NUTRITION LITERACY, ITS CORRELATES AND EFFECTIVENESS OF A SKILL DEVELOPMENT INTERVENTION TO IMPROVE NUTRITION LITERACY AMONG FEMALES AGED 25-45 YEARS OF AGE IN DISTRICT OF COLOMBO

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Abstract

Nutrition literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand nutrition information needed to make appropriate dietary decisions. Literacy encompasses a wide range of skills, from the ability to apply basic literacy skills in reading, writing and calculations in everyday health decision making, to the ability to apply more advanced literacy skills to independently obtain relevant information, to derive their meaning and to critical analyse the obtained information.

A few attempts had been made globally to assess level of nutrition literacy. Tests that have been were not comprehensive to assess all the facets of the construct of nutrition literacy. The body of literature amply emphasizes the importance of the nutrition literacy among adult females in the view of the importance of their own nutritional status and their role in uplifting the nutritional status of the children and other family members. No research has been conducted in Sri Lanka to assess nutrition literacy among adult females.

With this background the present research aimed to determine prevalence and correlates of nutrition literacy among females aged 25-45 years in district of Colombo and to design, implement and assess the effectiveness of a skill development intervention to improve nutrition literacy of females aged 25-45 years in the district of Colombo.

The study comprised three components. First component was development and validation of a test to assess nutrition literacy among females aged 25-45 years in district of Colombo. Second component was a descriptive cross-sectional study to determine the prevalence of nutrition literacy and correlates for inadequate nutrition literacy among the said study population. Third component was to design a skill development intervention package to improve nutrition literacy skills of females and to implement a cluster randomized trial to assess the effectiveness of the designed intervention.

The test that was developed in the present study to assess nutrition literacy among adult females was named, Nutrition Literacy Test. It comprised 30 single best answer multiple choice questions to elicit the different skills required for one to be nutritionally literate. The test was designed to be completed by the respondents and it did not specify a time limitation.

The development of the Nutrition Literacy Test was a stepwise process which involved a triangulation of quantitative and qualitative methods. The test was also adjusted to Grade 8 reading level to ensure its applicability to a majority of females in the Sri Lankan setting. Following development of the draft test a validation study was conducted to assess the validity and reliability of the test. The validation study included a detailed item analyses to assess the item-total correlation, Item difficulty index, Item discrimination index, inspection of the item characteristic curve, distractor analysis and a reliability analysis and an assessment of convergent validity. Establishment of the cut off score for the Nutrition Literacy Test, was using multi Receiver Operating Curves.

Second component of the present study was a descriptive cross-sectional study to determine the prevalence of nutrition literacy and correlates for inadequate nutrition literacy among females aged 25-45 years in district of Colombo. A sample of 1220 females were selected using a multi stage cluster sampling with probability proportionate to the number of females aged 25-45 years from all the 13 Divisional Sectary (DS) divisions of the district of Colombo. A total of 43 clusters were included in study, and cluster size was thirty. Study units were recruited in a household survey. Validated Nutrition Literacy Test was used to assess nutrition literacy while an interviewer administered questionnaire was used to obtain information on correlates of nutrition literacy. Two trained female pre-intern medical officers collected data under supervision of the principal investigator.

In the third component to design a skill development intervention package to improve nutrition literacy of adult females, many steps were taken to design an educationally sound and culturally appropriate skill development intervention. Principles of development of educational material was followed and the package comprising two training modules and supplementary teaching material were developed and pilot tested. A facilitator with an educational background in the field of nutrition was selected and was trained to deliver the package uniformly. Effectiveness of the intervention was assessed using a cluster randomized trial to assess the effectiveness of the intervention. A grama niladhari area was defined as a cluster and as indicated by the sample size calculation, a total of 24 clusters which are situated geographically apart from each other from two DS divisions of the Colombo district were randomly selected to be include in the study. The selected clusters were randomly assigned the intervention and control status. From each cluster 10 females of 25-45 years of age were selected as the study units. Nutrition literacy, assessed using the Nutrition Literacy Test was used as

the outcome indicator of the success of intervention.

The study and control participants were recruited in a household visit where the pre intervention assessment was conducted by the same data collectors as in Component 2. The intervention was then delivered to females in intervention group, in groups of 10 in two sessions. Six months after the intervention the post intervention assessment was conducted using the same data collectors and the same study instruments.

The results of the validation test indicated that the Nutrition Literacy Test was a valid and reliable test to assess nutrition literacy.

Item total correlations of all items were satisfactory as the values were 0.3 or more for all items. Item difficulty ranged from 0.2-0.9 and the point biserial correlations were above +0.20 for all items. These results confirmed that all the items in the test were appropriate to be retained.

None of the item characteristic curves were flat and all distractors were sufficiently efficient and none of the items were found to be ambiguous or confusing. Item characteristic curves were found to be satisfactory for all items. The test also demonstrated adequate internal consistency as per KR-20 coefficient of 0.913, which were greater than 0.9 which indicate excellent reliability.

Assessment of convergent validity found that high nutrition literacy scores assessed by the Nutrition Literacy Test converged with high use of material on nutrition and high education level.

Based on the findings of multi ROCs, lower cut off offered a sensitivity of 97% and specificity of 95% and the upper cut off score, a sensitivity, 100% and specificity 98%.

1. The present study found that the prevalence of adequate nutrition literacy among females aged 25-45 years in Colombo district to be 44.3% (95% CI 44.3-44.3). The prevalence of marginal and poor nutrition literacy level were 41.1% (95% CI 41.0-41.14) and (14.6% (95% CI 14.5-14.7), respectively.

The age adjusted prevalence of inadequate nutrition literacy of the 25-45 year old females was nearly equal in all age categories. The adjusted prevalence of inadequate nutrition literacy was higher in the Sinhalese (51.8%) compared to non-Sinhalese (48.2%). Prevalence of adequate nutrition literacy level gradually increases with the

increasing level of education. Adequare nutrition literacy also showed a gradually incearsing trend with increasing wealth quintile.

Multivariate analyses revealed that two socio economic correlates were significant correlates of inadequate nutrition literacy when adjusted for effects of confounding. They were having an education level below G.C.F. A/L (adjusted OR=(2.43(95%CI1.81-3.27) and not being employed (adjusted OR=1.58(95%CI1.13-2.21). Involvement in household food purchasing for more than 4 days per week (adjusted OR 1.63 (95%CI 1.19-2.23)), non=-receipt of formal education on nutrition related fields up to G.C.E. O/L (adjusted OR 1.58 (95%CI1.15-2.19)), not using of television to obtain nutrition information during the past six months (adjusted OR=2.47(95%CI1.37-4.43), not using of newspapers to obtain nutrition information during the past six months (adjusted OR=2.90 (95%CI 1.96-4.28)) and possessing low level of nutrition knowledge (adjusted OR=2.18 (95%CI1.66-2.87)) were the other correlates that were found to be significant correlates of inadequate nutrition literacy when adjusted for effects of confounding.

In the cluster randomized trial, the findings showed that the intervention and the control groups were comparable based on selected socio demographic parameters and in levels of nutrition literacy of the study units.

Six months after completion of the intervention, at the post intervention assessment, proportion of study units with inadequate nutrition literacy level had significantly decreased in the intervention group ($p<0.001$) but not in the control group ($p=0.061$). Furthermore, the difference in the intervention group and the control group in the post intervention assessment was also significantly different ($p<0.001$), indicating that the intervention was effective at individual level.

The present study also found that the intervention was effective in improving nutrition literacy irrespective of the age ($p=0.760$) and educational level ($p=0.185$) of the study units. The intervention was also effective in improving each of the skills related to nutrition literacy.

Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention clusters between pre and post intervention assessments showed that the proportion of the participants with inadequate nutrition literacy in the intervention clusters had significantly decreased ($p<0.002$) while the corresponding

difference in the control clusters was not significant ($p<0.156$), indicating that the intervention was effective at cluster level. The present study also generated evidence that the females of 25-45 years old who underwent the intervention accepted the interventional activities well and perceived that participating in the study benefitted them.

The study concluded that inadequate nutrition literacy was a considerable problem among among females aged 25-45 years in Colombo district. The prevalence of inadequate nutrition literacy was seen to be higher among non-sinhalese, low educated and poor. Correlates of inadequate nutrition literacy identified were mostly modifiable factors.

The intervention developed and implemented to improve nutrition literacy skills of the study population was found to be successful in improving nutrition literacy among adult females of 25-45 years in Colombo district. The intervention was proved to be effective in improving nutrition literacy both at individual and at group level.

The study recommends that the problem of inadequate nutrition literacy among females should be brought to the notice of the relevant authorities and that they should be lobbied to consider implementing the intervention to improve nutrition literacy, which was found to be effective and acceptable in the present study, to improve nutrition literacy skills of adult females.

Key words: nutrition literacy, correlates of nutrition literacy, female, prevalence, nutrition literacy skills

Table of Contents

List of Tables

List of Figures

List of Annexure

Abbreviations

CI	Confidence Interval
FGD	Focus Group Discussion
G.C.E. (A/L)	General Certificate of Education (Advanced Level)
G.C.E. (O/L)	General Certificate of Education (Ordinary Level)
GN division	Grama niladari division
NCD	Non Communicable Diseases
KR -20 coefficient	Kuder Richardson coefficient
OR	Odds Ratio
ROC	Receiver Operating curve
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNRIC	United nations regional information centre

CHAPTER 1

Introduction

2.1 Nutrition

The knowledge on association between what we choose to eat and drink and our health, wellbeing, and quality of life is as old as human history. For millions of years, quest for food has shaped human development and the organization of society.

Nutrition describes processes which assist mankind to to maintain structural and functional integrity of the body (Gibney, 2009) by obtaining nutritents from cellular level to organ, and then from individual to societal level. A spectrum of basic and applied scientific disciplines are involved in the effort to understand how individuals obtain and utilize foods and nutrients from a molecular to societal level and factors determining and influencing these processes. These scientific disciplines include biochemistry, food science, microbiology, sociology, political science, anthropology, agriculture, communications, economics etc. (Gibney, 2009).

The field of food and nutrition science started to experience its first renaissance, in the second half of the eighteenth century, with the observation by scientists that intakes of certain foods influence the function of the body and protect against disease.During this initial period, nutrition was studied from a medical model.

Since the late 1980's nutrition has experienced a second renaissance, shifting the earlier medical or pathological paradigm to a more psychosocial one. It was mainly due to the growing perception that the knowledge gained alone is not sufficient to equip mankind to solve the global problems of food insecurity and malnutrition. Hence, issues related to household food security, social determinants, nutrition surveillance, preparation of dietary guidelines, and policy came into light during this period as areas that need to be improved (Gibney, 2009).

2.1 Nutrition communication

The ultimate aim of developing principles of nutrition is to apply them to promote health and wellbeing of individuals, families and communities. To achieve this, it is essential that scientific information gathered by the specialists on nutrition principles

reach consumers at each point of they select food for consumption. Most of the nutrition information reaches consumers via mass media and direct contact with health care personnel.

There are many inherent issues in nutrition information that reach the consumers via media and health care personnel. Media reports may lack scientific validity due to lack of understanding of the scientific information among the media reporters. Further experts in the field of nutrition at times hold opposing views on health facts related to foods. (Freisling H,. 2010) This is mainly due to the evolving nature of the scientific processes where recommendations on food items are liable to change with time. Consumers, who are not very conversant on these processes, would comprehend this as lack of credibility of nutrition cadence.

Thus, it is imperative that consumers be able to selectively identify appropriate nutrition information which would aid them to derive sound food decisions when they select food for consumption. Nutritional information should be presented to them in a manner that they understand them.

Studies on usage of food labels, which is one of the main sources of nutrition information, have shown that those who access information are more likely adopt health behaviours compared to those who do not (Post et al, 2010).Further studies have shown lack of understanding of the terms, symbols and values, poor presentation of the information and concerns of the accuracy, hinder people from using nutrition labels. Those who wish to use nutrition labels to make healthful choices had stated that using simplified formats and conveying them in comprehensible terms and statements would facilitate the use of nutrition information in food labels (Besler et al, 2012).

Hence proper communication of nutrition information is a fundamental requirement in instituting healthy food habits in a population.

Food and nutrition information provided by media can be commercial, instructional or entertainment oriented (Peterson, 2012). It has been shown that irrespective of the purpose of the aim of the media, people turn for media for nutritional information such as healthy portion sizes and food items mostly because they lack cooking skills and general food preparation knowledge (Lang et al., 1999). Furthermore, as most food media are highly influenced by sponsors and advertising support, the information they

provide is not necessarily in par with the public interest. Hence it is imperative that public be sufficiently empowered to critically evaluate food and nutrition information provided by media.

2.2 Nutrition literacy

The term 'literacy' by definition comprises a set of skills that enable people to participate more fully in society, and to exert a higher degree of control over everyday events. The term 'literate" has been generally used to mean "ability to read and write" and still the most popularly used term globally. Until the late 19th century,a person has been considered literate if they are well educated, able to read or familiar with the literature(UNRIC,2014).

This conventional definition of literacy has evolved over the years. Due to development of the information and communication technology, and changes in the economic and socio cultural contexts, (UNRIC, 2014).

The UNESCO message on the international literacy day,2013 further adds up to this as "... other ways of understanding "literacy" or "literacies" haveemerged to address the diverse learning needs of individuals in knowledge-oriented and globalized societies" (NCYC, 2010)). The wider context of the term literacy is highlighted by the different types of literacies, such as information literacy, health literacy, nutrition literacy and oral health literacy, which are content and context specific, which have evolved in the field of literacy.

Nutrition literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand nutrition information needed to make appropriate dietary decisions (Zoellner, 2009). The above definition of the nutrition literacy has been derived from the widely used definition of health literacy (Zoellner, J. 2009; U.S. Department of Health and Human Services, 2010).

The scope of concept of literacy encompasses a wide range of skills, fromability to apply basic literacy skills in reading, writing and calculations in everyday health decision making to ability to apply more advanced literacy skills to independently obtain relevant health information, derive meaning and critical analysis of information.

Possession of this basic to advanced set of skills permits a person to perform optimally in society and improve ability to exert a greater control over external environment.

Assessments of literacy can be in two forms. It can either be in absolute termsi.e. distinguishing between those who possess basic literacy skills against those who cannot, or in relative termsi.e.comparative assessment of possession of literacy skills (Nutbeam,2008).

2.3 Measuring nutrition literacy

Measuring nutrition literacy itself is a challenge as the scope covered by the concept is wide and objective assessment of certain aspects of it is difficult. Furthermore, measurement indicators should be relevant and appropriate for the group of the persons being measured.

Parker, who has done much work in the field of health literacy, has stated that there really is no 'gold standard' for measuring health literacy (Parker et al., 1999). This limitation of not having a gold standard is applicable for nutrition literacy, too.

In attempting to assess nutritional literacy, researchers have developed and used several tests. The Nutritional Literacy Scale is a test with no imposed time limitation which has 28 multiple choice items, arranged in a paragraph based on weight maintenance and control of non-communicable diseases. This testassesses nutrition related reading and comprehension skills of the adults (James et al, 2007).

Newest Vital Sign (NVS) is another test which has been used to assess nutrition literacy (Weiss, et al, 2005).It is a three minute test based on a nutrition label of an ice cream container and comprises six structured questions which call for short answers.This testassessesabstract reasoning, reading and numeracy skills of the respondents.

The Nutrition Label Survey is a 24item survey instrument aiming to assess food label comprehension of the participants. This is also a test with no time limitation (Rothman et al, 2006).

Many other nutrition related readability tests have also been developed, using traditional print material and internet based information. Most common topics used in

these readability tests are general nutrition guidance regarding cardiovascular diseases and cancer prevention.

Another aspect of assessment of nutrition literacy is that even with in the same content and context, the optimal level of literacy varies within differing age groups, stages of life and even the cultural back ground (Nutbeam, 2008).Hence, different measurement tests are needed for different ages and stages of life and these tests should be appropriately adjusted to be culturally acceptable.

2.4 Level of nutrition literacy

Research evidence on estimates of nutrition literacy level is available, globally.

A descriptive cross-sectional study has been conducted in the lower Missisipi delta using NVS test to assess nutrition literacy of adults. The study has found that out of the 177 adults who were assessed, only 48% had adequate nutrition literacy (Zoelner et al, 2009).

Another study was conducted to assess nutrition literacy and nutrition knowledge among school nutrition managers. An adopted version of NVS had been used as the test of nutrition literacy. This study revealed that out of 728 school nutrition managers 72.2% had adequate nutrition literacy (Zoelner et al, 2010).

An assessment of food label comprehension using 24 item nutrition label surveyin 200 primary care patients in USA had shown that on average, 69% of the patients answered the food-label questions correctly. Common reasons for incorrect responses included misapplication of the serving size, confusion due to extraneous material on the food label, and incorrect calculations.

There is a dearth in the literature on assessments of nutrition literacy from the Asian countries. No nutrition literacy assessments have been conducted in Sri Lanka.

2.5 Correlates of nutrition literacy

Several research studies have been done to identify the correlates of nutrition literacy. Although the correlation does not imply the causation, the causation implies the correlation (Mukala, 2012). Further, based on the evidence obtained from studying

correlation, it is possible to plan out interventions for improving nutrition literacy, targeting the correlates that can be modified.

Based on the findings of a cross-sectional study on the nutrition literacy level and the preferred nutrition communication channels among adults aged 18 and above (n=177) in rural Lower Mississippi Delta (Zoellner, et al, 2009), adequate nutrition literacy was found significantly associated with high media use for general purposes ($F = 2.79$, $P = 0.005$), high media use for nutrition information ($F = 2.30$, $P = 0.04$), and high level of trust from nutrition sources ($F = 2.29$, $P = 0.005$).

A cross-sectional study assessing barriers and catalysts of nutrition literacy among Japanese elderly population above the age of 75 years (Aihara and Minai, 2011) has shown that nutrition literacy is higher among males than females. It was also found that cognitive impairment, low education and low economic status were associated with limited nutrition literacy.

Another study was performed on predictors of nutrition information comprehension (Lisa et al, 2010). The study population was adults aged 18 to 80 years of age. The study found that nutrition knowledge, attention to nutrition information and age to be significant predictors ($p<0.05$) of nutrition information comprehension.

2.6 Importance of nutrition literacy in females

Unhealthy diet is a recognized as the primary life style related risk factor for Non Communicable Diseases (NCD). Nutrition literacy is of fundamental importance in adherence to a healthy diet.

Adult females often bear the responsibility of choosing and preparing food for the family. Being nutrition literate facilitates ones' ability of the females to recognize and use their skills to provide family with a healthful diet and develop healthful dietary habits in the family.In Sri Lankan setting, most of the activities in decision-making processes involved in diet is taken by the female head of the family.

Research evidence from other countries also supports the evidence of importance of females to be nutrition literate. A study done in USA to identify the male involvement

in meal planning, shopping and food preparation has shown that only 23%, 36% and 27% of the males are involved in above activities (Harnack et al, 1998).

Another study to assess the influence of gender, age, education and household size on meal preparation and food shopping responsibilities in USA on a sample of 3195 married or partnered adults has supported high female contribution to family diet related matters (Flagg et al, 2013). The study has shown that women were more likely to take primary responsibility of meal preparation and food shopping responsibilities than to share this responsibility with a spouse.

These evidence highlight that women's nutrition literacy has a crucial bearing on food practices of family and children.

There are several points in life of a woman which are associated with important decision making related to nutrition. During the period of young adulthood, women undergo some important milestones of their life. Pregnancy is one such event where nutrition plays a vital role. Pre-pregnancy nutrition level and weight gain, adequacy of micro nutrients such as iron and control of diet related diseases such as gestational diabetes during pregnancy are crucial for favorable pregnancy outcomes. Possessing a good level of nutrition literacy would enable her to make informed decisions regarding healthy food choices during pregnancy.

Following pregnancy, during the period of breast feeding, the women need a wholesome meal with adequate amount of macro and micro nutrients which will be facilitated by good nutrition literacy. This is very important for her health and the health of the neonate.

Feeding of the infant and child is directly under the care of the mother. Her level of nutrition literacy, depicting her ability to understand nutrition information and ability to decide on suitable food will have a bearing on the nutrition of the child.

Home environment is the first place where children learn about food. Child's eating habits are strongly affected by parent's nutrition literacy, especially mother's. Parents with low nutrition literacy tend to inculcate low nutrition skills in children (savage et al, 2007).

Young womanhood also has an impact on development of NCD in later life (ref). Although most of the dietary practices are established during the period of adolescence, young womanhood also plays a role in maintaining those throughout the rest of life. As this is the period where they become economically productive and independent regarding decision making, their dietary patterns and food acquisition would be guided by their income and literacy level. Hence, it is important that they possess a good level of nutrition literacy during this period.

2.7 Interventions to improve nutrition literacy

As discussed earlier, improving nutrition literacy of the public is imperative to empower public to make sound nutrition decisions. Literature provides evidence of ainterventions to improve various types of literacy.

The United Nations Educational, scientific and cultural organization (UNESCO) has conducted several community based general literacy interventions targeting female adolescents and adults and families which has been shown to be effective in improving general literacy Adult functional literacy programme in Pakistan, Family literacy Programme in Turkey, Early literacy project in India, are few of these (UNESCO, 2004).

"Cook It Up!'' is a community-based cooking program for at-risk youths aiming to improve food literacy (Thomas et al, 2011). In this intervention an 18-month community-based cooking program has been conducted for for at-risk youth. The intervention was planned and implemented to improve the development and progression of cooking skills and food literacy. In this intervention education and skills on agriculture, healthy eating, food preparation, and food purchasing skills has been provided to selected 8 volunteer youths over a period of 18 months and the effectiveness was evaluated at the end.

Frankston Community Kitchens Project is another such intervention project conducted by Frankston Community Health Service in Canada aiming to improve food literacy of adults.In this intervention a group of people that comes together on a regular basis to cook healthy and affordable meals for themselves and their families with the support of a facilitator. Pre and post evaluation of the intervention has showed participants were

more motivated to cook at home, more likely to use a shopping list, increased confidence and have a higher reported intake of Fruits and vegetables (Trezise, 2006).

2.8 Justification

Sri Lanka is burdened with a wide range of nutrition related problems. Nutrition related problems still exist in spite of a wide range of direct and indirect nutrition related interventions that has been implemented in the country for a long duration (Dept. of Census and Statistics, 2007; Ministry of Health, 2008).

According to the findings of National micronutrient surveyin 2012 in Sri Lanka, prevalence of stunting, wasting, under-weight and anaemia among children under five years was 13.1%, 19.6%, 23.5%, and 15.1% respectively (Medical Research Institute, 2012). Furthermore, thinness, overweight and obesity among females in the age group of 18-59 years of agewere14.9%, 24.6% and 6.9%, respectively.The corresponding values for males were 16.2%, 22% and 4.2 %, respectively.

The burden of over nutrition is assessed in terms of prevalence of overweight and obesity.

