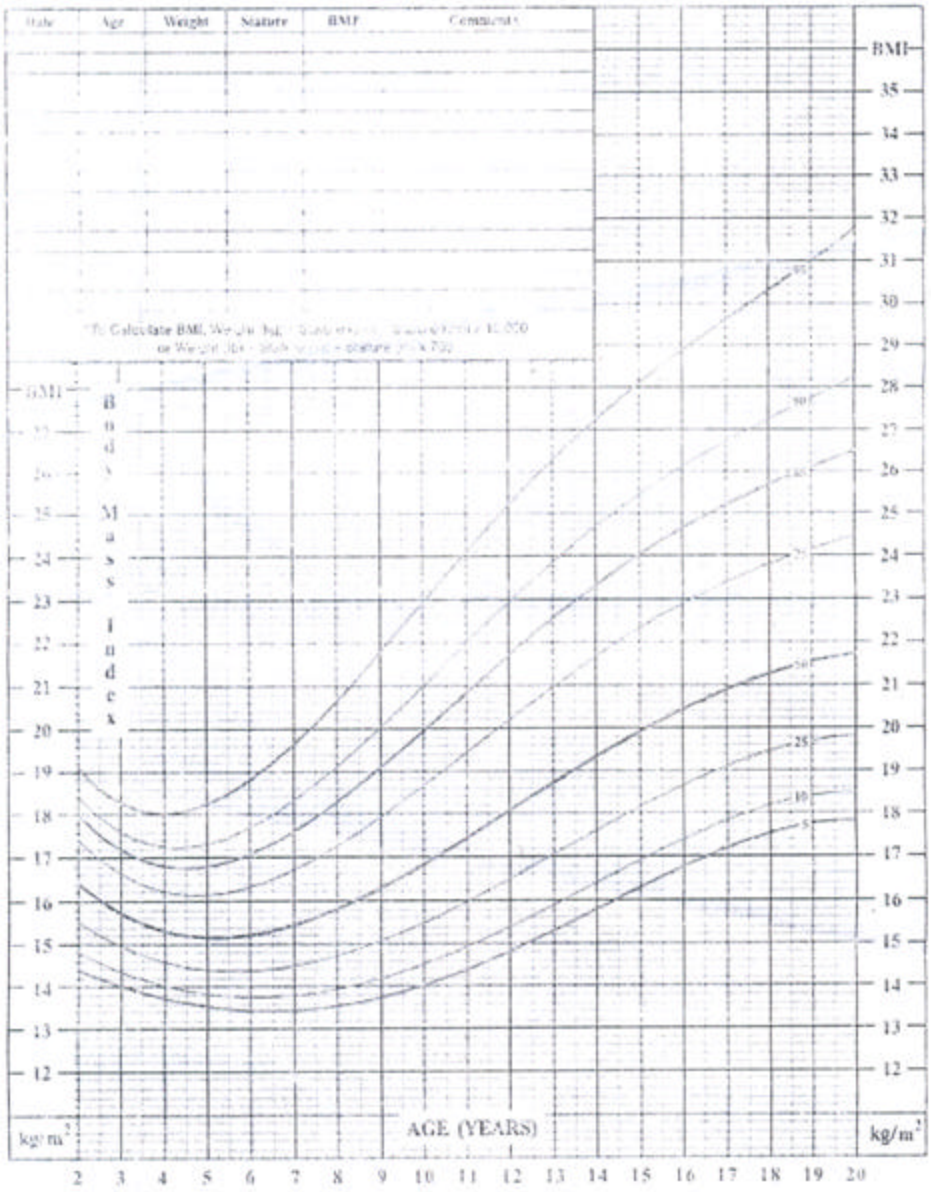
					Z-scores (arm circumference in cm)						
Year: Month	Month	L	M	S	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
4: 4	52	-0.3387	16.2654	0.08392	12.8	13.8	15.0	16.3	17.7	19.3	21.2
4: 5	53	-0.3464	16.2968	0.08421	12.8	13.8	15.0	16.3	17.8	19.4	21.2
4: 6	54	-0.3541	16.3283	0.08450	12.8	13.9	15.0	16.3	17.8	19.4	21.3
4: 7	55	-0.3616	16.3599	0.08479	12.8	13.9	15.0	16.4	17.8	19.5	21.4
4: 8	56	-0.3691	16.3916	0.08508	12.8	13.9	15.1	16.4	17.9	19.5	21.4
4: 9	57	-0.3765	16.4233	0.08537	12.9	13.9	15.1	16.4	17.9	19.6	21.5
4:10	58	-0.3838	16.4551	0.08566	12.9	13.9	15.1	16.5	18.0	19.6	21.6
4:11	59	-0.3910	16.4871	0.08595	12.9	14.0	15.2	16.5	18.0	19.7	21.6
5: 0	60	-0.3981	16.5191	0.08624	12.9	14.0	15.2	16.5	18.0	19.8	21.7