Non Communicable Disease Risk factor survey(STEP survey)in western province in 2003 among 15-74 age group (n=1500) revealed that of this age group, 4.3% had BMI more or equal to 30 kg/m^2 indicating obesity

Obesity is identified as a major risk factor for developing coronary heart disease,type 2 diabetes mellitus, cancers (endometrial, breast, and colon), hypertension, dyslipidemia and stroke(Rubenstein,A.H.,2005)

Adverse health effects of obesity are also evident in Sri Lanka. The prevalence of hypertension was 18.8% for men and 19.3% for women and the prevalence of diabetes was 14.2% for men and 13.5% for women in 2005 (Wijewardene,2005).According to annual health statistics of the year 2007, ischemic heart disease was the leading cause of death (13.1%) among hospital deaths.Neoplasm (10.1%), pulmonary heart disease and diseases of pulmonary circulation (10.1%) and cerebro-vascular disease (9.2%) ranked second, third and fourth positions, respectively in 2007. All together these diseases amounted to 42.5% of all deaths (Ministry of Health, 2007).In Sri Lanka,

prevalence of diabetes mellitus in the more than 20 years old group was found to be 10.3%. It has been projected that prevalence of diabetes would be 13.9% by the year 2030(Katulanda et al, 2008).

Sri Lanka's national policy for prevention and management of chronic NCD has identifiednine key strategies for control of NCDs. Empowering the community for promotion of healthy lifestyles is identified as the one of thestrategies. Empowering communities to adopt healthy diet is a key lifestyle factor. Improving nutrition literacy is a fundamental step in achieving this and thereby addressing the issue of NCD.

The National nutrition strategic plan for 2009- 2013 also focused on enhancing capacity to deliver effective and appropriate interventions to promote behavior change among all sections of population. It also aimed at enabling population groups to make right food choices and care practices as the first key action area (Ministry of Health, 2010)

In Sri Lanka, an assessment of the general literacy level had been carried out in the census of population and housing in the year 2001(Table 1.1). Those who are able to read and write at least one language has been regarded as literate and this assessment had been done based on the self-reported skills with no objective evaluation of the ability being performed. Based on the findings of the census, overall literacy rate in Sri Lanka was found to be 94.7% with male and female figures for the 95.3% and 94.0% respectively.

Nutritional literacy has not been assessed in Sri Lanka. High general literacy based on the self-reported ability to read and write, does not indicate the clear picture of the nutrition literacy skills. In the light of burden of nutrition related problems in the country, it is important to assess the nutrition literacy level and exploring interventions that may improve the nutrition literacy among those who have inadequate nutrition literacy level. Of the population groups, females aged 25-45 years can be considered as an important population group to target for efforts of improving nutrition literacy,

Females in the age group of 25-45 years are responsible for a diverse role in individual, family and community food choices. During thisage period females are likely to encounter many challenging milestones of their life. A majority would enter their first income generation activities which would have an impact on food choices. Marriage,

pregnancy and child rearing are other important milestones these women may face which are also associated with important decision making with regard to food. Furthermore, during this age period women are at risk of being subjected to risk factors predisposing them to subsequent development of non-communicable diseases. Thus, it is important that females of this age group possess good nutritional literacy and thereby make appropriate food choices.

Currently there is no test validated for measuring nutrition literacy in Sri Lanka. As discussed earlier, development of age specific culturally acceptable tests is essential for assessment of nutrition literacy. Assessment of the correlates of nutrition literacy and planning and conduction of literacy improvement intervention can be appreciated in the light of burden of nutrition related health problems, under nutrition and obesity and its related illnesses.

In this background present study was designed to develop and validate a measure to assess nutrition literacy and to assess nutrition literacy and its correlates of among females aged 25-45 years in district of Colombo. Designing a skill development intervention to improve nutrition literacy of females aged 25-45 years and implementing and assessing its effectiveness was also an aim of the present study. Findings of this study will provide the empirical evidence on the level of nutrition literacy among adult females. Identification of correlates for inadequate literacy was to obtain evidence on groups at which the nutrition literacy improving interventions to targeted to. Generating evidence on a targeted interventions to improve nutrition literacy was also an aim of the present study to provide the field of nutrition its much needed evidence on measures to improve nutrition literacy.

2.9 Objective

General objective

1. To develop and validate a measure to assess nutrition literacy and to determine the prevalence of nutrition literacy and its correlates of among females aged 25-45 years in district of Colombo
2. To design, implement and assess the effectiveness of a skill development intervention to improve nutrition literacy of females aged 25-45 years in district of Colombo.

Specific objectives

1. To develop and validate a measure to assess nutrition literacy among females aged 25-45 years in district of Colombo.
2. To determine theprevalence ofnutrition literacy of females aged 25-45 years in district of Colombo.
3. To assess the correlates of nutrition literacy among females aged 25-45 years in district of Colombo.
4. To design a skill development intervention to improve nutrition literacy among females aged 25-45 years in district of Colombo.
5. To implement and assess the effectiveness of the skill development intervention to improve nutrition literacy among a sample of females 25-45 years in district of Colombo

CHAPTER 3

Methodology

The research was conducted in three components.

Component 1:

Development and validation of a test to assess nutrition literacy among females aged 25-45 years in district of Colombo.

Component 2:

This was a cross-sectional study comprising the following

- **Subcomponent 1:** A descriptive cross-sectional study among females aged 25-45 years to determine the prevalence of nutrition literacy
- **Subcomponent 2:** A comparative cross-sectional study to determine correlates for nutrition literacy among females aged 25-45 years in the district of Colombo

Component 3:

This was an intervention study comprising the following

- **Subcomponent 1-** Designing a skill development intervention package to improve nutrition literacy skills of females aged 25 to 45 years in Colombo district.
- **Subcomponent 2** –Implementation of acluster randomized trial to assess the effectiveness of the skill development intervention to improve nutrition literacy skills among females aged 25 to 45 years of age.

3.1. Component 1: Development and validation of a test to assess nutrition literacy among females aged 25 to 45 years in district of Colombo.

3.1.1 Development of a test to assess nutrition literacy

Development of the test to assess nutrition literacy in the present study was a step wise process as described as follows.

- Step 1 - To explore the key definitions of nutrition literacy and identify key skills required to be nutritionally literate to be assessed in the proposed test
- Step 2- To select a range of appropriate nutrition related stimuli to evaluate the key skills required to be nutritionally literate.
- Step 3 - to develop test questions to evaluate the key skills required to be nutritionally literate based on the selected stimuli
- Step 4- To design the scoring system for test questions to evaluate the key skills required to be nutritionally literate.

Thus developed test, was named Nutrition Literacy Test.

Step 1 - To explore the key definitions of nutrition literacy and identify key skills required to be nutritionally literate to be assessed in the proposed test

A thorough literature survey was done to identify an operational definitions of nutrition literacy used in research and tests or scales to assess the nutrition literacy.

Only few studies have been conducted in the field of nutrition literacy and these studies (James et al, 2007; Zoellner et al, 2009) had used definitions that had been adopted from the widely accepted definition of health literacy. This widely used definition of health literacy is 'individual's capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions'(USA Department of Health and Human Services, 2000; Ratzan & Parker, 2000;Nielson-Bohlman et al, 2004). Based on the definition of literacy, a literate person should have a complex, multidimensional set of skills that include skills for reading, writing, numeracy (interpreting and analysing numbers or data of a laboratory test results, tables, and graphs), listening to get information, oral and visual communication, problem solving and decision making (Helitzer et al,2012).

Other than the review of literature, the present study consulted a experts in the field of nutrition at each step of the development of the test to assess nutrition literacy.

Thus, based on the literature and the opinion of a panel of experts in the field of nutrition, the present study adopted the operational definition 'the degree to which an individual can obtain, process, understand, and communicate, nutrition related information needed to make appropriate dietary decisions' for nutrition literacy.

As described in the section 2.4 of the chapter on review of literature, there are reports of a few validated tests to assess the health literacy and nutrition literacy. The test of functional health literacy (TOFHLA) and the Health literacy skills test' (Schillinger, et al, (2010) are the tests that have been widely used to measure health literacy. Nutrition literacy scale developed by James et al, (2007) and the Newest vital Sign test which was adopted by Zoellner et al, (2009) were the tests that have been reported in the literature as tests to assess nutrition literacy.

Perusing the tests to assess nutrition literacy revealed that they did not cover all facets of the construct, nutrition literacy. The present study next proceeded to identify the skill areas to be evaluated for a comprehensive assessment of literacy, with the aim of developing a comprehensive test of nutrition literacy which covers all facets of the construct.

Firstly, the present study identified the skills that are assessed by the widely used health and nutrition literacy tests in the literature. The findings of the literature review was then discussed with the experts in the field of nutrition. Following were the five major skill areas that were identified to be to be assessed in the test being developed..

1. Ability to identify nutrition related text.
2. Ability to comprehend nutrition related text.
3. Interpreting nutrition related information and data presented in the form of tables, charts, pictures, symbols and maps.
4. Completing nutrition related computations.
5. Making nutrition related inferences based on the information presented.

Reading and simple writing skills, basic numerical skills, skills for independent information seeking, communicating skills and skills enabling critical evaluation of information to make appropriate health decisions are the generic skills that are relevant in bringing about the above skills.Though the skills of critical analysis of the information is also relevant to the skill of decision making regarding nutrition, review of literature and expert opinion revealed that this skill was difficult to be assessed using a test. Furthermore, the skill of 'making nutrition related inferences based on information presented' which is a skill that was being planned to be assessed in the test being developed was found to be providing some information regarding the critical analysis of information.

Step 2- To select a range of appropriate nutrition related stimuli to evaluate identified key skills required to be nutritionally literate.

A literature search was next directed towards identifying stimuli that had been used by the existing tests of literacy to evaluate the tasks related to the skills. It was found that Newest Vital sign, Nutrition literacy Scale had aimed at assessing the tasks of comprehending nutrition related text and completing nutrition related computations using stimuli related to non-communicable diseases, weight maintenance and food labels. Based on the stimuli used in these tests it was decided to identify a set of stimuli to be used in the test being developed. This was done by the Principal Investigator (PI) in consultation with the experts in the field of nutrition based on the following criteria.

(a) The stimuli to be related to health concerns of majority of adult females of the country.

(b) The stimuli to be presented in a culturally appropriate manner in the test being developed.

(c) Stimuli to be related to health topics which are not controversial/ under research.

(d) Stimuli to be from sources which general public are in contact in their day today food and nutrition related activities. The present study used stimuli from sources such as nutrition labels and advertisements via printed media and publications of government and private sector publications.

(e) Stimuli to be related to day to day household food selection, food storage, food preparation of an average household in the country.

Following this process the present study identified thirteen stimuli to be used in the nutrition literacy test being developed

Step 3 - To develop test questions to evaluate the key skills required to be nutritionally literate based on the selected stimuli

This step of developing the test was done by the Principal Investigator (PI) in consultation with the experts in the field of nutrition and education. Considering the selected range of stimuli, as the basis, five or more questions were developed to assess ability of the individual to perform the tasks related to each identifiedskill that one should be able to perform to be nutritionally literate.

One stimuli provided the basis for, one or more questions aiming to assess one or two skills, but care was taken to ensure that one test question would assess only a single skill.

Many measures were taken to carefully design the questions to ensure validity of the assessment of nutrition literacy. When designing the questions, many care was also taken to ensure that prior nutrition knowledge was not required to answer the question. In other words, information mandatory to give correct answer to the question, was provided in the relevant stimuli. This was to ensure that the test being developed is an independent standalone measure of nutrition literacy and lack of knowledge of the subject matter would not bar accurate assessment of literacy. Questions were designed to be independent of each other. In other words, answers to a question was not dependent on the response of the previous question.

Questions were designed to be of a varying range of difficulty, so that the test would be sensitive to recognise varying degrees of nutrition literacy among the respondents. Questions were designed to be short using simple language avoiding technical or medical terms related to nutrition to facilitate understanding by the respondents (Abramson and Abramson, 1999).

The sequences of the questions were also carefully arranged. Easy questions were arranged in the beginning of the test and difficult ones were arranged towards the end to improve the response rate to the test (Abramson and Abramson, 1999).

When deciding the format of the questions to be used, The multiple choice questions in which one response is correct with three possible distracters, one being a don't know option was the format adopted by the health literacy skills test, was considered appropriate t. the structured essay question format adopted by the Newest Vital sign was not considered appropriate as it demanded complex writing skills and in the assessment it poses difficulties. The multiple choice questions in which one response is correct with three possible distracters, one being a don't know option, was used. Care was taken to ensure that the responses were mutually exclusive.

Self-administered approach was selected as the mode of administering the test. All health literacy and nutrition literacy tests that has been developed and used have been used as self-administered tests. The fact that reading is one of the basic functional literacy aspects and self-administration allows some assessment of the reading skill

supported the decision to design the test as a self-administered test. Furthermore, the fact that in day-to-day situations when people have to make decisions at the shop or market there will be no assistance for reading the information also, supported this decision.

The draft Nutrition Literacy Testthus prepared, contained 30 questions based on 13 stimuli related to nutrition. As described earlier each stimulus had two or three questions.

Step 4- To design the scoring system for each questions

This step of designing the weighted scoring system also was done by the Principal Investigator (PI) in consultation with the experts in the field of nutrition and education.

It was decided to assign marks so that each skill being assessed in the test will have equal weights. The test was designed to provide a total score of 100 b with each of the skill being allocated 20 marks. Within each skill the questions were assigned marks so that each question had an equal weight.

The scoring pattern was designed so that high scores of the draft Nutrition Literacy Test was indicating higher nutrition literacy.

Thus developed draft Nutrition Literacy Test was than subjected to assessment of content validity, translation into Sinhala language, adjustment of the reading level and pretesting.

3.1.2. Assessment of content validity of the draft Nutrition Literacy Test

Firstly, the draft Nutrition Literacy Test was subjected to assessment judgmental validity.

The assessment of the judgmental validity include assessing face, content and consensual validity of the test. Face validity of a test implies whether the questions you use in the test appear to be a valid assessment of the given construct. Content validity of a test implies whether all the components to be assessed are covered by the questions included in the test (Abramson and Abramson, 1999).

Development of the draft Nutrition Literacy Test was done ensuring content validity. In development phase of the test, the widely accepted definitions for nutrition literacy and health literacy were taken into consideration. All the skills required to be literate and major tasks that would depict whether one possess the skill were identified through a thorough literature review. Selection of nutrition related stimuli and formulating the questions were done through a scientific process under expert guidance.

Consensus regarding the thus developed draft Nutrition Literacy Test was assessed in this study by a group of experts whose consensus was obtained using the modified Delphi technique.The group of experts comprised three community physicians, two nutritionists, one nutrition assistants and one health education officer.

In the process of assessing consensual validity, each expert was provided with documents relevant to following information. The operational definition adopted for nutrition literacy, information related to the range of skills that has been included in the said definition, literature on the nutrition literacy testsdeveloped and used by other researchers in other countries and the draft Nutrition Literacy Test. When presenting the draft Nutrition Literacy Test, the experts were also provided the information on the skill being assessed by each question.

In the first round of obtaining consensus, the experts were asked to assess the suitability of each of the question to the skill that it was supposed to be assessing. The opinion of the expert on suitability of the question was obtained using a mark ranging from 1 to 5, where 1 represented not suitable at all and 5 representing highly suitable. Experts were also requested to suggest alternate wordings/ alternate questions if they are assigning a score of 3 or less to a question.

Similarly, the experts were also requested to assess the adequacy of the questions to assess the relevant skills and the cultural suitability of the questions using a mark ranging from 1 to 5. Experts were also requested to suggest alternate wordings/ alternate questions if they are assigning a score of 3 or less to a question.

The experts were also requested to assess the suitability of the scores that have been assigned for each of the question using a mark ranging from 1 to 5, where 1 represented not suitable at all and 5 representing highly suitable. Experts were also requested to suggest alternate marks if they are assigning a score of 3 or less to a question.

The set of documents used to assess the judgmental validity of the experts is presented in the Annexure I.

The scores given by all experts for each question of the draft Nutrition Literacy Test for each aspect assessed was then assessed. Any questions with a score less than 3 for nany aspect with suggested modifications were modified accordingly. Of the 30 questions, 5 questions were modified based on suggestions and the process of obtaining consensus was repeated using the modified version of the test. Second round of obtaining consensus did not reveal scores less than three for any questions thus confirming the consensual validity of the draft Nutrition Literacy Test.

3.1.3 Translation of the draft Nutrition Literacy Test

The draft Nutrition Literacy Test which was confirmed as having content validity was then translated to Sinhala from its English version. The forward-backward translation methodology was employed in the translation of the draft test.

(a) Forward translation (English to Sinhala translation)

Two translators, both with a high level of fluency in English and Sinhala, independently translated the test into Sinhala. The two forward translations were then compared by an independent expert in English language. Both were considered appropriate by the independent third expert.

Considering the slight differences of the words used, one of the translations was considered more suitable by the agreement of the two translators and the third expert.

This version of the forward translation were then translated back into English

(b) Back translation (Sinhala to English translation)

Two translators, both with a high level of fluency in Sinhala and English, independently translated the forward translations of back into English without reference to the original English version. The independent expert in English language compared the English translations with the original test and found it to be compatible. Thus, the forward

translated Sinhala version of the draft Nutrition Literacy Test which was subjected to backward translation was accepted for use.

3.1.4 Adjustment of the reading level of the draft Nutrition Literacy Test

Next the Sinhala version of the draft test was adjusted to Grade 8 reading level. This adjustment was done as per the opinion of the experts of the field of education as the majority of the population in Sri Lankan community are educated at least up to grade 8 and the fact that even those with education level below grade 8, are able to read at this level according to the experts of education in department of education publications.

Reading level was reviewed by two experts in the ministry of Education publications and it was agreed that the reading level of the translated version of the nutrition literacy test is up to the reading level of grade 8.

3.1.5 Pre-testing the draft Nutrition Literacy Test

Drat Sinhala version of the draft Nutrition Literacy Test was administered to 10 females in the age group of 25 to 45 years of age to assess whether the wording used could be understood easily Each person was interviewed after completion of the test, and based on the opinion of them few modifications in the wording was carried out.

3.1.6 Validation of the draft Nutrition Literacy Test

A validation study was designed and conducted to assess many aspects of validity and reliability of the draft Nutrition Literacy Test. A scientific process was also adopted to definethe cut-off value of the draft Nutrition Literacy Test.

3.1.2.5. Validation study

3.1.2.5. (a) Study design

This was a descriptive cross sectional validation study to determine validity of the draft nutrition literacy test to assess nutrition literacy among females aged 25 to 45 years of age, in the district of Colombo.

3.1.2.5. (b) Study period

The validation study was conducted from May to June, 2012.

3.1.2.5. (c) Study setting

Selection of the study setting for the validation study was done after the selection of the study settings for the Component 2 of the present study. Hokandara South,

Wellangiriyra, Hokandara North, Arangala and Hokandara East GN area of Kaduwela Division (Annexure II) in district of Colombo, which were not selected for the study in component 2, was the study area for the validation study.

3.1.2.5. (d) Study population

Females in the age group of 25 to 45 years of age, who were permanent residents of the area over last two years were included as the study population. Females who had been diagnosed to suffer from psychiatry illnesses, cognitive impairments and acute illnesses at the time of survey were not included in the study.

3.1.2.5. (e) Sample size for the validation study

The calculation of the sample size for the validation was based on one of the aspects used in the validation study, which was to assess the scale structure using factor analysis.

In calculation of the appropriate sample size for the factor analysis, some consider minimum of five subjects per each item, to generate stable reliability and validity estimates (Tabachnik and Fidell, 1993). Draft Nutrition Literacy Test comprised 30 items. Hence, it was decided to take a sample of 150 persons in the validation study.

3.1.2.5. (f) Sampling technique

Females to be included in the validation study were selected using a cluster sampling method similar to the sampling technique of the Component 2.

A cluster in the validation study was defined as a group of females aged 25 to 45 years of age in a GN division and the number of study units included in the study per cluster (cluster size) was taken as 30. Participants were selected from households in these five GN divisions of Kaduwela DS division. When there were more than one eligible female in the household, only one female in the household was selected. In the selection of the study participants, the assistance of the local public health midwife was obtained as she was familiar with the area and the compliance of the participants was facilitated by her presence.

Once a participant is selected for the study, they were explained about the study (Annexure III and IV) and were invited to participate in the study after obtaining informed written consent (Annexure Vand VI). This procedure was followed till the required numbers of females were recruited into the study. The study was conducted

during weekends and evenings of weekdays to facilitate the inclusion of working females into the study.

3.1.2.5. (g). Data collection Instrument

Data collection instrument comprised the following

Part 1: Interviewer administered questionnaire (Annexure VII and VIII) comprising the following sections

* Basic socio demographic information including education level
* Questions on use of print material on nutrition

Part 2: Draft Nutrition Literacy Test (Annexure IX a and X)

3.1.2.5. (h).Training of a data colelctors

One female research assisstant was employed as the data collector to conduct the validation study and was trained by the principal investigator on the following aspects.

- Introducing the study to the potential respondents and to obtain informed written consent, ensuring confidentiality and minimizing non response.
- Administering of study instruments.

Precautions to be taken to obtain reliable, valid and accurate data 3.1.2.5. (i). Data Collection:

Principal Investigator performed the task of selecting the study units in the fields. The trained pre-intern medical officer visited the households and confirmed the eligibility of the respondent. Then she provided information on the purpose of the study and obtained written informed consent from the selected participant prior to collection of data. Then the interviewer administered questionnaire was administered.

Following this, the draft Nutrition Literacy Test which was linked to the filled interviewer administered questionnaire by an index number, was handed over to the respondent. Participant was requested to complete the test on her own, while data collector remained in the house to collect the completed test. The importance of not obtaining assistance from any family member or any material was emphasized.

All questionnaires were checked by the PI for completeness at the end of the day and re- interviews were made for incomplete questionnaires.

3.1.2.5. (j). Data Analysis:

Data analysis consisted of four steps. Each of the 30 questions in the draft Nutrition Lieracy Test was considered as an item

1. Item analysis.
2. Assessment of the distribution of the nutrition literacy test score.
3. Assessment of the convergent validity.
4. Establishment of the cut-off score for nutrition literacy test.

1. Item analysis

In the validation of the draft nutrition literacy test, item analysis was performed with regard to following aspects as described by Tavakol and Dennik (2011)

a) Assessment of the item-total correlation.
b) Assessment of the Item difficulty index.
c) Assessment of the Item discrimination index.
d) Inspection of the item characteristic curve.
e) Distractor Analysis.
f) Reliability analysis.

a**). Assessment of the item–total correlation**

In calculation of the item total correlation, the corrected item –total correlation i.e. the correlation between an item and the rest of the score, without that item being considered as a part of the test, was calculated. If the correlation is below 0.3 for an item, it was considered that the item is not measuring the same thing measured by the rest of the test. Hence, items with low (below 0.3) item-total correlation were considered for elimination (Tavakol and Dennik, 2011)

b). **Assessment of the Item difficulty index**

Item difficulty Index is the proportion of participants who got the item correct. This is also known as P value and is expressed as a decimal. Values near the 0.00 indicate greater proportion of participants responded to the question incorrectly, indicating that the item is very difficult and values near the 1.00 indicate greater proportion of participants responded to the question correctly, indicating that the item is veryeasy (Numnally, 1972). In the present validation study Item difficulty index of each of the 30

items was estimated. Item difficulty values between 0.2 to 0.9 values are considered to be appropriate to be included in the draft Nutrition Literacy Test.

c). **Assessment of the Item discrimination index**

The **item discrimination index** is a measure of how well an item is able to distinguish between examinees who are knowledgeable and not. This index was also estimated for each of the 30 items in the draft Nutrition Literacy Test. In the assessment of the item discrimination two methods were adopted; i.e. Calculation of the point biserial correlation of the items and calculation of the discrimination index.

Assessment of the item discrimination index of the Nutrition Literacy test using point biserial correlation

For assessment of the item discrimination, Point Biserial Correlation of the participants score on each item (0 or 1) along with the overall test score was assessed. This measures the degree to which an item and the test as a whole are measuring a unitary attribute. The range of value for the items would be -1.00 to +1.00 and negative values are considered as indicative of misleading questions and a value of point bi-serial correlation of +0.20 or above was considered appropriate for the test (Tavakol and Dennik, 2011)

Assessment of the item discrimination of the Nutrition Literacy test by discrimination index

For assessment of the item discrimination, discrimination index for the items was calculated based on the method described by Tavakol and Dennik (2011).

In this method the participants were divided in to two equal groups based on the overall score as high and low. The percentage of participants who obtained correct response for each item in the two categories was assessed and the difference between two percentages was calculated. The difference in the percentages between high score group and low score group is known as discrimination index.

A positive difference indicates that the item discriminates in the same direction as the total score.

d). **Inspection of the item characteristic curve**

The item characteristic curves for the each item was drawn using the Microsoft excel 2007 software and was visually inspected.

The item characteristic curves explores the possibility of correct response at varying ability levels, its X axis depicts the ability level which range from -3 to +3 In General, it is considered that -∞ to +∞ is the ideal range for the ability. The Y axis of the curve represents the probability of correct response p(ø))(Baker and Frank,2001).

In the present study, inspection of the item characteristic curves was performed to detect whether any items will have a flat curves. Flat curve is indicates that at all ability levels the possibility of correct response is equal.

e). Distractor analysis.

A distractor analysis addresses the performance of incorrect response options. As the correct response option, must be definitively correct, the distractors must be clearly incorrect and plausible i.e. the distractors should seem likely or reasonable to a person sufficiently knowledgeable in the content area (Tavakol and Dennik, 2011)

Following analysis was performed in the assessment of the distractors.

1. The percentage of participants who selected each of the response options.
2. The percentage of participants who selected each of theresponse options, was compared in the one third of highest scores and one third of the lowest scores.

In the present validation study, selection of the distractors less often by the high scorers compared to the low scorers was also considered as evidence that items were not being ambiguous or confusing.

f). Reliability analysis

The present validation study used the method of estimating internal consistency of the test by KR-20 coefficient and Spearman Brown Coefficient as the two indices for this assessment.

i. Internal consistency with KR-20 coefficient

The Kuder–Richardson Formula 20 (KR-20) is a measure of internal consistency reliability for measures with dichotomous choices. It is analogous to Cronbach's α, except Cronbach's α is also used for non-dichotomous (continuous) measures. It is often claimed that a high KR-20 coefficient (e.g., > 0.90) indicates excellent reliability (Ary et al, 2010).

2. Assessment of the distribution of the nutrition literacy test score

The measures of central tendency and the measures of dispersion were examined and the distribution of the nutrition literacy test score was checked for normality, by following measures.

i. Visual inspection of the histogram and Q-Q plot for the distribution of nutrition literacy test score

ii. estimating values for measures of central tendency and skewnessand kurtosis for the distribution

The Z score for the skewness was calculated by dividing skewness by standard error of skewness and Z score for the Kurtosis was calculated by dividing Kurtosis by standard error of Kurtosis. The acceptable range which depicts a normal distribution was, considered to be +1.96 to -1.96.

iii. determining the significance of the Shapiro-Wilk's test statistic

Null hypothesis in this test is that data are not normally distributed. Hence if p value is less than 0.05, then the null hypothesis, is rejected which leads to acceptance of the alternative hypothesis that data are normally distributed.

3. Assessment of convergent validity

Assessing convergent validity consists of providing evidence that similar instruments that are believed to measure similar attributes should produce results with strong correlation (Abramson and Abramson, 1999).

Convergent validity was assessed in the present validation test assuming that individuals with high accessibility and usage of print material on nutrition and higher education levels are more likely to obtain high nutrition literacy scores compared to those who are do not have low accessibility and usage of print material on nutrition and low education levels.

4. Defining Cut-off score for nutrition literacy level.

The aim of this analysis was to categorize the participants into three groups, namely, , inadequate, marginal and adequate nutrition literacy Hence it was aimed to define two cut-off points to demarcate the three groups.

In deciding the suitable cut-off point for the nutrition literacy test, several Receiver Operating Curves were drawn. The items with satisfactory discrimination index with varying levels of difficulty index were first selected for this purpose. Then the responses to these questions were categorised into two levels of education level of the participant.

In setting cut-off score to demarcate the marginal and inadequate group following was considered

Two items with high discrimination index, (closer to 0.6 and above), and low difficulty index (closer to 0.8) were selected. Appropriateness of these two questions for this analysis was assessed with checking the significance of the difference between nutrition literacy test scores obtained by the each low and high educational level groups for each item as described by Tavakol and Dennik (2011)

Educational level categorized into two, as those who have studied up to GCE O/L as low educational level and those who have passed GCE OL or studied beyond that as hihgh educational level.

Then Receiver Operating Curves were drawn and the best cut-off was selected based on the curve (Delong et al, 1988).

In setting cut-off score for the marginal and adequate group,

Two items with high discrimination index, (closer to 0.6 and above), and high difficulty index (closer to 0.3) were selected. Appropriateness of these two questions for this analysis was assessed with checking the significance of the difference between nutrition literacy test scores obtained by the each low and high educational level groups for each item as described by Tavakol and Dennik (2011)

Educational level categorized into two, as those who have studied up to GCE O/L as low educational level and those who have passed GCE OL or studied beyond that as hihgh educational level.

Then Receiver Operating Curves were drawn and the best cut-off was selected based on the curve (Delong et al, 1988).

Following validation, draft Nutrition literacy Test was finalised as the Nutrition literacy Test.

3.2 Component 2:

This was a cross sectional study comprising the following

- **Subcomponent 1:** A descriptive cross sectional study among females aged 25 to 45 years to determine the prevalence of nutrition literacy
- **Subcomponent 2 :** A cross sectional analytical study to determine correlates for nutrition literacy among females aged 25 to 45 years in the district of Colombo

3.2.1 Subcomponent 1- A descriptive cross-sectional study among females aged 25 to 45 years to determine the prevalence of nutrition literacy

3.2.1.1 Study design

This was a descriptive analysis of the cross-sectional study to determine the prevalence of nutrition literacy among females aged 25 to 45 years in the district of Colombo.

3.2.1.2 Study period

The cross-sectional study was conducted from August 2012 to January 2013.

3.2.1. 3Study setting

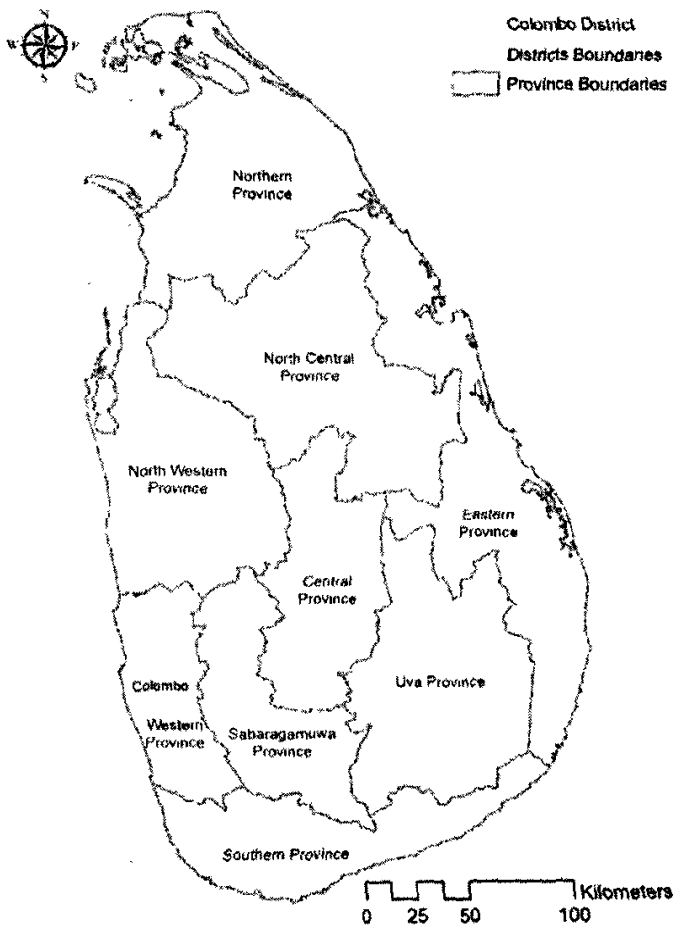


Figure 3.1 Geographical Location of Colombo District in Sri Lanka

This study was carried out in the administration district of Colombo, in the Western Province (Figure 3.1). Colombo district has an estimated land area of 676 square kilometres with a population density of 3,300 persons per sq.km (Dept. of Census and Statistics, 2001).

At the time of selecting the sample in this study, the reports of the population census conducted in the country in 2010 Census were not available. Hence, the study was designed based on the data from the population census conducted in 2001.

The total population of the Colombo district was 2,251,274 according to population census of year 2001. Out of this population 54.6% reside in urban sector and rural and estate populations amount to 45.1% and 0.3% respectively.

The Colombo District has 13 Divisional Secretariat (DS) areas and all were included in the study. Each DS division consisted of varying number of Grama Niladari Divisions with both urban and rural populations with a diverse socio economic composition (Department of Census and Statistics, 2004).

3.2.1.4Study population

The study population comprised all females in 25 to 45 years category, who were permanent residents of the area over last two years in the Colombo District. The total adult female population in 25 to 45 years category amounted to 369,884(Department of Census and Statistics, 2001) which was found to be 16.43% of the total population.

The distribution of the study population by age categories is shown in the Table 3.1

Table 3.1. Distribution of population in age groups in district of Colombo

Age group	**Total Population**	**male**	**female**
All age groups	**2,251,274**	**1,151,413**	**1,099,861**
25-29	212,893	112,710	100,183
30-34	190,926	100,122	90,804
35-39	175,443	89,406	86,037
40-44	159,839	80,918	78,921
45	28,175	14,198	13,977

(Source: Census of population and housing-2001, Department of census and statistics)

3.2.1.5. Studypopulation

Female population in 25 to 45 years age category, who are permanent residents of district of Colombo, consisted the study population.

3.2.1.6. Study sample

The study sample was females of 25 to 45 years age category, who were permanent residents of the area during the two years preceding the study in the Colombo District.

Exclusion criteria:

Females who had diagnosed psychiatry illnesses, cognitive impairments and acute illnesses at the time of survey were not included in the study, as it was assumed that literacy functions may be impaired in these situations.

3.2.1.7. Sample size calculation

Sample size to determine the prevalence was estimated using the following formula (Lwanga and Lemeshow, 1991).

n = $z^2 p(1-p) / d^2$

n = the required sample size

z = 1.96(Standard normal deviate for 5% α error)

p = Expected prevalence of adequate nutrition literacy among females aged 25-45 years of age was taken as 50% in the absence of evidence form previous studies.

d = required level of precision for margin of error was set at 0.05.

$$n = \frac{(1.96)^2 x\ 0.5\ (1 - 0.5)}{(0.05)^2} = 384$$

In selecting this sample, multistage cluster sampling was carried out with probability proportionate to the size of the females aged 25-45 years of age in each divisional secretariat division. Since cluster sampling method was adopted the effect of clustering was overcome by making a correction for design effect (Moser and Kalton, 1971).

N= final sample size

n= calculated sample size prior to correction for the design effect

N= Design effect *n

Design effect = 1 + (b -1) rho

b= cluster size,

The "rho" is a measure of the degree of homogeneity of study units within the cluster and "rho" ranges from 0.1 to 0.4 (Moser and Kalton, 1971). As estimate for "rho" was not available from previous studies, a value for design effect (N) was taken as three, to allow a large enough sample which would overcome the effect of clustering. Considering a correction for design effect of three, the sample size was estimate as

384 x 3= 1152

A 10% of non-response rate was also added.

N=1152x100/90= 1290

Thus, it was decided to include 1290 females in the age group of 25 to 45 years of age.

A cluster in this study was defined as a group of females aged 25 to 45 years of age in a GN division and the number of study units included in the study per cluster (cluster size) was taken as 30. Thirty was considered a suitable number for the cluster size to capture the possible variation of the level of nutrition literacy among females of 25 to 45 years of age from one GN area and considering the feasibly issues for carrying out the study.

Thus, the number of clusters to be included in the study was calculated as 43 (1290/30=43).

3.2.1.8. Sampling technique

In selecting the study units, multistage cluster sampling was carried out with probability proportionate to the size of the females of 25 to 45 years of age population in divisional secretariat divisions of Colombo district.

The first stage of sampling was DS divisions. The number of the females of 25 to 45 years of age category in the each divisional secretariat division was listed and the number of clusters to be allocated for the each divisional secretariat division was calculated as follows;

The sampling interval = Total cumulative population /No of clusters

$$=369,\ 884\ /43= 8601.95 \approx 8602$$

The sample interval was 8602

The number of cluster allocated to each DS Division is shown in the table 3.2

Table 3.2. Distribution of clusters in Divisional Secretariat Divisions (DSD) of district of Colombo

DS Division	Total Population	No of expected females in 25-45 age group	Cumulative Population	Number of clusters from each DS Division
Colombo	380,946	62,589	62,589	7
Thimbirigasyaya	266,154	43,729	106,318	5
Kesbewa	209,619	34,440	140,758	4
Kaduwela	209,251	34,380	175,138	4
Homagama	186,050	30,568	205,706	3
Maharagama	185,193	30,427	236,133	4
Moratuwa	177,563	29,174	265,307	4
Kolonnawa	161,247	26,493	291,800	3
Sri Jayawardanapura Kotte	116,366	19,119	310,919	2
Rathmalana	108,716	17,862	328,781	2
Dehiwala	101,830	16,731	345,512	2
Hanwella	94,001	15,444	360,956	2
Padukka	54,338	8,928	369,884	1
Total				43

(Source: Census of population and housing-2001, Department of census and statistics)

Second stage of sampling was Grama Niladari (GN) divisions. Then from the list of GN divisions in each DS division, the desired number of clusters was selected using computer generated random numbers. Thus the selected GN divisions for the each DS division are as follows;

Table 3.3 DS divisions of Colombo District and GN divisions selected as clusters to be included in the study (Annexure XI)

	Selected GN divisions	Divisional secretariat divisions
1	Aluthmawatha	Colombo D.S. Division
2	Grandpass South	
3	Maradana	
4	Maligawatta West	
5	Panchikawatta	
6	Khettarama	
7	Maligawatta East	
8	Kolonnawa	Kolonnawa D.S. Division
9	Kajugahawatta	
10	Madinnagoda	
11	Malabe North	Kaduwela D.S. Division
12	Kothalawala	
13	Kalapaluwawa	
14	Batapotha	
15	Godagama South	Homagama D.S. Division
16	Mawathgama	
17	Magammana East	
18	Kalu Aggala	Hanwella D.S. Division
19	Pahala Hanwella	
20	Udumulla	Padukka D.S. Division
21	Jambugasmulla	Maharagama D.S. Division
22	Thalapathpitiya	
23	Pragathipura	

24	Madiwela	
25	Ethulkotte	Sri Jayawardanapura Kotte D.S. Division
26	Obesekarapura	
27	Narahenpita	Thimbirigasyaya D.S. Division
28	Dematagoda	
29	Kuppiyawatta West	
30	Thimbirigasyaya	
31	Wanathamulla	
32	Kohuwala	Dehiwala
33	Karagampitiya	
34	Rathmalana East	Ratmalana D.S. Division
35	Attidiya South	
36	Borupana	Moratuwa D.S. Division
37	Egoda Uyana South	
38	Villorawatta East	
39	Soysapura North	
40	Boralesgamuwa West B	Kesbewa D.S. Division
41	Bokundara	
42	Mahalwarawa	
43	Egodawatta	

The second stage of sampling was to select the 30 study units from each of these selected GN divisions. This was done in the field using a cluster sampling method. Then the place to initiate the data collection in the Selected GN area was identified using a spot map placed on the area map of the selected GN area. On the spot map and random spot was selected and the road closest to the spot was identified in the area map. Thereafter, this house was considered as the index house and all the houses in the same side of the road were selected to visit in search of eligible study units. When visiting the houses, the immediate adjacent house to the right front door of the index house was selected as the second house. Same process was followed until the required number of eligible study units (30) were selected from the GN area.

Searching and selection of study units were mostly done in daytime during weekends and during public holidays considering higher possibilities of the working females

being available in their homes on these days. When a household was visited, the household members were inquired into presence of eligible study units among the members living in that household. When there were more than one eligible study units in the households the first encountered female was selected for the study. When the selected person who lived there was not available at the time of visiting the house, additional two visits were done to the house at times that she would be available/ most likely to be available. In cases where the selected study unit could not be contacted even after three consecutive visits, another eligible person in same GN area was selected. The study unit was considered as a non-respondent when no other eligible study unit could be found from the GN area.

3.2.1.9. Study instrument

The study instrument used was

(1) The validated version of the Nutrition literacy test

(2) An interviewer administered questionnaire to obtain information related to basic socio demographic characteristics and proposed correlates of nutrition literacy. Developing the interviewer administered questionnaire to obtain information related to basic socio demographic characteristics and proposed correlates of nutrition literacy was done in a stepwise manner, which is described in detail in section 3.2.2.5.

3.2.1.10. Data collection

Two research assisstants were employed as the field investigators to conduct the cross sectional study and were trained for one day by the principal investigator on the following aspects.

* Selecting the eligible study units in the field within the cluster
* Introducing the study to the potential respondents obtaining informed written consent, ensuring confidentiality and minimizing non response
* Administering of study instruments
* Precautions to be taken to obtain reliable, valid and accurate data.

Principal Investigator performed the task of selecting the index household in the field. The assistance of the area public health midwife was obtained in identification of the households and the study participants as it improves the compliance of the participants.

Thereafter the trained pre-intern medical officers visited the households and confirmed the eligibility of the respondent. Then they provided information on the purpose of the study and obtained written informed consent from the selected participant prior to collection of data. If the selected study unit was willing to participate in the study at the time of visit the interviewer administered questionnaire was administered at the same time. Following this, the Nutrition Literacy test which was linked to the completed interviewer administered questionnaire by an index number, was handed over to the respondent to be completed by her in the presence of the data collectors. The importance of not obtaining any family member or any material was emphasized.

If the selected study unit was not willing to participate in the study at the time of this visit, an appointment was obtained from her during a time that data is being conducted in the same GN division and the data collector visited the house at the given time and conducted the study.

The field data collection activities were supervised by the PI. The PI was available throughout the day in the field. The PI checked the filled questionnaires for completeness and clarity and incomplete ones were refilled by the FI.

3.2.1.11. Data entry and analysis

Following data entry, the frequency distributions of categorical variables were examined and incompatible entries were identified and corrected by referring to the original questionnaire. Statistical analyses were conducted employing the software package SPSS -Statistical Package for Social Sciences (Version 16).

Prevalence of adequate, marginal and inadequate nutrition literacy was described based on the defined cut-off values of the Nutrition Literacy test. The number of participants with each level of nutrition literacy were considered as the numerator and total study population (n=1220) was considered as denominator.

The percentages of females with adequate and inadequate nutrition literacy was described based on the defined cut-off values of the Nutrition Literacy Test. Nutrition literacy was also assessed with by age category, nationality, education level and wealth quintile.Statndardized prevalence was estimated for age and ethnicity.

3.2.2 Subcomponent II- A cross sectional analytical study to identify correlates of nutrition literacy among females aged 25-45 years in Colombo district.

3.2.2.1 Study Design

This was a comparative analyses of the data collected in the cross sectional study of the sub-component I of the component 2 of the study

3.2.2.2 Study Setting

The study setting was same as subcomponent I, described insection 3.2.1.

3.2.2.3 Study Population

The study units who participated in the cross-sectional study served as the study population and comparison population in this comparative analyses. Correlates were determined for inadequate nutrition literacy. Those with inadequate and marginal nutrition literacy levels were combined together to form one group and collectively was identified as "inadequate nutrition literacy" and served as the study group while those with adequate level of nutrition literacy (those scored the defined cut-off or above in the validated Nutrition Literacy Test) were identified as the comparison group.

3.2.2.4 Sample size

Based on the analyses of the subcomponent I of component 2, the study units who were revealed as having inadequate nutrition literacy were considered as the study group and the study units who were revealed as having adequate nutrition literacy were considered as the comparison group.

3.2.2.5 Study instrument

Data on correlates were collected using two study instruments;

1. Instrument 1- an interviewer administered, questionnaire (Annexure XII…)
2. Instrument2-a data entry form to record anthropometry measurements (Annexure XIII)

Step 1: Developing the interviewer administered questionnaire to obtain information related to basic socio demographic characteristics and proposed correlates of nutrition literacy was done in a stepwise manner.

Developing the interviewer administered questionnaire to obtain information related to basic socio demographic characteristics and proposed correlates of nutrition literacy was done in a stepwise manner.

A literature survey to identify correlates of nutrition literacy that had been identified in the research done on nutrition literacy so far, hence an extensive literature search was done both manually and electronically, using search words such as correlates of nutrition literacy, correlates of health literacy, factors affecting nutrition literacy, associated factors of nutrition literacy, correlates of information seeking, correlates of nutrition information seeking, barriers for nutrition literacy, catalysts of nutrition literacy, etc. Based on the research done in the field of nutrition literacy and health literacy, some indicators were identified.

Step 2: In the step 2, PI together with few experts in the field on nutrition decided on the variables to be assessed as correlates in the present study.