About Pediatrics

2 to 20 years: Girls

Body mass index-for-age percentiles

NAME _____



SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000). http://www.cdc.gov/growthcharts

About Pediatrics

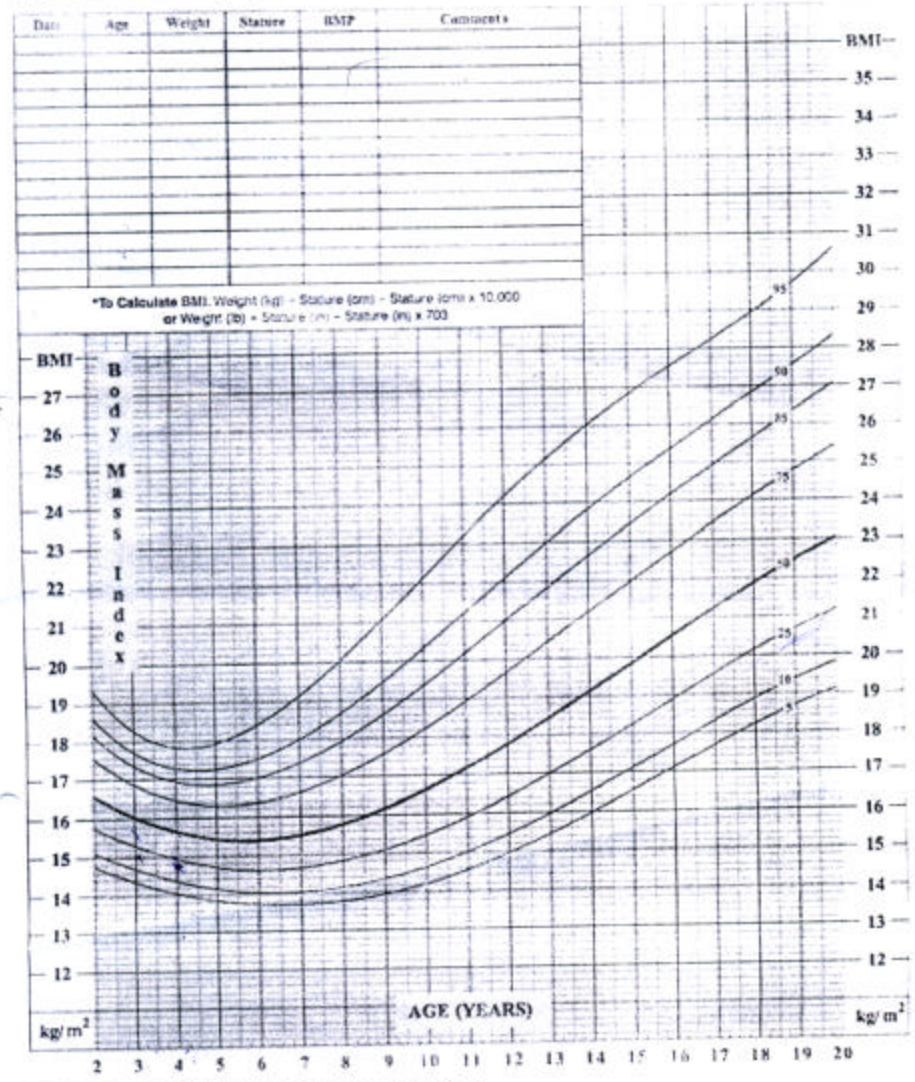
2 to 20 years: Boys

Body mass index-for-age percentiles

NAME

Date	Age	Weight	Stature	BMI*	Comments

*To Calculate BMI: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

ghfk - m

mbggil tpguqfis mwpAk Nehffhzygbtk

FwpgG: Muharrpahsh gpdtUk midjJ jftyfisAk gqNfwgthfspikpUeJ Nrfhpjj (✍) vdw Fwpia kpfTk nghUjjkhditfSfF vjpNuAss fllljjpy ,Lthh.

Njjp.....

gqNfwgthvz .....