Based on these findings following were identified to be assessed in the questionnaire;

Structure of the questionnaire on correlates of Nutrition literacy

Individual Correlates

Socio demographic characteristics

Age- age in completed years as at last birth day

Ethnicity- Sinhala, Tamil, Muslim, Malay, Burgher or any other race

Religion- Buddhist, Christianity, Catholic, Hindu, Islam or any other religion

Marital status - as Married, Unmarried, Separated, Widowed, Divorced

Having children and ages of children

Physiological status as per pregnancy, breast feeding

Socio economic characteristics

Education level –

Highest grade completed or highest examination passed was assessed as not gone to school, up to grade5, up to grade 6-9, up to GCE (O/L), passed GCE (O/L), passed GCE (A/L) and higher education (Graduated/Diploma)

Status of employment – whether employed or not

Occupation - given as an open ended question

Presence of non-communicable diseases or risk factors for non-communicable diseasesrequiring dietary modifications and frequency of medical advice on the dietarycontrol

Accessibility and usage of the communication channels by the participant

Language skills of the participant-speaking/writing

Adoption of nutrition related health promoting behaviour by the participant-

For the assessment of the adoption of nutrition related health promoting behaviour by the participant, eight questions in the health promoting life style profile questionnaire were adopted. Cultural adaptation of the

Nutrition knowledge of the participant-

For evaluation of nutrition knowledge questions were prepared based on the food based dietary guidelines and general nutrition knowledge assessment questionnaire, which has been validated for measuring nutrition knowledge in UK adults. Some questions that are equally applicable for the Sri Lankan setting was adopted for this set of questions. The questions were worded in simple language that would be understood by any adults irrespective of the education level. In arranging the order of the questions special attention was paid to preserve the best line of flow, and simple to more complex questions. The terminology of questions was adjusted in such a way that it is acceptable to cultural norms.

Correlates of family /household level

Socio economic characteristics

Monthly household income – given as an open ended question

Possessions of the household assets –

Several indicators that were used for the calculation of the standard living index, which has been adopted by Jayasooriya, 2007 and Disanayake, 2006 (Annexure XIV) was used in the calculation of standard living index.

Presence of non-communicable diseases or risk factors for non-communicable diseases requiring dietary modifications in a family member or siblings

b) Assessing validity of the interviewer administered questionnaire

The questionnaire was then reviewed by the supervisor and two experts in the field of nutrition who confirmed judgemental validity (face, content and consensual validity).

The questionnaire was prepared in English medium and then translated to Sinhala. Then it was back translated to English by a third person to ensure accuracy of the translation and necessary modifications was done in the final questionnaire.

Wherever indicated guidelines were prepared to the interviewers and it was included in the questionnaire (Annexure XV).

3.2.2.6: Pretesting of the questionnaire

Then the interviewer administered questionnaire was administered to ten females in the age group of 25-45 years of age from a GN area that was not included in the study to understand how they understood the questionnaire, whether any questions needed to be changed and whether the questionnaire were too long.

Following administering the pre-test, the participants were inquired into how they understood the important questions, to determine whether the wording used were understandable. The questionnaire was finalized following the pretesting.

3.2.2.7. Training of the field investigators

As described in the Section 3.2.1.7 of the Chapter on Methods, data collectorsother than what is described in this section, a detailed training was conducted on administering the questions on correlates. Instructions on administering each of the question related to correlates was discussed.

The data collectors were encouraged to clarify their doubts.

3.2.2.8. Training on the anthropometric measurements

Both field investigators were well trained on anthropometric measurements, measuring height and weight. They were given a guide on the anthropometric measurements (annexure XV).

3.2.2.9. Method of data collection

Data for this subcomponent was collected at the same time that the data for the subcomponent I was collected.

The same two pre intern female doctors who collected data of the subcomponent I collected data. Female field investigators were selected as the study included questioning from the females and anthropometric measurements also had to be taken. Respective Public Health Midwife (PHM) worked as a field guide and assisted the data collectors to locate the households as she was familiar with the area and her being a member of the team increased the corporation of the study participants.

As described earlier the PI performed the task of selecting the index household in the field. Thereafter the trained pre-intern medical officers visited the households and confirmed the eligibility of the respondent. Then they provided information on the purpose of the study and obtained written informed consent from the selected participant prior to collection of data. . If the selected study unit was willing to participate in the study at the time of visit the interviewer administered questionnaire was administered at the same time.

Anthropometry assessment was conducted as the last item of data collection. Based on the instructions suitable location in the house was selected to place the stadiometer and the weighing scale and the data collector performed measurements as per instructions.

As for the anthropometric measurements standing height and body weight of the study participant was measured. Standing height measured to the nearest 0.1 cm using a Ceca standing stadiometer and body weight measured to the nearest 0.1 kg using an electronic digital readout, stand-on weighing scale.

Weighing scales were calibrated with a known 10 kg weight before each field session.Batteries were replaced as required.

All measurements were done when participants were in upright position, in light indoor clothing without foot wear or heavy items in pockets. All methods of measurement were standardized as indicated in the operation manual.

Standing height and body weight of the study participant was measured by the field

investigators and investigators were trained by the principal investigator.

If the selected study unit was not willing to participate in the study at the time of this visit, an appointment was obtained from her during a time that data is being conducted in the same GN division and the data collector visited the house at the given time and conducted the study. The field data collection activities were supervised by the PI. The PI was available throughout the day in the field. The PI checked the filled questionnaires for completeness and clarity and incomplete ones were refilled by the FI.

The field data collection activities were consistently supervised by the PI. The PI was available throughout the day with the data collectors. The PI checked the filled questionnaires for completeness and clarity and incomplete ones were refilled by the data collectors on a daily basis.

3.2.2.10. Assessing the inter observer reliability

Approximately 5% of the participants (n=61) were re-inter viewed by the PI, on Selected categorical variables of the interviewer administered questionnaire to assess the **inter- observer** reliability (PI versus any interviewer) (Annexure XVII).

The agreement between the assessments were measured by Cohen's kappa and kappa of 0.75 or more was taken as excellent agreement and values of 0.4-0.74 indicate fair to good agreement(Abramson 1999)

Inter observer reliability of anthropometric measurements against the PI was also examined by PI also performing 5% of anthropometry measurements (n =61) in the field. The level of agreement for the measurements was checked using pearson correlation coefficient (annexure XVII).

3.2.2.11. Data Analysis

In the assessment of the correlates, Bivariate logistic regression was done for the selcetd correlates andsignificant correlates were identified.Then multi variate logistic regression model was developed to identify significant predictors of inadequate nutrition literacy.

3.2.2.12. Measures to ensure quality of data of component 2

Measures were taken to improve the quality of data at design and implementation of the study.Possible sources of variation in the study are subject, instrument and interviewer (Abramson and Abramson, 1999).

Steps to minimize variation due to subject

Many measures were taken to minimize sampling errors to ensure inclusion of a representative sample of study units in the study. Sample size was estimated using a scientific process and the most feasible scientific sampling technique was adopted for the study. The PI visited the data collection procedure throughout the study and ensured that the sampling technique was implemented in the filed as planned. PI cross checked the accuracy of participant enrolment by verifying identification of eligibility criteria in a selected study units in each cluster.

Other variation that can be introduced by the subject is having a large non response. Many measures were taken to minimize non response in the study. Interviews were conducted at times convenient to the participants. Further data collection and anthropometric measurements were carried out in the participant's home and privacy and confidentiality was secured. Personal identification data such as name, address was not taken .Assistance of the public health midwife was obtained in identifying the index household and this increased the corporation of participants.

Steps to minimize the variation due to instrument

Nutrition Literacy test was validated prior to use and validity and reliability of the test to assess nutrition literacy was confirmed.

Questionnaire to gather information on correlates was designed in such a way that it include more operational and clear variables. Pretesting of the questionnaire was also done. Content validity and reliability of the important questions were assessed and was found to be valid and reliable.

Weighing scales were calibrated before use for anthropometry measurements and the measurements were performed according to an operation manual. Reliability of the measurements were assessed and confirmed. Weighing scale was an automated device and it did not vary based on the expertise of the observer.

Steps taken to minimize variation due to interviewer/observer

Minimum possible number of data collectors were used in the study to minimize inter interviewer bias. Both data collectors were trained by the PI on administering the questionnaire as well as anthropometric measurements. In the field the data collection was supervised by the PI. Weighing scale was an automated device and therefore was not influenced by observer. Standard measurement procedures were included step by step in operation manuals.

3.2.2.13. Administrative and ethical considerations of component 2

Prior to data collection, permission was obtained by the Provincial Director of Health Servicesof the Western province, Regional Director of Health Services, of Colombo, and Chief Medical Officer of Health ,Colombo Municipal Council to conduct the study in the field.

At the onset of the study, ethical clearance was obtained from the Ethical Committee of the Faculty of Medicine, Colombo. Informed and written consent was obtained from the study units. The objectives of the study were explained and confidentiality was assured. After taking the anthropometric measurement of the participant, Body Mass Index was calculated and a card was given as feed back to the participant and a leaflet on body mass index and weight control, prepared by Medical research Institute for public education, was given.

Data entry and analysis was done by PI. Electronic version of data base was password assured and the data sheets were kept under lock and key.

3.3 Component 3:

3.3.1. Designing a skill development intervention to improve nutrition literacy of females aged 25-45 years, implementing a cluster randomized trial to assess the effectiveness of the intervention.

Under this component an intervention package was designed and was implemented among females aged 25-45 years in Colombo district with the aim of improving

nutrition literacy skills in them. Together with the implementation of the intervention package, an experimental study was conducted to assess the effectiveness of the intervention.

This component comprised 2 subcomponents

Sub- component 1- Designing a skill development intervention package to improve nutrition literacy skills of females aged 25-45 years in Colombo district.

Sub- component 2 –Implementation of acluster randomized trial to assess the effectiveness of the intervention to improve nutrition literacy skills among females aged 25-45 years of age.

3.3.1. Sub- component 1- Designing a skill development intervention package to improve nutrition literacy skills of females aged 25-45 years in Colombo district

This phase included development of an intervention to improve nutrition literacy skills among females aged 25-45 years of age in Colombo district. In planning the intervention, a few preliminary steps were carried out, identifying topics for the intervention, identifying suitable methods for administering intervention, and development of the curriculum, the lesson plans material for the administration of the intervention.

Step 1: In designing a skill development intervention a thorough literature search was done to identify evidence based literacy improvement interventions, literacy programmes ,educational curricula, that has been targeted at improving literacy skills of people.

Adult Literacy and Skills Training Programme (ALSTP) implemented by the Operation Upgrade of South Africa (UNESCO,2012), The Mother-Child education Programmes implemented by the Mother -Child Education Foundation of Turkey (UNESCO,2012) and many other general literacy improvement interventions coordinated by the United Nations Educational, scientific and cultural organization and Nutrition Literacy Tool kit(Colorado Department of Education, 2006), a curriculum planning tool used in designing curriculum to promote healthy eating along with literacy skills were found beneficial in the development of the intervention.

These interventions have used interactive and participatory approaches such as problem-solving, role play (simulations), drama, dance and music and story-telling and group discussions as teaching-learning methods. In selecting the activities to be performed, real-life examples has been used and discussions has been promoted during the sessions to identify the relevance of the theme to their respective community and to improve skills in communication and comprehension. In improving numeracy skills same participatory approaches has been used with examples often being drawn from livelihood or income generation activities. Contents of the intervention have been planned as proactive responses to practical challenges faced by the set community and specifically targeted to overcome the said challenges.

In selection of the facilitators, emphasis has been placed upon of the competency in the subject matter as well as communication skills with adequate social and attitudinal maturity and being a local person who is conversant on the locally challenging issues, communicating languages and cultural contexts.

The nutrition literacy tool kit provides frame work for developing curriculum, identifying hierarchical set of skills needed to be a nutritionally literate person. These are obtaining knowledge on core concepts, identifying external and internal influences affecting dietary choices, accessing specific sources for nutrition information, develop effective communication tactics and strategies and decision making, self-management and advocacy skills to promote healthy eating.

Step 2: Designing the intervention to improve nutrition literacy, was based on the findings of the review of literature on successful literacy skill development interventions. In developing the intervention, specific attention was given to cover all the skills that were identified as necessary to be nutritionally literate in the development of the nutrition literacy test and in the nutrition literacy tool kit and special attention was laid on skills that were identified deficient in the component II of the study.

Thus the intervention aimed to develop modules aiming to improve skills related to accessing specific sources for nutrition information, to improve computational skills and making inferences from nutrition related to information, thus decision making.

Step 3: The skill development intervention was then drafted as three training modules. Each training module was expected to cover a selected set of learning outcomes (Annexure XIX.a and XIX.b).

These training modules was then discussed with experts in the field of nutrition and health communication, a nutrition assistant, three nutritionists, a community physician and a medical officer who are involved in the field of nutrition, health education officer and a public health nursing sister. Opinion of the experts was obtained with regard to possibility of operationalizing learning outcomes set under each skill area and acceptability of the proposed to the Sri Lankan context. Further opinion was taken with regard to possible suggestions to improve the set training modules. As the consulted experts were in agreement with the set skill areas and the proposed learning outcomes for the each skill, it was decided to proceed to the next step.

Step 4: Then for each training module under the set learning outcomes, lesson plans to cover each objective and teaching/discussion methods suitable for each step was defined. In planning the lesson plans, several activities were incorporated to cover one objective. In selecting the activities, special emphasis was taken to incorporate activities related to day today food and nutrition related activities which is familiar to majority of the community members. Under each activity, discussion points to be highlighted was also incorporated, hence facilitating the delivery of knowledge on core concepts. For each and every activity, teaching/learning methods were defined ensuring participatory approaches such as group discussions and group activities. Communication skills were encouraged via within group interactive activities and competitive presentation of summaries of the findings among groups.

Supplementary material to be used in the activities were selected from commonly available nutrition related materials in the markets, posters and printed advertisements in common media such as newspapers and magazines and government publications meant for general public.

Then opinion of the same group of experts involved in assessing the set skill areas and learning outcomes was consulted with regard evaluation of the proposed activities under

the each objective, discussion points under the each activity, suitability of the proposed teaching/learning method, and the suitability of the proposed supplementary material for specific activity. Hence consensus of the experts was obtained with regard to adequacy and appropriateness of the intervention, in each step, to develop the nutrition literacy skills of the females in 25-45 years of age.

Step 5: A facilitator to deliver the intervention package was then selected. In the selection of the facilitator, the competency of the facilitator in the nutrition related subject matter, and the experience and the expertise of the person in communicating nutrition information to the general public and the and being conversant in Sinhala, which was the mother tongue of the majority of the participants expected to be involved in the intervention.

Hence a local graduate, in food science and technology, who was practicing as a nutritionist as well, and able to communicate well in Sinhala, was selected as the facilitator for the intervention. The principal investigator trained the said facilitator on the contents of the developed modules, learning outcomes for each of the module, activities to be performed in each module, subject matter to be delivered through each activity and the teaching/learning method for each activity.

Step 5- Pilot testing

Pilot testing of the skills development intervention was conducted by among a group of females who volunteered to undergo training in Thimbirigasyaya GN Division which is outside the study area. Conducting this pilot testing also gave the opportunity for the selected facilitator to obtain a practical training in conducting the intervention. At the beginning, the objective of the pilot test was explained to the participants. The training was carried out in the exact manner in which it was planned to be conducted in the intervention. An evaluation form was given to the participants to obtain their view regarding the aspects covered in the intervention, activities performed under each objective and the information delivered, teaching /learning methods, supplementary materials used, the performance of the facilitator ,the way that intervention was delivered to participants and the duration of the intervention.

During the period of pilot testing the PI noted the areas that required few modifications and the logistical constrains that may be encountered when intervention is actually carried out. The importance of adapting measures to improve participation was also

convinced in the pilot testing. Hence it was decided to obtain the support of the public health midwife in approaching the participants for the intervention.

3.3.2. Sub- component II: Implementation of acluster randomized trial to assess the effectiveness of the intervention to improve nutrition literacy skills among females aged 25-45 years of age.

Under this subcomponent, the developed intervention was implemented and improvement of the set skills was evaluated, conducting a cluster randomized trial.
It was implemented in three phases;

Phase 1-preintervention assessment with questionnaires (annexure)

Phase II- Implementation of the intervention

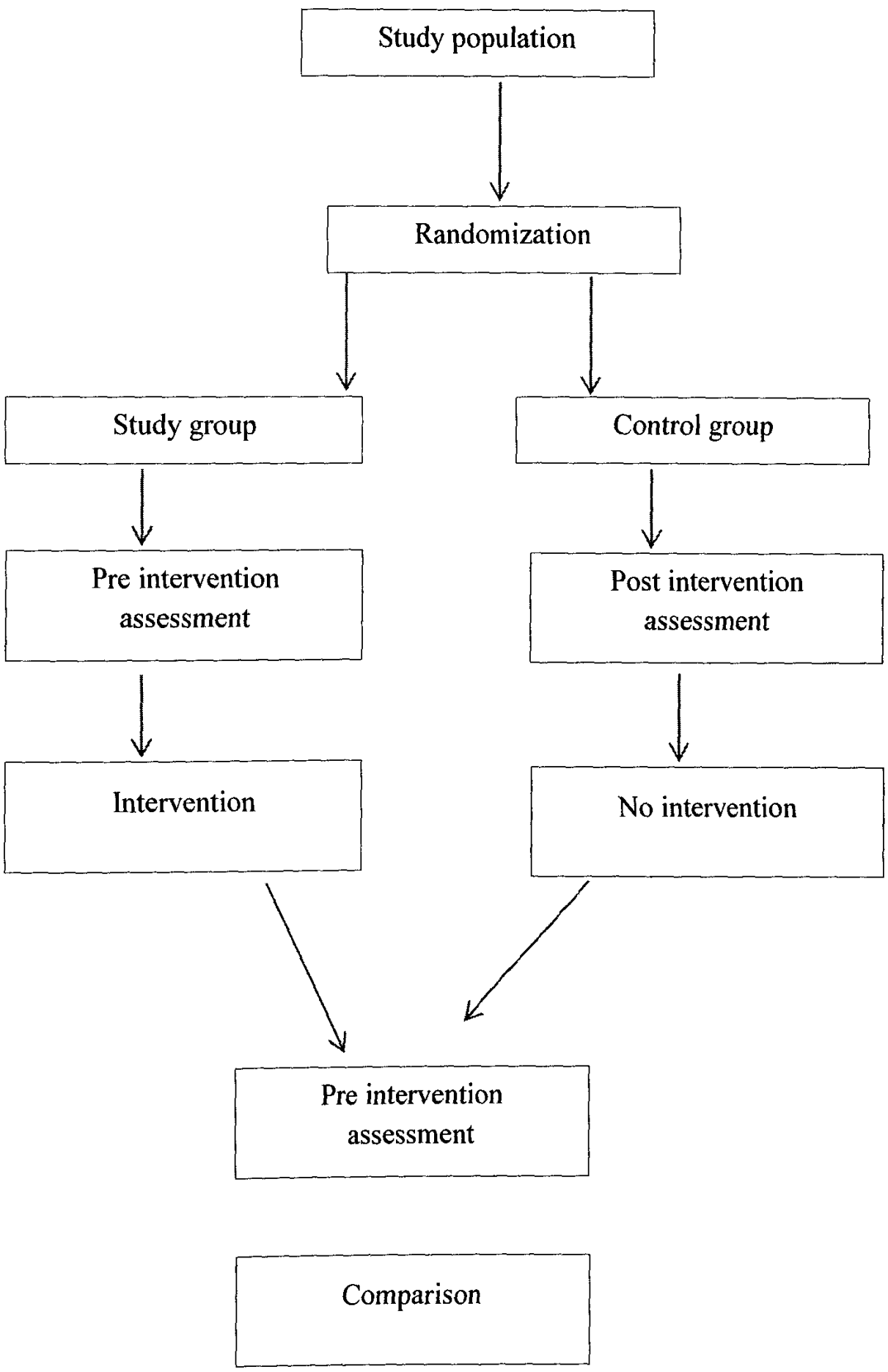
Phase III- Evaluation of the intervention by post intervention assessment with questionnaires

3.3.2.1. Study design

A cluster randomized controlled trial was designed with separate intervention and control clusters, in which there were equal number of participants per cluster. In this design clusters were randomized to intervention and control groups. A control study group was selected to control for the possibility that the changes in nutrition literacy level were not a part of a secular trend.

Cluster randomized trials are increasingly recommended for evaluation of new health interventions, as it minimizes the cross contamination of the intervention compared to individual randomization and administrative efficiency as per time and resources. Blinding was not possible in this intervention study, as the intervention was in this case practical sessions conducted by a facilitator.

Figure. 3.2. Schematic presentation showing the sequence of events in component.



The principal investigator decided to adapt completely randomized design in the current intervention study due to following reasons.

The selected clusters demonstrated some degree of homogeneity as explained earlier. The number of participants per cluster was expected to be equivalent in all clusters, hence no disparities in the clusters as per small, medium of large is expected. For Matched pair design, detailed information on the matching criteria, that directly affect

the outcome, need to be considered as it aims to obtain very tight and explicit balancing of potentially important prognostic factors. But such information was not readily available for the considered clusters in the intervention. Further matched pair design has many practical and analytical difficulties (need of intra-cluster correlation from matched- pair data), over the completely randomized design. Stratified design allocates two or more cluster to stratum, and then randomize. But this design has not been used much so far.

3.3.2.2. Study setting

Intervention was carried out in two DS divisions of the Colombo District, namely Kaduwela and Kolonnawa. These DS divisions were selected due to following reasons;

a) Similarities identified as indicators of homogeneity of the communities- Possible indicators of the homogeneity of the populations in the two DS Divisions were inspected. Both these two DS divisions have majority of Sinhalese Buddhists population and Sinhala is the communicating language in majority. Literate population in both are above 90% these two areas have similar health care delivery mechanism and access to almost similar information sources.

b) Administrative feasibility of the intervention

   As the two DS divisions were in close proximity, administration of the intervention in these two areas was found convenient for the principal investigator.

c) Adequacy of the possible units of randomization in these two DS divisions.

   GN divisions were the units of randomization, and Kolonnawa DS division there were 46 GN divisions and in Kaduwela there were 57 GN divisions.This provided and adequate framework for selecting clusters, avoiding the risk of intervention contamination between adjacent areas.

3.3.2.3. Sample size

The true difference in the intervention and the control groups following the nutrition literacy skills development intervention had to be detected. Therefore the following equation was used for sample size calculation for the dichotomous variable (Pocock, 1984)

In calculation of the sample size, in the current intervention study the principal investigator decided the outcome of the intervention as 'improvement in the percentage

of participants with adequate nutrition literacy'. The adequate nutrition literacy was taken as the score for the nutrition literacy test, above the cut-off defined in the validation study.

$$N = [P_1(100-P_1) + P_2(100-P_2)] \times f(\alpha\beta)$$

N = Number of participants per intervention group

P_1= Percentage of adequate nutrition literacy expected in the pre-intervention group (44%). This was the prevalence of adequate nutrition literacy, obtained in the prevalence estimate of the component II of this study

P_2 = Percentage of adequate nutrition literacy on the which one desires to detect as being different from the P_1 (64%)

α = the level of significance test used for detecting an intervention difference α, equivalent to

0.05.

1-β= The degree of certainty that the difference P1- P_2, if present would be detected.(often

set at 0.90), hence β=0.1

$f(\alpha\beta)$ = 10.5 (Pocock, 1984)

The effect size for this study was taken as 20%.

$$N = [P_1(100-P_1) + P_2(100-P_2)] \times f(\alpha\beta)$$

$$n = [\ 44 \times (100-44) + 70 \times (100-30)\ ] \times 10.5 \ / \ (64-44)^2$$

n = 70.89

n = 70.89≈ 71

Since cluster sampling was done correction for design effect was done to increase the precision.. Therefore the design effect for a cluster randomized trial was calculated as follows.

$d = 1+\{ (cv+1) m-1\} \rho$ (Eldridge et al,2006)

cv= coefficient of variation

Values for the coefficient of variation, could not be found from Sri Lankan studies. According to Eldridge et al, 2006, the coefficient of variation calculated from several cluster randomized trials commonly had a value of 0.65 on average which in turn could result in sample size increases up to 42%. Therefore the cv for the present study was taken as 0.65.

m= average number of participants per cluster. The number of participants per group, in the literacy interventions carried out to improve general literacy levels have been between 20-25 participants at a time under one facilitator. As the current study is a preliminary study in Sri Lanka the number of participants per one cluster was taken as 10, hence facilitating closer follow up.

ρ= rate of homogeneity

Based on studies assessing the magnitude of intra cluster correlation coefficient for cluster randomized trials, on wide range of variables (Adams et al, 2004), has found cluster level median ICC was 0.005 with interquartile range of 0 to 0.021.

ICC for literacy levels among diabetes patients, clustered in primary care settings, had been found 0.037 (Littenberg and MacLean, 2006).

Hence in the current study the value for ρ was taken as 0.037.

Hence the design effect was,

$$d = 1+\{ (cv+1) m-1\} \rho$$

$$= 1+\{ (0.65 +1) 10 -1\} 0.037$$

$$= 1+\{ (1.65* 9) \} 0. 037$$

$$=1.55$$

Based on the value obtained for the design effect the number of participants per group was calculated as follows;

Required sample size considering the design effect N= 71 x 1.55 = 110.

Considering 5% non- response the number of participants per one group would be 115.

Hence it was decided to include a sample of 115 participants in the intervention arm and 110 participants in the control arm.

3.3.2.4. Sampling technique

Randomization of the cases and controls is an important feature in the experimental studies. This was achieved through cluster randomization. In cluster randomization instead of individuals groups of subjects of the study and the control groups are randomly assigned as a whole to either the intervention or control (Hauck et al, 1991).

3.3.2.5. Randomization of the clusters

The list of GN divisions in the two selected DS divisions, Kolonnawa and Kaduwela was made. These two DS divisions comprised of 46 GN divisions 57 GN divisions respectively. This made a collective 103 GN divisions for randomizing into intervention and control groups. This list of GN divisions was given number ranging from 1 to 103. Then list of random numbers was generated using the computer software, and 24 GN divisions were selected randomly for the study. Once each number was selected the location of the GN was noted in the map, and if an adjacent GN division to a previously selected one was selected again, it was not taken and the next number was selected.

In allocating the intervention /control to the GN divisions, a restricted randomization technique was adopted to ensure equal number of intervention and control groups. Hence allocation of the intervention/control was done based on random permuted blocks methods, which is a conventional method that ensure exactly equal treatment numbers at certain equally spaced points in the participant sequence.

For this purpose, selected GN divisions were then listed out in the same order of being selected, and consecutive two GN divisions were put to one block, and each block was given a number 1 to 10, using a computer generated list of random numbers. It was previously determined in the allocation of the intervention/control, for numbers 1 to 5 will be allocated intervention-control sequence and for numbers 6-10 will be allocated control- intervention sequence. Hence final allocation of the areas for randomization was as follows.(Annexure. XXXIII.);

Intervention Group		Control Group	
GN Division	DS division	GN Division	DS division
Kajugahawatta	Kolonnawa	Salamulla	Kolonnawa
Kolonnawa		Wellampitiya	
Kotokawatte West		Wennawatta	
Asiri Uyana	Kaduwela	Nawagamuwa	Kaduwela
Dedigamuwa		Oruwala	
Hewagama		Pothuarawa	
Hokandara East		Rajamalwatta	
Kalapaluwawa		Thalahena South	
Malabe North		Thalangama North A	
Pahala Bomiriya		Welivita	
Welihinda		Wellangiriya	
Welipillewa		Wickramasinghapura	

3.3.2.6 .Selection of the participants, within the cluster, for the intervention and control groups.

The map of the GN division was taken and then a transparent paper with 20 marked random spots was taken. From a list of random generated numbers, 20 places were identified in the selected GN divisions for selecting participants for the intervention.

Criteria for the selection of the participants were set as follows;

i. Being a volunteer female of 25-45 years age category
ii. Being able to communicate well in Sinhala(read and write), as the communication language itself will affect the outcome of the intervention and the proposed intervention was carried out in the Sinhala medium
iii. Permanent resident in an selected location, hence facilitating the subsequent follow up and minimizing loss to follow up
iv. Being free of chronic illnesses, leading to cognitive impairment.

Participants who volunteered for the study were enrolled, by the principal investigator, with the assistance of the local public health midwife. In the enrolment for the study, they were provided with information sheets containing information on the objectives of the study, nature of the intervention and their rights with regard to participation and

withdrawal (annexure). Then informed written consent of the participants was obtained. The nutrition literacy level of the each volunteer was assessed using the developed nutrition literacy test.

Subsequently the intervention group went through the intervention, and the control group did not receive any intervention.

3.3.2.7. Study instrument

The study instruments were self- administered questionnaires. This was feasible and effective since those who were selected for the intervention were well able to read and write in Sinhala.

Instrument I- consisted of basic information on socio demographic and socio economic data of the respondent

Instrument II- validated nutrition literacy test in the component 1 of this study.

3.3.2.8. Data Collection

3.3.2.8. (a) Selection of the field investigators

Field investigators who were involved in the data collection of the descriptive study were involved in the data collection of the intervention study.

3.3.2.8. (b) Training of the field investigators

A training session was conducted by the PI during which the study design and the objectives were explained to the FIs. The data collection instruments were introduced. All questions were discussed in detail and FI were given an opportunity to clarify any doubts regarding contents of the instruments.

3.3.2.8. (c) Pre intervention collection of data

Once the clusters were selected and allocated for the intervention and control arms of the study, the principal investigator along with the field investigators, visited the area and with the assistance of the local public health midwife identified the ten volunteer participants for the intervention and control arms.

Informed written consent was obtained prior to administering study instruments of the pre intervention assessment. Then the study instrument I was administered, which is an interviewer administered questionnaire on basic socio demographic and socio economic information and a self- administered validated nutrition Literacy test. The filled test questionnaire was then collected.

For the participants selected for the intervention, the tentative place and date and the time for the intervention was informed and feasibility of the participant to participate in the intervention on the said date was asked. In the selection of the date and time, special attention was made to select a week end or a public holiday, hence maximizing the participation.

3.3.2.9. Implementation of the intervention

For the implementation of the intervention, a common place within the close reach of the participants such as a community center within the community, or a spacious garden of a volunteer participant, was selected. The place was arranged by the principal investigator, with the assistance of the local public health midwife, as for group of ten participants, 5 in one group. Each group members were seated around one table. The teaching learning material for the intervention were prepared by the principal investigator, with the assistance of a nutrition assistant, health education officer and a public health nursing sister, was taken to the session by the principal investigator and the session was facilitated by the previously selected graduate in food science and technology who was involved in the pilot study as well.

On the first session of the intervention, basic introduction of the aim of the intervention study was explained to the participants, and the proposed content of the subject matter was outlined (annexure XIX.b). Then the resource personnel involved in the study was introduced to the participants and self-introduction of the participants was done.

The proceeding to the intervention proper, activities related to fulfilling objectives related to improving skills related to identifying external and internal influences affecting dietary choices, accessing specific sources for nutrition information were covered in the first session. There was a break of fifteen minute with in the session and a discussion session of 15 to 20 minutes at the end of each session summarizing the

points of the session and clarifying the questions of the participants. As an incentive for the participation Rs 100/= was given at the end of the session.

The second session was conducted within two weeks following the first session. In the start of the second session the discussion points covered in the first session was summarized, facilitating recall of the content and then activities related to decision making and self-management promote healthy eating were covered. There was a break of fifteen minute with in the session and a discussion session of 15 to 20 minutes at the end of each session summarizing the points of the session and clarifying the questions of the participants. As an incentive for the participation Rs 100/= was given at the end of the session.

3.3.2.10. Evaluationof the effectiveness of the intervention

3.3.2.10. (a) Post intervention data collection

The participants of the intervention group were evaluated following completion 6 months of the second session of the intervention, using the same nutrition literacy test. The control group was also evaluated at the same intervals following administration of the initial nutrition literacy test, and at the end of the second evaluation, their body mass index was measured, and a feedback was given.

3.3.2.11. Data entry and analysis

Data entry was similar to that described in the cross sectional component. Data were analysed using SPSS Version 16 software package. Descriptive analysis of the intervention component was similar to the cross sectional component.

Pre intervention basic socio demographic data of the study and control groups were compared to assess comparability of the two groups.

Analysis consisted of individual level and cluster level analysis

For individual level analysis,

* The nutrition literacy levels of the intervention and control groups were compared with chi square test to assess the comparability of the two groups.
* In the assessment of the effectiveness of the intervention, the number of participants in the intervention group was assessed for the pre and post

intervention difference in the inadequate nutrition literacy level using chi square test. The same assessment was done for the control group as well.

* Then the difference in the nutrition literacy levels of the post assessment in the intervention and control group was done to check whether the difference was significant.
* Subsequently in the intervention group, pre and post assessment difference was evaluated based on the varying socio demographic variable, to assess whether outcome differs based on the differing socio demographic characteristics.

For cluster level analysis (Allan and Donnar (2000)).

The proportion of participants in the each cluster with inadequate level of nutrition literacy was assessed in the intervention and control groups.

* Then the comparison was made on level of inadequate nutrition literacy in the intervention and control , using the Mann whiteny U test
* In the assessment of the effectiveness of the intervention, the number of participants with inadequate nutrition literacy in each cluster, in the pre intervention assessment and post intervention assessment was assessed and compared using the Wilcoxon signed rank test. The same evaluation was done for the control group as well.
* Then the the number of participants with inadequate nutrition literacy in each cluster in post intervention assessment, was assessed for the intervention and control cluster and compared with Mann whiteny U test.

Compliance with the intervention was assessed using participation rates in the pre and post assessments by the participants in the intervention and control groups and the self-reported measures adopted in the food and nutrition behaviour by the study participants.

3.3.2.12. Quality of Data

a). Measures to improve quality of data

The following methods were used to improve the quality of data.

b).During development of the modules

A team of experience professionals on the relevant fields were used as resource personnel. The modules were made simple, self-explanatory and presented in a user friendly manner. Data collection tools and the modules were pretested in order to identify and rectify any deficiencies.

c).During the baseline survey

Pre intern medical graduates were employed and they were trained in in order to maintain the uniformity in conducting the study. Data collection was carried out within the shortest possible period to minimize cross contamination.

The questionnaires were not lengthy and it was made simple. This ensured easy answering.

The study instruments were self-administered questionnaires and they were worded in simple language to prevent ambiguity. As this was a self-administered questionnaire, the respondents were more likely to answer honestly.Socio demographic questions were asked initially to make the respondent be at ease and the questions on nutrition literacy assessment was administered afterwards.

PI kept close inspection of the data collection.PI visited almost all intervention and control clusters during the interviews.

Questionnaires were again checked by the PI for missing items.

d). During the implementation of the intervention and post intervention assessment

Pre testing of the draft modules were done to ensure that all participants were able to comprehend and use the modules. Distributing the self-learning modules by visiting the branches and collecting the answers for the modules each week ensured compliance. Organizing the intervention sessions was done in the week ends and public holidays to increase the compliance. The contact information of the study participants were gathered and carefully preserved to minimize loss to follow up. In addition they were told to inform the PI in case of change of contact address.

The same study instruments were used in both pre and post intervention assessments.PI entered the data and rechecking and cross checking was done was done following data entry. Any inconsistent or missing responses were traced back to the questionnaires and re- corrected.

Reliability and validity of data

The selected nutrition literacy test used in this component was validated for assessment of nutrition literacy of females in 25 to 45 years age group and it had good internal consistency.

3.3.3. Ethical considerations

Ethical clearance for the study was obtained from the Ethics review committee of the Faculty of Medicine, University of Colombo and the trial was registered in the Sri Lanka clinical Trials Registry.

In obtaining the consent from the participants single consent design was used where consent was taken sequent to the allocation to intervention or control groups. Hence these participants had option of declining from the study if they are unwilling to participate

At the beginning of the intervention, participants in the intervention and control groups were well explained regarding the objectives of the intervention and the procedure of the intervention. Written informed consent was obtained from all the study participants. Further participants were assured that the confidentiality of the information obtained will be secured and measures were taken to do the same. Electronic version of the data base was kept password secured and the data sheets were kept under lock and key.

Participants were provided with an incentive of hundred rupees in the intervention and control groups for the participation in the intervention study and for the control group body mass index was assessed he end of intervention and feedback was provided.

CHAPTER 4

Results

4.1 Component 1: Development and validation of a test to assess nutrition literacy among females aged 25-45 years in Colombo district.

All the 150 females in the 25-45 years of age category who were invited, participated in the study. Thus, the response rate was 100%.

4.1.1 Background information of the validation study population

The distribution of the basic socio-demographic features of the validation study population is given below in Table 4.1.

Table 4.1: Distribution of the study sample by the basic socio-demographic characteristics

Socio-demographic characteristics	Number (n=150)	Percentage
Age in completed years		
25- 29	52	34.7
30- 34	43	28.7
35-39	30	20.0
40-45	25	16.7
Ethnicity		
Sinhala	147	98.0
Tamil	3	2.0
Religion		
Buddhism	145	96.7
Hinduism	2	1.3
Catholicism	2	1.3
Christianity	1	0.7

As shown in the Table 4.1, the validation study sample was more or less equally representative of all the subcategories of age, within the relevant age group of 25-45

years for whom the test is being validated. A majority of the study population were Sinhalese (n=147, 98%) and Buddhists (n=145, 96.7%).

Table 4.2 shows the distribution of the validation study sample by the basic socio-economic characteristics of the study population.

Table 4.2: Distribution of the study sample by the basic socio-economic characteristics

Socio-economic characteristics	Number (n=150)	Percentage
Highest educational level achieved		
Grade 1-5	2	1.3
Grade 6-9	11	7.3
Up to G.C.E. O/L*	49	32.7
PassedG.C.E. O/L*	27	18.0
PassedG.C.E. A/L**	55	36.7
Graduate	6	4.0
Employment status		
Being currently employed	46	30.7
Being previously employed	50	33.3
Not employed currently	54	36.0

*G.C.E. O/L- General Certificate of Education Ordinary Level

** G.C.E. A/L- General Certificate of Education Advanced Level

As shown in the Table 4.2, approximately two thirds of the sample comprised of study units who possessed either a highest education level of having studied up to G.C.E. O/L (n=49, 32.7%) or having passes G.C.E. A/L (n=55, 36.7%). When the employment status was considered, the validation samplewas more or less equally represented the three groups of currently employed (n=46, 30.7%),previously employed (n=50, 33.3%) and currently not employed (n=54, 36%).

Distribution of the validation study sample by whether they had undergone a special training for a duration of one year or more in nutrition or a related field or whether

they possess a degree in nutrition or in a field related to nutrition is shown in Table 4.3. .

Table 4.3: Distribution of the study sample by whether they have undergone a special training for a duration of one year or more in nutrition or a related field or whether they possess degree in nutrition or in a field related to nutrition

Special training /degree in nutrition or in a related field	Number	Percentage
Health/ Nutrition	4	2.7
Home science	12	8.0
Other nutrition related fields	8	5.3
No training/degree	126	84.0
Total	150	100.0

Based on the above findings it could be seen that of the total validation study sample, only 24(14%) have had a special training more than one year in nutrition related field or were in possession of a degree in a related field.

4.1.2 Results of item analysesof the draft Nutrition Literacy Test

As described in the section 3.1.2.5, in the validation study, following were the types of item analyses performed on the draft Nutrition Literacy Test.

4.1.2.1. Assessment of the item-total correlation

4.1.2.2. Assessment of the Item difficulty index

4.1.2.3. Assessment of the Item discrimination index

4.1.2.3. Assessment of the Item discrimination index

4.1.2.4. Inspection of the item characteristic curve

4.1.2.5. Distractor analysis

4.1.2.5. Reliability analysis

4.1.2.1. Assessment of the item –total correlation of the draft Nutrition Literacy Test

Results of the item–total correlation of the 30 items of the draft Nutrition Literacy Test is shown in the Annexure XXIV. The method planned was to eliminate any item if the correlation wasfound to be below 0.3, as it indicated that the item is not measuring the same thing as the rest of the test is trying to measure. The results show that all items in the test had item–total correlation equal or above 0.3.Hence, all items were considered valid to be retained in the draft Nutrition Literacy Test being validated.

4.1.2.2. Assessment of the Item difficulty index of the draft Nutrition Literacy Test

The distribution of the item difficulty indices of the 30 items **of the draft Nutrition Literacy Test is shown in the Annexure XXV.**

Based on the above it was evident that all the items in the draft Nutrition Literacy Test have an item difficulty (p value) within the acceptable rangeof 0.2-0.9. Hence, all 30 items of the draft Nutrition Literacy Test being validated were considered to be valid to be retained.

4.1.2.3 Assessment of the item discrimination of the draft Nutrition Literacy Test

Results of the assessment of the item discrimination of the draft Nutrition Literacy Test using point biserial correlation, **is shown in the Annexure XXVI**.

There were no negative values for the point biserial correlation hence it was assumed that there were no misleading questions. Also the values were above +0.20 for all items, hence all items were considered appropriate to be retained in the test.

Results of the assessment of the item discrimination of the Nutrition Literacy test using item discrimination index, **is shown in the Annexure XXVII**.

Results of thediscrimination index (difference in the percentages who correctly responded to the item between high score group and low score group), of the all items were positive and it could be assumed that each item in the test discriminates in the same direction as the total score. It indicated that all items in the draft Nutrition

Literacy Test demonstrated satisfactory discrimination among high and low scoring groups.

4.1.2.4. Inspection of the item characteristic curve of the draft Nutrition Literacy Test

Item characteristic curves drawn for the each item is shown in the Annexure XXVIII.

Based on the item characteristic curves, it could be seen that none of the items has flat curves. Also for all items, possibility of correct response increased with increasing level of ability. Hence, all items in the test were considered as valid to be retained in the test.

4.1.2.5 Assessment of the distractors of the items of the draft Nutrition Literacy Test

As described in the section 3.1.2.5, following analyses was performed in the assessment of the distractors.

The percentage of participants who selected each of the response options, was compared in the one third of highest scores and one third of the lowest scores Findings of the assessment of the distractors of each item of the draft Nutrition Literacy Test, is shown in the Annexure **XXIX.** Based on the findings of the percentage of participants who selected each of the response options it could be seen that all response options except the 'don't know' option was selected by more than 5% of the study participants in almost all items.

The distribution of the percentage of participants who selected each of the response options, was compared in the one third of highest scores and one third of the lowest scores is shown in the Annexure XXIX.When response pattern for the each item was considered it could be seen that for each item the selection of the correct response was always higher among the one third of highest scores, and lower in the remaining two groups. The selection of the distractors was also seen higher among the one third of lowest scorescompared to the higher scorers. This was taken as evidence that items were not ambiguous or confusing.

4.1.2.7. Reliability analyses of the draft Nutrition Literacy Test

For the assessment of the reliability, internal consistency was assessed with KR-20 coefficient.

4.1.2.7.a. Internal consistency with KR-20 coefficient

Following results were yielded in the assessment of the reliability with KR-20 coefficient (Table 4.4).

Table 4.4: Distribution of KR-20 coefficient of the nutrition literacy test

KR- 20 coefficient	No. of Items
0.913	30

Based on the finding it could be seen that the overall KR-20 coefficient of the draft Nutrition Literacy Test was 0.913. as this coefficient is greater than 0.8, this result indicated adequate internal consistency of the draft Nutrition Literacy Test being validated which indicated that removal of any of the items did not improve the reliability of the test to a greater extent, confirming the reliability of the existing 30 items in the draft Nutrition Literacy Test. A detailed result of the reliability scores of the test if each item is deleted is shown in the Annexure XXX.

4.1.3 Assessment of the distribution of the nutrition literacy test score of the draft Nutrition Literacy Test

The results of the assessment of the distribution of the nutrition literacy test scores of the draft Nutrition Literacy Test is shown in the Annexure XXXI.

Visual inspection of the histogram and Q-Q plot showed that the distribution of the nutrition literacy test score was non-normal and the values for the skewness and the kurtosis demonstrates the distribution is skewedto the right. The Shapiro-Wilk's test statistic was significant, hence the null hypothesis, which assumes that the distribution was normal was rejected.

This indicated that the scores of the draft Nutrition Literacy Test should be considered as representing a skewed distribution in the analyses.

4.1.4 Assessment of convergent validity of the draft Nutrition Literacy Test

4.1.4.1. Assessment of convergent validity based on use of print material to obtain general information

The results of the comparison of ever users of print material to obtain general information along with those who do not use, is shown below in Table 4.5.

Table 4.5: Distribution of the study sample by ever use of print material to obtain general information and mean rank score of draft Nutrition Literacy Test

Usage of print material to obtain general information	Number	Mean Rankscore on draft Nutrition Literacy Test	Significance
Yes	80	90.21	Mann-Whitney
No			U=1623.500
	70	58.69	Z=-4.432
			p<0.001

It is shown that nutrition literacy scores are high in those who use print material to obtain general information compared to those who do not. This difference was statistically significant (p<0.000). This was taken as evidence of convergent validity of the draft Nutrition Literacy Test being validated.

When the nutrition literacy test scores were compared with the frequency of use of print material to obtain general information, using Kruskal Wallis H Test following results were obtained (Table 4.6).

Table 4.6: Distribution of the study sample by the frequency of use of print material to obtain general information andmean rank score of draft Nutrition Literacy Test

Frequency of usage of newspapers to obtain general information	Number	Mean Rank score on draft Nutrition Literacy Test	Significance
Not using	68	56.41	
Less than once a week	14	78.75	χ^2= 25.814,
Once a week	31	97.27	df=4,
2-4 times per week	12	93.25	p<0.001
More than four times per week	25	90.08	

When the difference between the groups who access newspapers at varying frequencies to obtain general information was assessed, it could be seen that the nutrition literacy score has gradually increased with increasing frequency of use of newspapers to obtain general information. This difference in the nutrition literacy test score was statistically significant (p<0.000).This was taken as evidence of convergent validity of the draft Nutrition Literacy Test being validated.

4.1.4.2. Assessment of frequency of use of print material to obtain information onnutrition

Results of the comparison of ever users of print material to obtain nutrition information on nutrition along with those who do not use, is shown below in Table 4.7

Table 4.7: Distribution of the study sample by ever use of print material to obtain information on nutrition andmean rank score of draft Nutrition Literacy Test

Usage of print material to obtain nutrition information	Number	Mean Rank score on draft Nutrition Literacy Test	Significance
Yes	58	93.80	Mann-Whitney U=1606.500
No	92	63.96	Z= -4.097 p<0.001

It is shown that the nutrition literacy scores were high in those who use print material to obtain informationon nutrition compared to those who do not, and this difference was statistically significant (p<0.001). This was taken as evidence of convergent validity of the draft Nutrition Literacy Test being validated.