1. taJ (tUlqfspy)
   - m) 3 ✍
   - M) 4 ✍
   - ,) 5 ✍
2. ghypdk
   - m) Mz ✍
   - M) ngz ✍
3. gpwgG thpir
   - m) xdW ✍
   - M) ,uzL ✍
   - ,) %dW kwWk mjwF Nky ✍
4. FLkg tif
   - m) jdpfFLkgk ✍
   - M) $lLfFLkgk ✍
5. jhapd fytpjjFjp
   - m) fytp mwpT ,yyhjth ✍
   - M) Mukg fytp (1 Kjy 5 tiu) ✍
   - ,) ,ilepiyffytp (6 Kjy 10 tiu) ✍
   - <) cahepiyffytp (11 Kjy 12 tiu) ✍
   - c) glljhhp ✍
6. jeijapd njhopy
   - m) Ntiyapyyhjth ✍
   - M) jdpahh Copah ✍
   - ,) muR Copah ✍
   - <) Ranjhopy ✍

7. jha‰d njho‰y

m) ,yyjjur‰ ✍

M) jd‰ahh Co‰ah ✍

,) muR Co‰ah ✍

<) Ranjho‰y ✍

8. FLkg khj tUkhdk

m) &.3000fF FiwT ✍

M) &.3001 Kjy &.5000 tiu ✍

,) &.5000fF Nky ✍

9. Foeija‰d j‰drh‰ gofftoffk

m) mqfd thb nryYjy ✍

M) t‰isahlLf fyt‰f$lk nryYjy ✍

,) Mukg fyt‰f$lk nryYjy ✍

<) tlby ,Uggth ✍

10. jhagghy nfhLjj fhymsT

m) MW khjqfs ✍

M) xU tUlk ✍

,) xdwiu tUlk ✍

<) ,uz L tUlqfs ✍

11. ,izczT Mukg‰jj taJ

m) 4 khjqfSfF Kd ✍

M) ehdF khjk ✍

,) MW khjk ✍

<) vlL khjk ✍

c) 10 khjk ✍

12. jLgg+r‰ e‰iy- ,diwa taJ tiu rh‰ahd jLgg+r‰ nfhLjjy

m) Mk ✍

M) ,yiy ✍

ANNEXURE - C

LETTER REQUESTING OPINION AND SUGGESTIONS OF EXPERTS FOR CONTENT VALIDITY OF THE RESEARCH TOOLS

From

Ms.Jayalakshmi.C,
Final year M.Sc. (N),
Sri Gokulam College of Nursing,
Salem, Tamil Nadu.

To

Respected Sir/ Madam,

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

I, **Ms.Jayalakshmi.C,** a Final Year M.Sc. (Nursing) student of Sri Gokulam College of Nursing, Salem. I have selected the topic mentioned below for the research project to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai for the partial fulfillment of Master's Degree in Nursing.

Topic:A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures of underweight preschool children in selected villages, Salem.

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

Thanking you

Place: Salem
Date :

Yours sincerely,

(MS.JAYALAKSHMI.C)

Enclosed:

1. Certificate of validation
2. Criteria checklist of evaluation of tool
3. Tool for collection of data
4. WHO growth chart
5. CDC growth chart
6. WHO child growth standards

ANNEXURE - D

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **JAYALAKSHMI.C** , Final year M.Sc. Nursing student of Sri Gokulam College of Nursing, Salem (affiliated to The Dr.M.G.R. Medical University) is validated and can proceed with this tool and content for the main study entitled **"A study to evaluate the effectiveness of administration of Quail's egg on anthropometric measures of underweight preschool children in selected villages, Salem".**

Signature with Date

ANNEXURE – E

LIST OF EXPERTS

1. **Dr. K. Selvakumari, MD,**
   Consultant Physician
   Sri Gokulam Hospital
   Salem.

2. **Dr. Maheswari, M.Sc(N), Ph.D.,**
   Associate Professor
   HOD, Paediatric Nursing
   Vinayaka Mission Annapoorna College of Nursing
   Salem.

3. **Mr. M. Kandasamy, M.Sc (N)., Ph.D.,**
   Associate Professor
   HOD, Community Health Nursing
   Sri Gokulam College of Nursing
   Salem.

4. **Mrs. Latha, M.Sc(N),**
   Associate Professor
   HOD, Pediatric Nursing
   Sri Gokulam College of Nursing
   Salem.

5. **Mr. Kannan, M.Sc, Ph.D.,**
   Dietician
   Sri Gokulam Hospital
   Salem.

ANNEXURE – F

CERTIFICATE OF EDITING

TO WHOMSOEVER IT MAY CONCERN

Certified that the dissertation paper titled **"A Study to Assess the Effectiveness Of Administration of Quails Egg On Anthropometric Measures among Underweight Preschool Children in Selected Villages, Salem"** by **Ms. JAYALAKSHMI.C.** It has been checked for accuracy and correctness of English language usage and that the language used in presenting the paper is lucid, unambiguous free of grammatical or spelling errors and apt for the purpose.

Sakila Banu M.Com M.Phil

SIGNATURE

WINGS ®
ENGLISH ACADEMY
1,2,3, IInd Floor Ratha Complex,
Five Roads, SALEM-636 004

ANNEXURE – G

PHOTOS (QUAIL'S EGG)