When the nutrition literacy test scores were compared with the frequency of use of print materialto obtain informationon nutrition, using Kruskal Wallis Test following results were obtained (Table 4.8).

Table 4.8: Distribution of the study sample by frequency of use of newspapers to obtain information on nutritionandmean rank score of draft Nutrition Literacy Test

Frequency of usage of newspapers to obtain general information	Number	Mean Rank score on draft Nutrition Literacy Test	Significance
Not using	93	63.49	
Less than once a week	5	90.60	χ^2= 19.45,
Once a week	28	100.00	df=4
2-4 times per week	11	88.41	p<0.001
More than four times per week	13	91.92	

When the difference between the groups who access newspapers at a varying frequencies to obtain informationon nutrition, was assessed it could be seen the nutrition literacy score has gradually increased with increasing frequency of use of newspapers to obtain information on nutrition. This difference in the nutrition literacy test score was statistically significant ($p<0.001$).This was taken as evidence of convergent validity of the draft Nutrition Literacy Test being validated.

4.1.4.3. Assessment of level of education and nutrition literacy test score

Table 4.9 shows the relationship of the education level with nutrition literacy test score.

Table 4.9: Distribution of the study sample by level of education andmean rank score of draft Nutrition Literacy Test

Education Level	Number	Mean Rankscore on draft Nutrition Literacy Test	Significance
Up to grade 5	2	29.75	
Grade 6-9	11	44.73	χ^2= 35.65,
Up to O/L	49	58.03	df=5
Passed O/L	27	74.41	$p<0.001$
Passed A/L	55	92.98	
University education and higher	6	134.50	

Based on the findings it could be seen that with the increasing level of education, mean rank for the nutrition literacy test also had increased. This increment was statistically significant ($p<0.000$).This was also taken as evidence of convergent validity of the draft Nutrition Literacy Test being validated.

4.1.5. Estimation of the suitable cut off score for the draft Nutrition Literacy Test

The plan of analysis of nutrition literacy was to categorize the participants in to three groups, poor, marginal and adequate nutrition literacy groups. Hence, it was aimed to set two cut-off points to demarcate the three groups.

In deciding the suitable cut off points for the nutrition literacy test, several Receiver Operating Curves (ROC) were drawn, using the significant differences of the parameters identified in the assessment of the convergent validity, i.e. education level and selected items which have satisfactory discrimination index with varying level of difficulty.

4.1.5.1. Selection of the suitable items to be considered to set cut off score for the draft Nutrition Literacy Testbased on item difficulty and discrimination

In the selection of suitable items to be considered to set cut off score for the draft Nutrition Literacy Test, items were ranked based on their difficulty index and discrimination index. Two items with high discrimination index, (discrimination index closer to 0.6 and above), and lower difficulty index (difficulty closer to 0.8), were considered in the estimating cut off value for the marginal and poor group.Two items with high discrimination index, (discrimination index closer to 0.6 and above), and higher difficulty index (difficulty closer to 0.3-0.4), were considered in the estimating cut off value for the marginal and adequate group (Table 4.10).

Table 4.10: Theitems selected for estimation of cut-off score based on item difficulty index and discrimination index

Items selected	Item number	Item difficulty	discrimination index
For the marginal and poor group	18	0.8	0.62
	3	0.61	0.73
For the marginal and adequate group	2	0.43	0.57
	25	0.51	0.63

The suitability of the each item in deciding the cut off score was further assessed by the statistical significance (Tavakol and Dennik, 2011) of the difference in scores of the participants who had responded incorrectly and correctly to the items (Table 4.11 and Table 4.12).

Table 4.11: Distribution of items by significance of the mean ranks of scores, based on the response to the item 18 and 3 for estimation of cut-off score

Item		Number	Mean Rank	Significance
Item 18	Correct response	120	88.05	Mann-Whitney
	Incorrect response	30	25.30	U=294.000
				Z=- 7.076
				p<0.001
Item 3	Correct response	92	100.48	Mann-Whitney
	Incorrect response	58	35.87	U=369.500
				Z= -8.871
				p<0.001

Table 4.12: Distribution of items by significance of the mean ranks of scores, based on the response to the item 2 and 25 for estimation of cut-off score

Item		Number	Mean Rank	Significance
Item 2	Correct response	65	104.75	Mann-
	Incorrect response	85	53.13	WhitneyU=861.000
				Z=-7.212
				p<0.001
Item 25	Correct response	77	102.18	Mann-Whitney
	Incorrect response	73	47.36	U=56.000
				Z= -7.726
				p<0.001

Tables 4.11 and 4.12 show that all the selected items were suitable in deciding the cut off scoresas indicated by the statistical significance of the difference in scores of the participants who respond incorrectly and correctly to the item (p<0.000).

In defining suitable cut off for the marginal and poor group, participants were categorized to two groups based on the dichotomous response for all three parameters. Then several ROC curves were drawn, based on the education level, categorized into two, as those who have studied up to GCE O/L as low educational level and those who have passed GCE OL or studied beyond that as high educational level and response (correct or incorrect) to item 18 and 3. The number of participants in low education level and incorrectly responded to both item 18 and 3 were found to be 65 while the number of participants in high education level and correctly responded to both item 18 and 3 were found to be 19. All these curves were drawn in in the same graph, and the cut off value for the inadequate and marginal Nutrition Literacy was identified.

4.1.5.2. Estimation of the cut off score for the poor and marginal Nutrition Literacy group.

Similarly, in defining suitable cut off for the marginal and adequate group, participants were categorized to two groups based on the dichotomous response for all three parameters. Then ROC curves were drawn, based on the education level, categorized into two, as those who have studied up to GCE O/L as low educational level and those who have passed GCE OL or studied beyond that as high educational level), and response (correct or incorrect) to item 18 and 3. The number of participants in low education level and incorrectly responded to both item 18 and 3were found to be 65 while the number of participants in high education level and correctly responded to both item 18 and 3 were found to be19. All these criteria were combined and deciding the point of score at which sensitivity and specificity were maximized.

Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 18 and 3, for cut off score for the poor and marginal nutrition literacy group is shown in the Annexure XXXII.

As the area under the curve was 0.995 with 95% Confidence interval (CI) between 0. 986-1.004, this was considered to provide evidence for excellent discrimination.

Based on these findings, 35.22≈ 35 was taken as the cut-off score for thepoor and marginal nutrition literacy group, with a sensitivity of 97% and a specificity of 95%.

4.1.5.3Estimation of the cut off score for the adequate and marginal Nutrition Literacy group

In defining suitable cut off for the marginal and adequate group, participants were categorized to two groups based on the dichotomous response for all three parameters. Then ROC curves were drawn, dividing those with a low level of education and had incorrectly responded to both item 2 and 25 into one side and those who were in the high level of education and had correctly responded to both item 2 and 25 on the other. The number of participants in low education level and incorrectly responded to both item 2 and 25 were found to be 42 while the number of participants in high education level and correctly responded to both item 2 and 25 were found to be 22.
Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 2 and 25, for cut off score for the adequate and marginal nutrition literacy group is shown in the Annexure XXXII.

As the area under the curve is 0.996 with 95% CI between 0. 986-1.006, this was considered to provide evidence for excellent discrimination.
Based on these findings, 66.15≈ 66 was taken as the cut-off score for the adequate and marginal nutrition literacy group, with a sensitivity of 100% and a specificity of 98%.

4.2 Component 2:

This component comprised two subcomponents.

Subcomponent 1: A descriptive cross-sectional study among females aged 25 to 45 years to determine the prevalence of nutrition literacy

Subcomponent 2: A cross sectional analytical study to determine correlates for nutrition literacy among females aged 25 to 45 years in the district of Colombo

Subcomponent 1: A descriptive cross-sectional study among females aged 25 to 45 years to determine the prevalence of nutrition literacy

For assessment of the prevalence of nutrition literacy, a sample of 1290 females aged 25-45 years representing all the secretariat divisions in the Colombo district was selected. Out of the 1290 eligible study units selected to be included in the study, 70 could not be contacted even after three visits to the househol. Thus, sample of 1220 females aged 25-45 years were included in the study was 1220, giving a response rate of 94.5%.

4.2.1. Background characteristics of the study population

4.2.1.1 Basic characteristics of the study population

Table 4.13 shows the basic socio-demographic characteristics of study population.

Table 4.13: Distribution of the study populationby the basic socio-demographic characteristics

Socio-demographic characteristics	Number (n=1220)	Percentage
Age in completed years		
25- 29	541	44.3
30- 34	314	25.7
35-39	219	18.0
40-45	146	12.0
Ethnicity		
Sinhala	1031	84.5
Tamil	62	5.1
Muslim	116	9.5
Other	11	0.9
Religion		
Buddhism	977	80.0

	Hinduism	39	3.2
	Catholicism	68	5.6
	Christianity	24	2.0
	Islam	110	9.0
	other	2	0.2
Marital Status			
	Married	1132	92.8
	Unmarried	74	6.1
	Separated	6	0.5
	Widow	5	0.4
	Divorced	3	0.2

As shown in Table 4.13, a majority of the study units were in age category of 25-29 years (n=541, 44.3%). A large majority were Sinhalese (n=1031, 84.5%) and Buddhists (n=977, 80.0%). A majority of the study sample were married (n=1132, 92.8%).

Features related to basic socio-economic characteristics of the study population is shown in Table 4.14 a and Table 4.14 b.

Table 4.14a: Distribution of the studypopulation by thebasic socio-economic characteristics

Socio-demographic characteristics	**Number (n=1220)**	**Percentage**
Highest educational level achieved		
Grade 1-5	57	4.7
Grade 6-9	179	14.7
Up to G.C.E. O/L*	457	37.5
PassedG.C.E. O/L*	204	16.7
PassedG.C.E. A/L**	294	24.1
Graduate	29	2.4
Employed at the time of the study		
yes	251	20.6
no	969	79.4

Monthly household income in Rs.			
	<9000	27	2.2
	9000-18999	202	16.6
	19000-28999	226	18.5
	29,000-38,999	138	11.3
	39000-48,999	32	2.6
	≥49, 000	46	3.8
Wealth Quintile			
	Lowest	245	20.1
	Second	255	20.9
	Middle	247	20.2
	Forth	298	24.4
	Highest	175	14.3

*G.C.E. O/L- General Certificate of Education Ordinary Level

** G.C.E. A/L- General Certificate of Education Advanced Level

As shown in the Table 4.14a, amajority (n=457, 37.5%) were educated up to G.C.E. O/L and a considerable number (n=294, 24.1%) had passed G.C.E. A/L .Off the total study population, only one fifth (n=251, 20.6%) were employed.

In the monthly household income group, approximately hlf (n=566, 46.4%) were in the monthly income categories of rs. 9000 to 38,999. The distribution of the population in the first three wealth quintiles were nearly equal and was approximately 20%.

The distribution of the study population by items included in the standard of living index in the study population is described in detail in the Annexure XXXIIIa. Summary of the categorization of the study population based on the score obtained for the standard living index is given in the Table 4.14b.

Table 4.14b: Distribution of the study population by standard of living index

Item		Number	Percentage
Standard of living index			
	High	51	4.18
	Medium	1122	91.97

	low	47	3.85
Total		1220	100.0

Of those participants, a majority (n=1122, 91.97%) belonged to medium standard of living category.

4.2.1.2 Basic reproductive health related characteristics of the study population

Distribution of the study population by reproductive health related details is shown in the Table 4.15.

Table 4.15: Distribution of the study population by reproductive health related details

Reproductive health related detail		Number (n=1220)	Percentage
Having children			
	Yes	1076	88.2
	No	144	11.8
Number of children			
	No children	145	11.9
	One child	425	34.8
	2-3 children	628	51.5
	>4 children	22	1.8
Number of children one year and below			
	No children	983	80.5
	One child	235	19.3
	Two children	2	0.2
Number of children >1 year and ≤ 5 years			
	No children	541	44.3
	One child	622	51.0
	Two children	54	4.4
	Three children	3	0.2
Number of children > 5 years			
	No children	690	56.6
	One child	298	24.4

	Two children	181	14.8
	Three children	51	4.2
Being currently pregnant			
	Yes	95	7.8
	No	1125	92.2
Currently breast feeding			
	Yes	576	47.2
	No	644	52.8

A majority had children (n=1076, 88.2%). A total of 237(19.3%) had at least one child below one year and 679 (55.7%) had one or more children between 1 to 5 years. Out of the total study population, 95(7.8%) were pregnant at the time of survey, and 576(47.2%) were breast feeding at the time of the survey.

4.2.1.3 Diet related disease characteristics of the study population

Distribution of the study population by selected non-communicable diseases needing dietary interventions and the risk factor for NCD, Hypercholesterolaemia, needing dietary interventions in the study population is shown in the Table 4.16.

Table 4.16: Distribution of the study population by selected non-communicable diseases needing dietary interventions and the risk factor for NCD, Hypercholesterolaemia, needing dietary interventions in the study population

Non-communicable disease		**Number (n=1220)**	**Percentage**
Diabetes			
	Yes	103	8.4
	No	1117	91.6
Hypertension			
	Yes	78	6.4
	No	1142	93.6

Cancers			
	Yes	9	0.7
	No	1211	99.3
Heart Disease			
	Yes	19	1.6
	No	1201	98.4
Other			
	Yes	17	1.4
	No	1203	98.6
any one more NCD			
	Yes	210	17.2
	No	1010	82.8
Hypercholesterolemia			
	Yes	24	2.0
	No	1196	98.0

Self-reports showed that of the study population, 103(8.4%) had diabetes and 78(6.4%) had hypertension. Of the total study population 210(17.2%) had at least one NCD needing dietary interventions.Of the study population 24(2.0%) reported that they had hypercholesterolemia.

4.2. Prevalence of nutrition literacy among females aged 25-45 years in Colombo district

In the assessment of the prevalence of nutrition literacy among the females aged 25-45 years in Colombo district, the females were divided in to three groups based on their nutrition literacy levels, based on the scores they obtained for the validated Nutrition Literacy Test. The categorization.

Nutrition literacy test score of equal or below 35 was taken as poor nutrition literacy. The test score of above 35 and equal or below 66 was taken as marginal nutrition literacy level and score of above 66 was taken as adequate nutrition literacy.

Prevalence estimates for the each of these levels of nutrition literacy level among the study population.is shown below in the Table 4.17.

Table 4.17: Distribution of the study population by prevalence of varying nutrition literacy level

Nutrition Literacy level	Number	Percentage	Confidence Interval	
			Lower %	Upper %
Poor	14.54	14.65	14.54	14.65
Marginal	41.06	41.14	41.06	41.14
Adequate	44.26	44.34	44.26	44.34
Total	1220	100.0		

The prevalence of adequate nutritional level 44.3% (95% CI 44.26-44.34)and marginal nutrition level 41.1% (95% CI 41.06-41.14). The lowest prevalence was seen in the category of poor nutrition literacy (14.6% (95% CI 14.54-14.65)

The measures of central tendency and dispersion in the nutrition literacy test score, is given in the Annexure XXXIII.

The descriptive statistics of the Nutrition Literacy Test scores within each nutrition literacy categoryis shown in the Table 4.18.

Table 4.18: Distribution of descriptive statistics of the nutrition literacy test scores of each nutrition literacy category

Nutrition Literacy level	Mean Score(SD)	Median
Poor	16.36(±12.88)	18.72
Marginal	54.29 (±8.43)	55.58
Adequate	80.54 (±8.14)	80.72

It is shown that the mean score for the inadequate nutrition literacy group was 16.36(SD=±12.88), whereas for the marginal and adequate groups it was 54.29 (SD=±8.43) and 80.54 (SD=±8.14), respectively. The dispersion of scores within the categories of marginal (SD=±8.43) and adequate (SD=±8.14)were similar.

Comparison of the Nutrition Literacy Test scores of the study units in the three levels of nutrition literacy, using Kruskal-Wallis test is shown in the Table 4.19.

Table. 4.19: Comparison of the Nutrition Literacy test scores of the study units in the three levels of nutrition literacy

Nutrition Literacy level	Number	Mean Rank	Significance
Poor	178	89.50	χ^2= 1024.611
Marginal	501	429.00	df=2,
Adequate	541	950.00	p<0.001

Nutritional Literacy Test scores of the study units of the three levels of nutrition literacy were found to be significantly different (p<0.000).

The Nutrition Literacy Test assessed the following five major skills

1. Ability to identify nutrition related text.
2. Ability to comprehend nutrition related text.
3. Interpreting nutrition related information and data presented in the form of tables, charts, pictures, symbols and maps.
4. Completing nutrition related computations.
5. Making nutrition related inferences based on the information presented.

A comparison of the mean score obtained for each of the skill by the study units in differentlevels of nutrition literacy is shown in the Tables 4.20 to 4.24 and the significance of difference between three groups was assessed using the Kruskal-Wallis test.

Table 4.20: Comparison of the mean scores obtained for the skill of identifying nutrition related text by the study units in different levels of nutrition literacy

Nutrition Literacy level	Number (n=1220)	Mean Rank	Significance
Poor	178	161.44	χ^2= 538.09
Marginal	501	570.99	df=2,
Adequate	541	794.84	p<0.001

The results shows that the study units in different levels of nutrition literacy had performed significantly differently (p<0.001) in the skill of identifying nutrition related text. The study units in the poor nutrition level had performed worst while the study units in the adequate nutrition level have performed best.

Table 4.21: Comparison of the mean scores obtained for the skill of comprehending nutrition related text by the study units in different levels of nutrition literacy

Nutrition Literacy level	Number (n=1220)	Mean Rank	Significance
Poor	178	194.18	χ^2= 564.24
Marginal	501	498.89	df=2,
Adequate	541	850.83	p<0 .001

The study units in the poor nutrition level had performed worst in the skill of comprehending nutrition related text while the study units in the adequate nutrition level have performed best. The performance of the study units in different levels of nutrition literacy was significantly differently (p<0.001) in the skill of comprehending nutrition related text.

Table 4.22: Comparison of the mean scores obtained for the skill of interpreting nutrition related information and data in the form of tables ,charts, pictures, symbols and maps by the study units in different levels of nutrition literacy

Nutrition Literacy level	Number (n=1220)	Mean Rank	Significance
Poor	178	129.54	χ^2= 658.57
Marginal	501	514.37	df=2,
Adequate	541	857.76	p<0.001

The results shows that the study units in different levels of nutrition literacy had performed significantly differently (p<0.001) in the skill of interpreting nutrition related information and data in the form of tables, charts, pictures, symbols and maps. The study units in the poor nutrition level had performed worst while the study units in the adequate nutrition level have performed best.

Table 4.23: Comparison of the mean scores obtained for the skill of completing nutrition related computationsby the study units in different levels of nutrition literacy

Nutrition Literacy level	Number (n=1220)	Mean Rank	Significance
Poor	178	164.00	χ^2= 693.40
Marginal	501	480.12	df=2,
Adequate	541	878.14	p<0.001

The study units in the poor nutrition level had performed worst in the skill of completing nutrition related computations while the study units in the adequate nutrition level have performed best. The results shows that the study units in different levels of nutrition literacy had performed significantly differently (p<0.001) in the skill of comprehending nutrition related text.

Table 4.24: Comparison of the mean scores obtained for the skill of making nutrition related inferences based on the information presentedby the study units in different levels of nutrition literacy

Nutrition Literacy level	Number (n=1220)	Mean Rank	Significance
Poor	178	165.44	χ^2= 714.80
Marginal	501	471.53	df=2,
Adequate	541	885.63	p<0.001

The results shows that the study units in different levels of nutrition literacy had performed significantly differently (p<0.001) in the skill of making nutrition related inferences based on the information presented. The study units in the poor nutrition level had performed worst while the study units in the adequate nutrition level have performed best.

Prevalence of nutrition literacy disaggregated based on selected socio-demographic and socio-economic characteristics was also performedand the results are shown in Tables 4.25 to 4. 28.

Table 4.25:.Distribution of the study population by prevalence of nutrition literacy level and age

Age category	Nutrition literacy Level						Total	
	Poor		Marginal		Adequate			
	No.	%	No.	%	No.	%	No.	%
25-29 years	71	13.2	219	40.7	248	46.1	538	100
30-34 years	53	16.8	132	41.8	131	41.5	316	100
35-39 years	32	14.6	91	41.6	96	43.8	219	100
40-45 years	24	16.3	57	38.8	66	44.9	147	100
Total	180	14.8	499	40.9	541	44.4	1220	100

The prevalence of the each of the nutrition literacy level, did not vary greatly among the study population of different age categories as shown in the Table 4.25.

As the representation of the study sample varied among the age categories, age adjusted prevalence was calculated. In calculation of the age adjusted prevalence the marginal and the poor nutrition literacy levels were amalgamated and the group was renamed as 'inadequate nutrition literacy'.Age adjusted prevalence of the inadequate nutrition literacy is shown in Table 4.26.

Table 4.26: Age adjusted prevalence of the inadequate nutrition literacy

Age category	Prevalence of inadequate nutrition literacy		Age adjusted prevalence of inadequate nutrition literacy
	No.	%	
25-29	290	53.8	26.1
30-34		58.9	25.9
35-39		56.2	23.4
40-45	81	54.8	24.6
Total	679	55.7	

The age adjusted prevalence of inadequate nutrition literacy, was shown to be the highest in the 25-29 years age category (26.1%), and lowest in the 35-39 years age category (23.4%).

Table 4.27: Distribution of the study population by prevalence of nutrition literacy level and ethnicity

Ethnicity	Nutrition literacy Level						Total	
	Poor		Marginal		Adequate			
	No.	%	No.	%	No.	%	No.	%
Sinhalese	121	12.0	428	42.3	462	45.7	1011	100
Non Sinhalese*	59	28.2	71	34.0	79	37.8	209	100
Total	180	14.8	499	40.9	541	44.3	1220	100

*ethnicities other than sinhalese were amalgamated as non -Sinhalese;

The Table 4.27 shows a disparity in the nutrition literacy levels of the study population based on ethnicities. Among the Sinhalese population, prevalence of adequate nutrition literacy was 45.7% where as it was 37.8% among the non-sinhalese.

Considering the difference of the representation of ethnic groups in the sample to the population structure of the Colombo district, adjusted prevalence for the ethnicity was calculated. In calculation of the ethnicity adjusted prevalence the marginal and the poor nutrition literacy levels were amalgamated and the group was renamed as 'inadequate nutrition literacy'. In calculating the adjusted prevalence, the prevalence of Sinhalese population in the district of Colombo was taken as 76.6% (Dept. of Census and Statistics, 2001). Ethnicity adjusted prevalence of the inadequate nutrition literacy is shown in Table 4.28.

Table 4.28: Ethnicity adjusted prevalence of the inadequate nutrition literacy

Ethnicity	**Prevalence of inadequate nutrition literacy**		**adjusted prevalence of inadequate nutrition literacy**
	No.	**%**	
Sinhalese	549	54.3	51.8%
Non sinhalese	130	62.2	48.2%
Total			

Based on the adjusted prevalence inadequate nutrition literacy was higher in the Sinhalese (51.80%) population compared to non-Sinhalese (48.2%).

Table 4.29: Distribution of the study population by prevalence of nutrition literacy level and education level

Highest education level	Nutrition literacy Level						Total	
	Poor		Marginal		Adequate			
	No.	%	No.	%	No.	%	No.	%
Grade 1-5	28	49.1	21	36.9	8	14.0	57	100.0
Grade 6-9	47	26.3	78	43.6	54	30.1	179	100.0
Up to G.C.E. O/L*	67	14.7	233	50.0	157	34.3	457	100.0
Passed G.C.E. O/L*	16	17.9	79	38.7	109	53.4	204	100.0
Passed G.C.E. A/L**	17	5.8	87	29.6	190	64.6	294	100.0
Graduate	1	3.5	5	17.2	23	79.3	29	100.0
Total	180	14.8	499	40.9	541	44.3	1220	100.0

*G.C.E. O/L- General Certificate of Education Ordinary Level

** G.C.E. A/L- General Certificate of Education Advanced Level

Above results clearly indicate that the prevalence of adequate nutrition literacy level gradually increases with the increasing level of education and the prevalence of poor and marginal nutrition level decreases with increasing education level.

Table 4.30: Distribution of the study population by prevalence of nutrition literacy level and wealth quintile

Wealth Quintile	Nutrition literacy Level						Total	
	Poor		Marginal		Adequate			
	No.	%	No.	%	No.	%	No.	%
Lowest	71	28.9	104	42.5	70	28.6	245	100
Second	30	11.8	111	43.5	114	44.7	255	100
Middle	38	15.4	92	37.3	117	47.3	247	100
Forth	26	8.7	129	43.3	143	48.0	298	100
Highest	15	8.6	63	36.0	97	55.4	175	100
Total	180	14.7	499	40.9	541	44.4	1220	100

The prevalence of adequate nutrition literacy level gradually increases with the increasing wealth quintile and the prevalence of poor nutrition level decreases with increasing wealth quintile.

4.3 Correlates of nutrition literacy among females aged 25-45 years in Colombo district

For the assessment of the correlates of nutrition literacy, the participants in the poor and marginal nutrition literacy groups were taken together and considered as inadequate nutrition literacy group. Correlates for inadequate nutrition literacy were identified in comparison with adequate nutrition literacy using bivariate analyses. .

4.3.1. Socio demographic correlates of nutrition literacy

Table 4.31 shows the distribution of the nutrition literacy level by socio-demographic correlates.

Table 4.31: Distribution of the nutrition literacy level by socio-demographic correlates

Socio-demographic characteristics	Nutrition literacy level		
	Inadequate	**Adequate**	***significance***
	No. (%)	**No. (%)**	
Age category			
Less than or equal to 35 years	491 (74.1%)	392 (75.1%)	χ^2= 0.166,
Above 35 years*	172 (25.9%)	130 (24.9%)	df=1, p=0.684
			OR= 0.95
			(95% CI0.73-1.23)
Ethnicity			
Non- sinhalese	130 (19.2%)	79 (14.6%)	χ^2= 4.424,
			df=1, p=0.037
Being sinhalese*	549 (80.9%)	462 (85.4%)	OR= 1.38
			(95% CI 1.02- 1.88)
Religion			χ^2= 0.099,
Being Buddhist	508 (74.8%)	409 (75.6%)	df=1, p=0.753
			OR=0 .95
Other Religion*	171 (25.2%)	132 (24.4%)	(95% CI 0.73-1.24)
Marital status			
Being Married	630 (92.8%)	503 (93.0%)	χ^2= 0.017,
			df=1, p=0.897
Being unmarried /widow*	49 (7.2%)	38 (7.1%)	OR= 1.03
			(95% CI 0.66-1.59)
Having Children			

Yes	609 (89.7%)	467 (86.3%)	χ^2= 3.262, df=1, p=0.897
No*	70 (10.3%)	74 (13.7%)	OR= 1.37 (95% CI 0.97-1.95)
Being pregnant at the time of the study			
Yes	58 (8.5%)	504 (93.2%)	χ^2= 1.227, df=1, p=0.271
No*	621 (91.5%)	37 (6.8%)	OR= 1.27 (95% CI 0.82-1.95)

* Reference level

Out of the socio-demographic factors only the ethnicity,being a-non- sinhalese was found to be a significant correlate of inadequate nutrition literacy (OR= 1.38 (95% CI 1.02- 1.88)).

4.3.2 Socio economic correlates of nutrition literacy

Distribution of the nutrition literacy level by socio-demographic correlates is shown in Table 4.32.

Table 4.32: Distribution of the nutrition literacy level by socio-demographic correlates

Socio economic characteristics	**Nutrition literacy level**		
	Inadequate No. (%)	**Adequate No. (%)**	***significance***
Level of education			
Below G.C. E. A/L** education	569 (83.8%)	328 (60.6%)	χ^2= 83.335, df=1, p<0.001

Passed G.C.E. A/L** and above*	110 (16.2%)	213 (39.4%)	OR= 3.35 (95% CI 2.57-4.38)
Being employed			
No	573 (84.4%)	396 (73.2%)	χ^2= 22.95, df=1, p<0.001
Yes*	106 (15.6%)	145 (26.8%)	OR= 1.97 (95% CI 1.49-2.62)
Wealth quintiles			
Wealth quintile 1-3	446 (65.7%)	301 (55.6%)	χ^2= 12.786, df=1, p<0.001
Wealth quintile 4-5*	233 (34.3%)	240 (44.4%)	OR= 1.52 (95% CI 1.21-1.92)
Standard of living Index			
Low or medium	657 (96.8%)	512 (94.6%)	χ^2= 3.352, df=1, p=0.069
High*	22 (3.2%)	29 (5.4%)	OR= 1.69 (95% CI 0 .96-2.97)

* Reference level

** G.C.E. A/L- General Certificate of Education Advanced Level

A low education level below G.C.E. A/L (OR= 3.35 (95% CI 2.57-4.38)), participant being unemployed (OR= 1.97 (95% CI 1.49-2.62)), being in the low wealth quintiles (OR= 1.52 (95% CI 1.21-1.92)) were significant correlates of inadequate nutrition literacy among 25-45 year old females.

4.3.3 Diet related disease characteristics as correlates of nutrition literacy

Distribution of the nutrition literacy level by whether the participant is having a non-communicable disease which need dietary interventions, as correlates of nutrition literacy is shown in Table 4.33.

Table 4.33: Distribution of the nutrition literacy level by whether the participant is having a non-communicable disease which need dietary interventions, as correlates of nutrition literacy

Participant having a NCD	Nutrition literacy level		*nificance*
	Inadequate No. (%)	Adequate No. (%)	
Yes	158 (23.3%)	121 (22.4%)	χ^2= 0.140, df=1, p=0.709 OR= 1.05 (95% CI 0.80-1.37)
No*	521 (76.7%)	420 (77.6%)	
Total	679 (100%)	541 (100%)	

* Reference level

Having a non-communicable diseasewas not a significant correlate of nutrition literacy (OR= 1.05(95% CI 0 .80-1.37)).

4.3.4. Diet related disease characteristics of the families of the study population as correlates of nutrition literacy

Table 4.34 shows the distribution of the nutrition levels by whether a parent or a sibling of the study unit having a non-communicable disease which need dietary interventions, as acorrelate of nutrition literacy.

Table 4.34: Distribution of the nutrition literacy level by whether a parent or a sibling of the study unit is having a non-communicable disease which need dietary interventions, as a correlateof nutrition literacy

Parent or a sibling of the participant having a NCD	Nutrition literacy level		*significance*
	Inadequate No. (%)	Adequate No. (%)	
Yes	294 (43.3%)	295 (54.5%)	χ^2= 15.231, df=1, p<0.001 OR= 1.57 (95% CI 1.25-1.97)
No*	385 (56.7%)	246 (45.5%)	
Total	679 (100%)	541 (100%)	

* Reference level

Parent or a sibling having a non-communicable disease, which need dietary interventions, was a significant correlate of inadequate nutrition literacy level (OR=1.57(95% CI 1.25-1.97)).

Table 4.35shows the distribution of the nutrition levels by whether any member in the household of the study unit having a non-communicable disease which need dietary interventions, as acorrelate of nutrition literacy.

Table 4.35: Distribution of the nutrition literacy level by whether a household member of the study unit is having a non-communicable disease which need dietary interventions, as a correlateof nutrition literacy

Household member of the study unit is having a NCD	Nutrition literacy level		*significance*
	Inadequate No. (%)	Adequate No. (%)	
No	493 (72.6%)	355 (65.6%)	χ^2= 15.231, df=1, p<0.001 OR=1.38 (95% CI 1.08-1.77)
Yes*	186 (27.4%)	186 (34.4%)	
Total	679 (100%)	541 (100%)	

* Reference level

Not having a household member of the study unit not having a non-communicable disease, which need dietary interventions, was a significant correlate of inadequate nutrition literacy level (OR=1.38(95% CI 1.08-1.77)).

4.3.5 Involvement of the study population in household food related activities as correlates of nutritional literacy

The distribution of nutrition literacy level by whether the study unit is involved in household food related activities as correlates of nutritional literacy is shown in Table 4.36.

Table 4.36: Distribution of nutrition literacy level by whether the study unit is involved in household food related activities as correlates of nutritional literacy

Involvement in household food related activities	Nutrition literacy level		*significance*
	Inadequate No. (%)	Adequate No. (%)	

involvement in household food purchasing by the participant			
Four or more days per week	353 (52.0%)	219 (40.5%)	χ^2= 16.06, df=1, p<0.001 OR=1.59 (95% CI 1.26-2.00)
Less than 4 days perweek*	326 (48.0%)	322 (59.5%)	
Involvement in household food decision making			
Four or more days per week	347 (51.1%)	207 (38.3%)	χ^2= 20.128, df=1, p<0.001 OR=1.68 (95% CI 1.34-2.12)
Less than 4 days perweek*	332 (48.9%)	334 (61.7%)	

* Reference level

Based on the above findings, involvement in household food purchasing for more than 4 days per week (OR=1.59(95% CI 1.26-2.00)) and involvement in household cooking for more than 4 days per week (OR=1.68(95% CI 1.34-2.12)) were significant correlates of inadequate nutrition literacy.

Table 4.37 shows the distribution of nutrition literacy level by the pattern of consumption of main meals from an outside during a typical week as correlates of nutritional literacy.

Table 4.37: Distribution of nutrition literacy level by the pattern of consumption of main meals from an outside as correlates of nutritional literacy

consumption of main meals from an outside	Nutrition literacy level		*significance*
	Inadequate No. (%)	**Adequate No. (%)**	
consumption of at least one main meal from an outside restaurant			
Four or more days during a typical week	72 (10.6%)	11 (2.0%)	χ^2= 39.704, df=1, p<0.001 OR=5.71 (95% CI 2.99-10.89)
Less than 4 days during a typical r week*	*607 (89.4%)*	*530 (98.0%)*	
consumption of all three main meals from an outside restaurant			
Four or more days during a typical week	35 (5.2%)	8 (1.5%)	χ^2= 13.13, df=1, p=0.001 OR=3.62 (95% CI 1.66-7.87)
Less than 4 days during a typical week*	644 (94.9%)	533 (98.5%)	

* Reference level

Consuming at least one main meal from an outside restaurant more than 4 days per week (OR=5.71 (95% CI2.99-10.89)) and consuming of all three main meals from an outside more than 4 days per week(OR=3.62(95% CI 1.66-7.87)) were significant correlates of inadequate nutrition literacy.

4.3.6. Education and training on nutrition and related subjects among the study population as correlates of nutrition literacy

Table 4.38 shows the distribution of nutrition literacy level by whether the participant had received formal education on nutrition related fields as correlates of nutritional literacy.

Table 4.38: Distribution of nutrition literacy level by whether the participant received of formal education on nutrition related fields as correlates of nutritional literacy

Receipt of formal education on nutrition related fields	Nutrition literacy level		*significance*
	Inadequate No. (%)	Adequate No. (%)	
receipt of formal education on nutrition related fields up to G.C.E. O/L			
No	229 (33.7%)	134 (24.8%)	χ^2= 11.669, df=1, p=0.001 OR=1.54 (95% CI 1.20-1.98)
Yes*	450 (66.3%)	407 (75.2%)	
receipt of formal education on nutrition related fields up to G.C.E. A/L			
No	658 (96.9%)	514 (95.0%)	χ^2= 2.846, df=1, p=0.093 OR=1.64 (95% CI 0.9-2.94)
Yes*	21 (3.1%)	27 (5.0%)	
receipt of formal education on nutrition related fields up diploma or degree level			
No	672 (99.0%)	531 (98.2%)	χ^2= 1.453, df=1, p=0.233 OR=1.80 (95% CI 0.68-4.78)
Yes*	7 (1.0%)	10 (1.8%)	

* Reference level

The results show that not receiving formal education on nutrition related fields up to G.C.E. O/Lwas a significant correlate of inadequate nutrition literacy (OR=1.54(95% CI 1.20-1.98)).

4.3.7 Receipt of nutrition related instructions from a health personnel as a correlate of nutrition literacy

Table 4.39: Distribution of nutrition literacy level by whether the participant received nutrition related instructions by health care workers as a correlate of nutritional literacy.

receipt of food and nutrition related instructions by health care workers	Nutrition literacy level		*significance*
	Inadequate No. (%)	Adequate No. (%)	
No	308 (45.4%)	198 (36.6%)	χ^2= 9.56, df=1, p=0.002 OR=1.43 (95% CI 1.14-1.81)
Yes*	371 (54.6%)	343 (63.4%)	
Total	679 (100%)	541 (100%)	

* Reference level

Non-receipt of food and nutrition related instructions by health care workers, within last six months, was a significant correlate of inadequate nutrition literacy (OR=1.43 (95% CI 1.14-1.81).

4.3.8 Possession of a health insurance by the study unit as a correlate of nutrition literacy

The distribution of nutrition literacy level by whether the study unit possesses a health insurance asa correlate of nutritional literacy (Table 4.40).

Table 4.40: Distribution of nutrition literacy level by whether the study unit possesses a health insurance as a correlate of nutritional literacy

Possession of a	Nutrition literacy level

health insurance	Inadequate No. (%)	Adequate No. (%)	*significance*
Yes	30 (4.4%)	11 (2.0%)	χ^2= 5.539, df=1, P=0.025 OR=2.22 (95% CI 1.10-4.48)
No*	649 (95.6%)	530 (98.0%)	
Total	679 (100%)	541 (100%)	

* Reference level

Possessing a health insurance was a significant correlate of inadequate nutrition literacy (OR 2.22 (95% CI 1.10-4.48)).

4.3.9. Accessibility and usage of information sources on nutrition related matters among the study population as correlates of nutrition literacy

The distribution of nutrition literacy level by whether the study unit has accessibility to main communication channels as correlates of nutritional literacy is shown in Table 4.41.

Table 4.41: Distribution of nutrition literacy level by whether the study unit has accessibility to main communication channels as correlates of nutritional literacy

accessibility to main communication channels	Nutrition literacy level Inadequate No. (%)	Adequate No. (%)	*significance*
accessto radio			
No	301 (44.3%)	163 (30.1%)	χ^2= 26.03, df=1, p<0.001 OR=1.84 (95% CI 1.45-2.34)
Yes*	378 (55.7%)	378 (69.2%)	

access to television			
No	155 (22.8%)	44 (8.1%)	χ^2= 50.67, df=1, p<0.001 OR=3.34 (95% CI2.33-4.77)
Yes*	524 (77.2%)	497 (91.9%)	
accessto newspaper			
No	325 (47.9%)	126 (23.3%)	χ^2= 80.10, df=1, p<0.001 OR=3.02 (95% CI 2.35-3.88)
Yes*	354 (52.1%)	415 (76.7%)	
accessto internet			
Yes	73 (10.8%)	106 (19.6%)	χ^2= 18.69, df=1, p<0.001 OR=2.02 (95% CI1.46-2.79)
No*	606 (89.2%)	435 (80.4%)	

* Reference level

Not having access to radio (OR=1.84 (95%CI 1.45-2.34)),television(OR=3.34 (95% I2.33-4.77)) and newspaper(OR=3.02 (95%CI2.35-3.88)) and having access to internet (OR=2.02 (95%CI1.46-2.79)) were significant correlates of inadequate nutrition literacy.

Table 4.42 shows the distribution of nutrition literacy level by whether the study unit use the main communication channels to obtain general informationduring the past six months as correlates of nutritional literacy.

Table 4.42: Distribution of nutrition literacy level by whether the study unit use the main communication channels to obtain general information during the past six months as correlates of nutritional literacy

use the main communication channels to obtain general informationduring the past six months	Nutrition literacy level		*significance*
	Inadequate No. (%)	**Adequate No. (%)**	
Use of radio to obtain general information			
No	380 (55.9%)	268 (49.5%)	χ^2= 4.995, df=1, p=0.372 OR=1.29 (95% CI 1.03-1.62)
Yes*	299 (44.1%)	273 (50.5%)	
Use of television to obtain general information			
No	125 (18.4%)	53 (9.8%)	χ^2= 18.515, df=1, p<0.001 OR=2.07 (95% CI 1.47- 2.92)
Yes*	554 (81.6%)	488 (90.2%)	
use of newspaper to obtain general information			
No	405 (59.6%)	270 (49.9%)	χ^2= 11.55, df=1, p=0.001 OR=1.48 (95% CI 1.18-1.86)
Yes*	274 (40.4%)	271 (50.1%)	
Use of internet to obtain general information			
No	642 (94.6%)	486 (89.8%)	χ^2= 9.545, df=1, p=0.002 OR=1.96 (95% CI 1.27-3.02)
Yes*	37 (5.4%)	55 (10.2%)	

* Reference level

Non-use of television (OR=2.07 (95% CI1.47- 2.92)), newspaper(OR=1.48 (95% CI1.18-1.86))and internet OR=1.964 (95% CI 1.27-3.02)to obtain general information during the past six months were significant correlates of inadequate nutrition literacy

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Table 4.43 shows the distribution of nutrition literacy level by whether the study unit use the main communication channels to obtain informationrelated to nutrition during the past six months as correlates of nutritional literacy.

Table 4.43: Distribution of nutrition literacy level by whether the study unit use the main communication channels to obtain information related to nutrition during the past six months as correlates of nutritional literacy

Use the main communication channels to obtain nutrition related informationduring the past six months	**Nutrition literacy level**		***significance***
	Inadequate No. (%)	**Adequate No. (%)**	
Use of radio to obtain nutrition information			
No	537 (79.1%)	439 (81.1%)	χ^2= 0.801, df=1, p=0.372
Yes*	142 (20.9%)	102 (18.9%)	OR=1.13 (95% CI 0.86-1.51)

Useof television to obtain nutrition information			
No	367 (54.1%)	225 (41.6%)	χ^2= 18.777, df=1, p<0.001 OR=1.65 (95% CI 1.32- 2.08)
Yes*	312 (45.9%)	316 (58.4%)	
use of newspaper to obtain nutrition information			
No	527 (77.6%)	366 (67.7%)	χ^2= 15.162, df=1, p<0.001 OR=1.65 (95% CI 1.29-2.14)
Yes*	152 (22.4%)	175 (32.3%)	
Use of internet to obtain nutrition information			
No	651 (95.9%)	494 (91.3%)	χ^2= 10.818 df=1, p=0.002 OR=2.21 (95% CI 1.37-3.58)
Yes*	28 (4.1%)	47 (8.7%)	

* Reference level

Non-use of television (OR=1.65 (95% CI 1.31- 2.07)), newspaper (OR=1.65 (95% CI 1.28-2.13))and internet(OR=2.21 (95% CI 1.36-3.58))to obtain information related to nutrition during the past six months were significant correlates of inadequate nutrition literacy .

4.3.10. Language skills as correlates of nutrition literacy

The distribution of nutrition literacy level by language skills as correlates of nutritional literacy is shown in Table 4.44.

Table 4.44: Distribution of nutrition literacy level by language skills as correlates of nutritional literacy

Language skills	Nutrition literacy level		
	Inadequate No. (%)	Adequate No. (%)	*significance*
Ability to speak in Tamil			
Yes	53 (7.8%)	14 (2.6%)	χ^2= 15.794, df=1, p<0.001 OR=3.18 (95% CI 1.75-5.81)
No*	626 (92.2%)	527 (97.4%)	
Ability to speak in English			
No	675 (99.4%)	531 (98.2%)	χ^2= 4.248, df=1, p=0.052 OR=3.17 (95% CI 0.99- 10.18)
Yes*	4 (0.6%)	10 (1.8%)	
Ability to write in Tamil			
Yes	47 (6.9%)	15 (2.8%)	χ^2= 11.414, df=1, p=0.002 OR=2.60 (95% CI 1.44- 4.71)
No*	632 (93.1%)	526 (97.2%)	
Ability to write in English			
No	649 (95.6%)	507 (93.7%)	χ^2= 2.094, df=1, p=0.148 OR=1.45 (95% CI 0.87- 2.40)
Yes*	30 (4.4%)	34 (6.3%)	

* Reference level

Based on the above findings it could be seen thatability to speak in Tamil (OR=3.18(95% CI 1.74-5.80)) and ability to write in Tamil (OR=2.60 (95% CI 1.44-4.71)) were significant correlates of inadequate nutrition literacy .

Both inability to speak in English (OR=3.17 (95% CI0.99- 10.18)) and inability to write in English (OR=1.45 (95% CI 0.87- 2.40) were not significant correlates of inadequatenutrition literacy.

4.3.11. Nutrition related health promoting behaviour among the study population as correlates of nutrition literacy

The distribution of the level of self-reported adoption of health promoting behaviours related to nutrition among the study participants is shown in Table 4.45.

Table 4.45: Distribution of the study population by frequency of adoption of health promoting behaviours related to nutrition

Health promoting behaviours related to nutrition	Frequency of adoption			
	Never	Sometimes	Frequently	Always
	No. (%)	No. (%)	No. (%)	No. (%)
I limit the amount of fat in my diet	86 (7.0%)	313 (25.7%)	608 (49.8%)	213 (17.5%)
I try to avoid foods with a high salt content	94 (7.7%)	263 (21.6%)	447 (36.6%)	416 (34.1%)
I am concerned about how much sugar I eat.	100 (8.2%)	286 (23.4%)	448 (36.7%)	386 (31.6%)

I make a special effort to get enough fiber in my diet.	114 (9.3%)	417 (34.2%)	372 (30.5%)	317 (26.0%)
I try to eat fresh fruits and vegetables daily	19 (1.6%)	208 (17.0%)	449 (36.8%)	544 (44.6%)
I always use a lot of low calorie or calorie reduced products.	443 (36.3%)	401 (32.9%)	275 (22.5%)	101 (8.3%)
I try to select foods that contain or fortified with vitamins and minerals	118 (9.7%)	285 (23.4%)	479 (39.3%)	338 (27.7%)
I am careful about what I eat in order to keep my weight under control.	267 (21.9%)	249 (20.4%)	350 (28.7%)	354 (29.0%)
I try to avoid foods that have additives in them	102 (8.4%)	300 (24.6%)	382 (31.3%)	436 (35.7%)
I am concerned about getting enough calcium in my diet.	145 (11.9%)	358 (29.3%)	438 (35.9%)	279 (22.9%)
I watch and listen for the latest information about health issues	57 (4.7%)	383 (31.4%)	407 (33.4%)	373 (30.6%)
I always read the nutrition labels on packaged foods for nutritional content	113 (9.3%)	317 (26.0%)	295 (24.2%)	495 (40.6%)

assessment of self- reported behaviour showed that daily consumption of fruits and vegetables was the mostly adopted nutrition related health promoting behaviour among the study population (n=544, 44.6%). Being careful about what they eat in order to keep weight under control (n=267, 21.9%) and use of low calorie or calorie reduced products (n=443, 36.3%) are the least adopted health promoting behaviours.

Of the total study population, 495(40.6%) claimed that they always read the nutrition labels on packaged foods for nutritional content, whereas only few (n=101, 8.3%) claimed they always use a lot of low calorie or calorie reduced products.

In the assessment of the adoption of health promoting behaviors related to nutrition as a correlate of nutrition literacy, a score was assigned to the frequency as follows;

3=always, 2= frequently,1= sometimes, 0=never Based on the score for all the specified behaviour, participants were categorized into two goups as having good health promoting behaviour and poor health promoting behaviour. Out of the total score of 36, which could be obtained for adoption of maximum of health promoting behaviour, participants with score of equal to 18 or more, were categorized as good health promoting behaviour and less than 18 were categorized to poor health promoting behaviour.

Table 4.46 shows the distribution of nutrition literacy level by nutrition related health promoting behaviour as correlates of nutritional literacy.

Table 4.46: Distribution of nutrition literacy level by nutrition related health promoting behaviour as correlates of nutritional literacy.

Health promoting behaviour	**Nutrition literacy level**		***Significance***
	Inadequate No. (%)	**Adequate No. (%)**	
Poor	285 (42.0%)	220 (40.7%)	χ^2= 0.212, df=1, p=0.645 OR=1.05 (95% CI 0.83-1.32)
Good*	394 (58.0%)	321 (59.3%)	
Total	679 (100%)	541 (100%)	

* Reference level

Category of health promoting behaviour was not found to be a significant correlate of inadequate nutrition literacy (OR=1.05(95% CI 0.83-1.32)).

4.3.12 Level of knowledge on nutrition among the study population as a correlate of nutrition literacy;

Knowledge of the participants on nutrition was assessed using a set of 15 questions. In analysis of knowledge on nutrition a correlate of nutrition literacy, each

respondent was given a score. In scoing each correct response was allocated one mark allowing a maximum score of 15.

Participants were categorized into two groups as having high nutrition knowledge and low nutrition knowledge based on the score obtained using a score of eight as the cut off. Those who had obtained a score of 8 or more, were categorized as high nutrition knowledge and less than 8 were categorized to low nutrition knowledge .

Table 4.47 shows the distribution of nutrition literacy level by level of knowledge on nutrition as correlates of nutritional literacy.

Table 4.47: Distribution of nutrition literacy level by level of knowledge on nutrition as correlates of nutritional literacy

Level nutrition knowledge	**of Nutrition literacy level**		
	Inadequate No. (%)	**Adequate No. (%)**	***significance***
Low	387 (57.0%)	171 (31.6%)	χ^2= 78.194, df=1, p<0.001
High*	292 (43.0%)	370 (68.4%)	OR=2.86 (95% CI 2.26-3.63)
Total	679 (100%)	541 (100%)	

* Reference level

Low level of nutrition knowledge of the participant was found to be a significant correlate of inadequate nutrition literacy level OR=2.86(95% CI 2.26-3.63)).

4.3.13. Nutritional status of the study population as a correlate of nutrition literacy

Table 4.48 shows the distribution of nutrition literacy level by nutritional status of the study population as a correlate of nutritional literacy.

Table 4.48: Distribution of nutrition literacy level by nutritional status of the study population as a correlate of nutritional literacy

BMI category of the participant	**Nutrition literacy level**		***significance***
	Inadequate No. (%)	**Adequate No. (%)**	
Thin/obese/overweight	389 (62.6%)	295 (58.5%)	χ^2=1.971, df=1, p=0.160
Normal*	232 (37.4%)	209 (41.5%)	OR=1.186 (95% CI 0.933-1.507)
Total	621 (100%)	504 (100%)	

* Reference level

(N=1125, as pregnant 95 females were eliminated)

Of the table shows that BMI category of the participant was not a significant correlate of inadequate nutrition literacy level, OR=1.186(95% CI 0.933-1.507)

The list of significant correlates of nutrition literacy identified in bivariate analyses is shown in Table 4.49.

Table 4.49: Significant correlates of nutrition literacy identified in bivariate analyses

Correlates	**OR (95% CI)**
Being a non-sinhalese	OR= 1.38(95% CI 1.02- 1
Education level below G.C.E. A/L	OR= 3.35(95% CI2.57-4..
Not employed	OR= 1.97(95% CI1.49-2.(
Being in wealth quintile 1-3	OR= 1.52 (95% CI 1.21-1
parent or a sibling of the participant having a non-communicable disease which need dietary interventions	OR= 1.57 (95% CI 1.25-1
household member of the participant not having a non-communicable disease which need dietary interventions	OR=1.38(95% CI1.081.7'
involvement in household food purchasing for more than 4 days per week (	OR=1.59 (95% CI 1.26-2
involvement in household cooking for more than 4 days per week	OR=1.68 (95% CI 1.34-2
consumption of at least one main meal from an outside restaurant by the participant – more than 4 days during a typical week	OR=5.71(95% CI2.99-10
consumption of all three main meals from an outside restaurant more than 4 days during a typical week	OR=3.62 (95% CI 1.66-7
Non=-receipt of formal Education on nutrition related fields up to G.C.E. O/L	OR=1.54(95% CI1.20-1.9

Non-receipt of food and nutrition related instructions by health care workers within last six months	OR=1.48 (95% CI 1.14-1
possession of a health insurance	OR=2.22 (95% CI 1.10-4
Not having access to radio	OR=1.84 (95% CI1.45-2..
Not having access to television	OR=3.34 (95% CI 2.33-4
Not having access to newspaper	OR=3.02 (95% CI 2.35-3
having access to internet	OR=2.02 (95% CI 1.46-2
Not using television to obtain general information during the past six months	OR=2.07 (95% CI 2.92))
Not using newspaper to obtain general information during the past six months	OR=1.48 (95% CI 1.18-1
Not using internet to obtain general information during the past six months	OR=1.96 (95% CI 1.27-3
Not using of television to obtain nutrition informationduring the past six months	OR=1.65 (95% CI1.31- 2
Not using of newspaper to obtain nutrition informationduring the past six months	OR=1.65 (95% CI 1.28-2
Not using of internet to obtain nutrition informationduring the past six months	OR=2.21 (95% CI 1.36-3
Ability to speak in Tamil	OR=3.18(95% CI1.74-5.8
Ability to write in Tamil	OR=2.60 (95% CI 1.44- 4
Low level of nutrition knowledge	OR=2.86(95% CI2.26-3.6

4.3.1 Multivariate analyses to identify correlates for inadequate nutrition literacy

4.3.2 Multivariate analyses were carried using logistic regression to identify the significant correlates for inadequate nutrition literacy while controlling the effects of confounding. Models were developed to determine adjusted odds ratios for inadequate nutrition literacy.

Independent variables used for these analyses were the correlates that derived a probability value of less than 0.05 in the bivariate analysis presented above. All independent variables were included as categorical variables. Table 4.50 shows the factors which were significant correlates of inadequate nutrition literacy in the multivariate logistic regression model.

Table 4.50. Multivariate regression model of inadequate nutrition literacy among females aged 25-45 years in Colombo district

Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B) Lower	Upper
Education level below G.C.E. A/L	0.888	0.151	34.476	1	0.000	2.430	1.806	3.267
Not employed	0.457	0.171	7.141	1	0.008	1.580	1.130	2.209
Involvement in household food purchasing for more than 4 days per week	0.490	0.160	9.426	1	0.002	1.632	1.194	2.231
Non=-receipt of formal Education on nutrition related fields up to G.C.E. O/L	0.462	0.165	7.798	1	0.005	1.587	1.148	2.195
Not using of television to obtain nutrition informationduring the past six months	0.903	0.299	9.118	1	0.003	2.468	1.373	4.436

Not using of newspaper to obtain nutrition informationduring the past six months	1.065	0.199	28.694	1	0.000	2.902	1.965	4.285
Low level of nutrition knowledge	0.780	0.141	30.768	1	0.000	2.181	1.656	2.873

Seven correlates were identified as significant adjusted correlates for inadequate nutrition literacy as shown in Table 4.49.

Two socio economic correlates were found to be significant correlates of inadequate nutrition literacy when adjusted for effects of confounding. They were having an education level below G.C.F. A/L (adjusted OR=(2.43(95%CI1.81-3.27) and not being employed (adjusted OR=1.58(95%CI1.13-2.21).

Involvement in household food purchasing for more than 4 days per week (adjusted OR 1.63 (95%CI 1.19-2.23)), non=-receipt of formal education on nutrition related fields up to G.C.E. O/L (adjusted OR 1.58 (95%CI1.15-2.19)), not using of television to obtain nutrition informationduring the past six months (adjusted OR=2.47(95%CI1.37-4.43), not using of newspapers to obtain nutrition informationduring the past six months(adjusted OR=2.90 (95%CI 1.96-4.28)) and possessing low level of nutrition knowledge (adjusted OR=2.18 (95%CI1.66-2.87)) were the other correlates that were found to be significant correlates of inadequate nutrition literacy when adjusted for effects of confounding.

Omnibus test was used to test the statistical significance of the overall model and to assess the overall capability of all variables to predict the dependent variable. The cut-off point is considered as 0.05 or smaller which indicates that newly build model fits the data adequately. The overall model showed a chi-square value of 216.421 and it is statistically significant at $p<0.001$.

Hosmer and Lemeshow test examines the prediction capacity of the residuals of the model (Hosmer and Lemeshow, 2000). Hosmer and Lemeshow test chi-square goodness of fit value is 14.902 with p value of 0.061. This indicates that the dependent variable and contrary the final model explains it with statistically significant manner.

In logistic regression there is no statistic which directly analogues to the R^2 value, but several pseudo R^2 values are being developed. This value attempts to predict the variance explained by the model to a certain degree. Nagelkerke's R^2 is a modification of the Cox and Snell R^2 and it varies from 0 to 1 making the interpretation easy. The final model show a pseudo Nagelkerke's R^2 of 0.223 which indicates it explains 22.3% of the variance of inadequate nutrition literacy.

4.4 Component 3:

This component comprised the following two subcomponents

Subcomponent 1-Designing a skill development intervention package to improve nutrition literacy skills of females aged 25 to 45 years in Colombo district.

Subcomponent 2- Implementation of acluster randomized trial to assess the effectiveness of the skill development intervention to improve nutrition literacy skills among females aged 25 to 45 years of age

Results of theassessment of effectiveness of the skill development intervention to improve nutrition literacy skills among females aged 25 to 45 years of age is presented below.

All participants for the intervention and control group selected for the study met the eligibility criteria. Of the 120 participants selected for the intervention group, 109 (90.8%) responded to the pre-intervention assessment and also participated in the both sessions of the intervention to improve nutrition literacy skills. Of these 109, only 106 participated for the post intervention assessment. The study was able to follow up and complete the assessment of 106 out of 109.

Out of the 120 participants who were selected for the control group, all underwent the pre intervention assessment and 110 (91.7%) underwent the post intervention assessment with ten lost to follow up as they had left the area for a long duration (Figure 3.1, Table 4.51).

Figure. 4.1. Schematic presentation showing the number of study units participated in the subcomponent 2

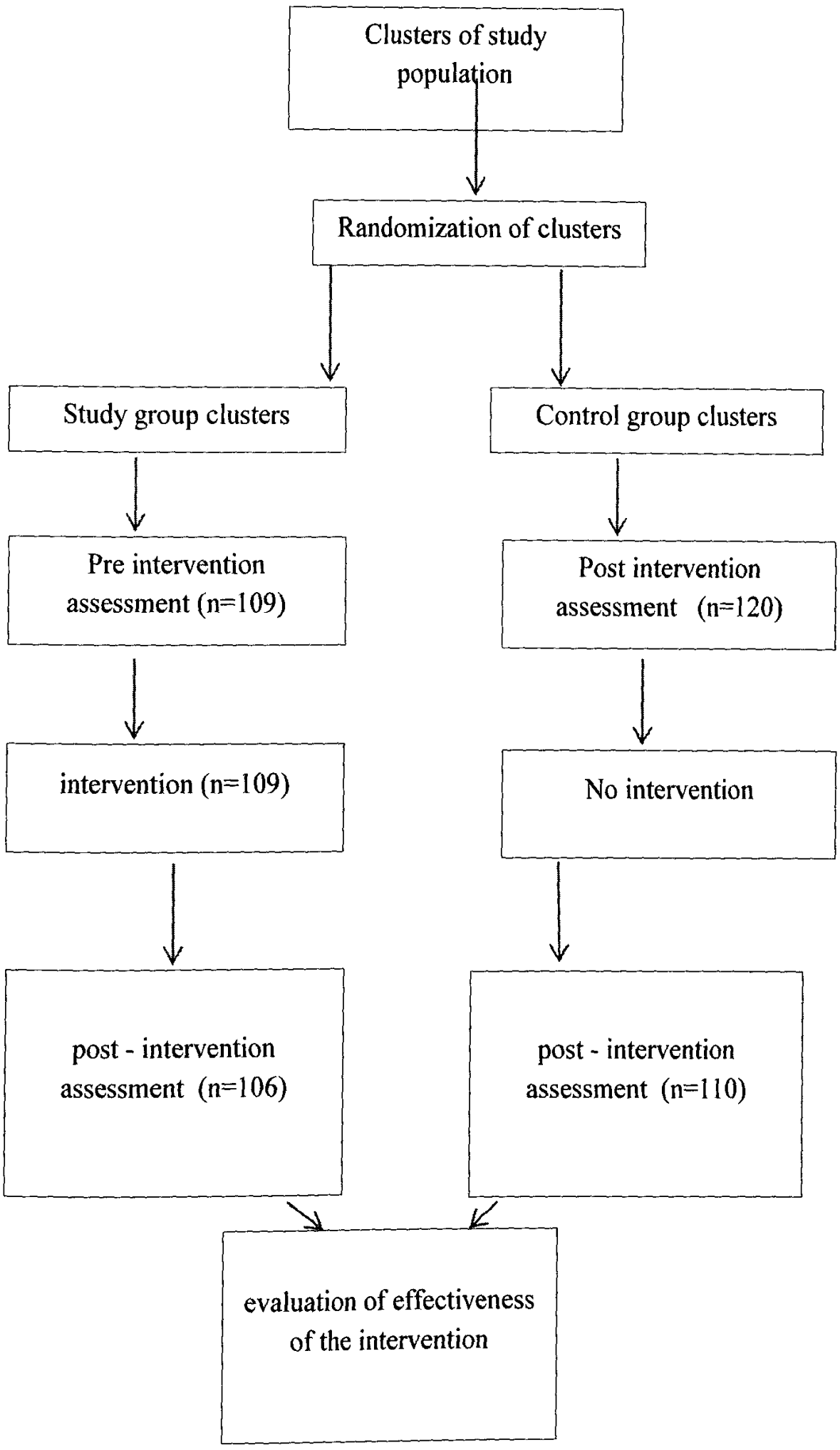

Table 4.51: Distribution of the females aged 25-45 years who participated in the pre and post intervention assessments in intervention and control groups

Group	No of eligible females selected	Participation in the pre intervention No. (% out of 120)	Participation in the post intervention No. (% out of 120)
Intervention	120	109(90.8%)	106 (88.3%)
Control	120	120(100.0%)	110(91.7%)

4.4.1 Comparison of basic characteristics of the study and control groups

A cluster randomized trial design was used in the present study. Hence it is necessary to assess the extent to which the study and the control groups are comparable in aspects that they are likely to have an impact on the outcome of the intervention. The relevant characteristics for this study were compared and presented in the Table 4.51.

A comparison of the basic socio demographic characteristics of the participants of the study and control groups are given in Table 4.52.

Table 4.52: Comparison of basic socio demographic characteristics of the study and control populations

Demographic information	Intervention group No. (n=106) (%)	Control group No.(n=110) (%)	Significance
Age group			
25- 29	38 (36%)	37(33.34%)	X^2= 3.886
30- 34	30 (28%)	17(15.16%)	*df* (3,),
35-39	17 (16%)	26 (24.25%)	p =0 .274
40-45	21(20%)	30 (27.28%)	

Ethnicity		
Sinhala	106(100.0%)	110 (100.0%)

As shown in the Table 4.51, the age pattern of intervention and control groups were similar (p=0.274). All participants (100.0%) in the intervention and control group were Sinhalese.

A comparison of the basic socio economic characteristics of the participants of the study and control groups are given in Table 4.53.

Table 4.53: Comparison of the basic socio economic characteristics of the participants of the study and control groups

Socio economic Characteristics	Intervention group No. (n=109) (%)	Control group No.(n=120) (%)	Significance
Education level			
Grade 1-5	0 (0%)	3 (3.04%)	χ^2= 5.575, df=4,
Grade 6-9	16 (14.82%)	10 (9.1%)	p=0.233
Upto O/L	47 (44.45%)	37 (33.34%)	
Pass O/L	16 (14.82%)	30 (27.28%)	
Pass A/L	27 (25.93%)	30 (27.28%)	
Marital Status			
Married/ Divorced /separated	92 (87.04%)	102 (92.43%)	χ^2=0.958, df=1.
Unmarried	14 (12.97%)	8 (7.58%)	p=0.328
Employment status			
Currently employed	31 (29.63%)	23 (21.22%)	χ^2=1.122, df=2,
Not employed	75 (70.38%)	87 (78.79%)	p=0.289

The intervention and control groups were similar in education levels (p=0.618), marital status (p=0.750) and employment status (p=0.258).

4.4.2 Individual level analysis to assess the effectiveness of the intervention to improve nutrition literacy level

The pre-intervention assessment was carried out in the study and control groups concurrently and it was designed to assess the nutrition literacy levels, using the validated Nutrition Literacy Test. The results of the pre-intervention assessment in the study and control groups are given in the Table 4.54.

Categorisation of the groups into inadequate and adequate used in the assessment of correlates on nutrition literacy was the categorisation used in the assessment of effectiveness of the intervention.

Table 4.54: Distribution of the intervention and control populations by their nutrition literacy level in the pre intervention assessment

Nutrition literacy level	intervention group No. (%)	Control group No. (%)	Significance
Adequate	39 (36.8%)	29 (26.4%)	χ^2=2.722,
Inadequate	67 (63.2%)	81 (73.6%)	df=1,
Total	106 (100%)	120 (100%)	p=0.099

The table shows that, in the pre intervention assessment, the nutrition literacy levels of study units in intervention and control groups were similar (p=0.099).

After completion of the pre intervention assessment, the intervention was implemented among the intervention group. The control group did not receive any intervention.Six months after completion of the intervention, participants were subjected to the post intervention assessment, using the same Nutrition Literacy Test (Table 4.55).

Table 4.55: Distribution of the intervention and control populations by their nutrition literacy level in the pre and post intervention assessments

Nutrition Literacy level	**Study group**		**Significance**	**Control group**		**Significance**
	Pre	**Post**		**Pre**	**Post**	
	No. (%)	**No. (%)**		**No. (%)**	**No. (%)**	
Adequate	39 (36.8%)	75 (70.8%)	X^2=24.59 *df* (1,), p =0 .000	29 (26.4%)	42 (38.2%)	X^2=3.515 *df* (1,), p =0 .061
Inadequate	67 (63.2%)	31 (29.2%)		81 (73.6%)	68 (61.8%)	
Total	106(100%)	106(100%)		110 (100%)	110(100%)	

It is shown that in the intervention group number of participants with inadequate nutrition literacy level had significantly decreased from n=67 (63.2%) to 31 (29.2%) (p=0 .000).

In the control group, participants with inadequate nutrition literacy level has slightly decreased from n=81 (73.6%) to 68 (61.8%) but this difference was not statistically significant (p=0 .061).

The nutrition literacy level of the post intervention assessment of intervention and control groups were compared (Table4.56).

Table 4.56: Distribution of the intervention and control populations by their nutrition literacy level in the post intervention assessment

Nutrition literacy level	**Study group**	**Control group**	**Significance**
	No. (%)	**No. (%)**	
Adequate	76 (70.3%)	42 (38.2%)	χ^2=22.74
Inadequate	32 (29.7%)	68 (61.8%)	df=1,
Total	108 (100%)	110 (100%)	p<0.001

It was found that in the intervention group 32 (29.2%) showed inadequate nutrition literacy level while the corresponding figure in the control group was 68 (61.8%).The difference in the intervention group and the control group was statistically(p=0 .000). Statistically significant improvement of the nutrition literacy among the intervention group following the intervention in the absence of a significant improvement in the control group, was taken as evidence of effectiveness of the intervention.

Following confirmation of the effectiveness of the intervention when considering the total intervention population, further analyses was performed to assess the effectiveness of the intervention on different categories of study units in the intervention group based on age and educational levl (Tables 4.57-4.58).

Table 4.57: Distribution of the post intervention difference of adequate and inadequate nutrition literacy level by age category

Age category in years	Inadequate Nutrition literacy No. (%)	Adequate nutrition literacy No. (%)	Significance
25- 34 years	19 (79.2%)	64 (76.2%)	χ^2= 0.09
35-45 years	5 (20.8%)	20 (23.8%)	df=2,
	24 (100%)	84 (100%)	p=0.760

There was no statistically significant difference (p=0.792) between the nutrition literacy levels of the two age categories in the post intervention assessment indicating that the nutrition litearcy improvement intervention was equally effective for all age groupsof females targeted.

Table 4.58: Distribution of the post intervention difference of adequate and inadequate nutrition literacy level by education level

Highest level of education	Inadequate Nutrition literacy No. (%)	Adequate nutrition literacy) No. (%)	Significance

Below G.C.E A/L*	3 (12.5%)	14 (16.7%)	
Equal or above G/.C.E. A/L*	21 (87.5%)	70 (83.3%)	χ^2= 1.757 df=1,
	24 (100%)	84 (100%)	p=0.185

* G.C.E. A/L- General Certificate of Education Advanced Level

There was no statistically significant difference (p=0.185) between the nutrition literacy levels of the two educational categories in the post intervention assessment indicating that the nutrition literacy improvement intervention was equally effective for all educational groupsof females targeted.

Pre and post intervention assessment the scores obtained for the each selected skill was also compared to assess whether intervention was effective in improving each of the skill. For this, the proportion of participants who obtained a score equal or more than ten was compared with the proportion of participants who obtained less than ten(Tables 4.59).

Table 4.59: Distribution difference of scores obtained for each skill by the intervention group in the pre and post intervention assessments

Skill		**Pre intervention No. (%)**	**Post intervention No. (%)**	**Significance**
Ability to identify nutrition related text	Score ≤10	19 (17.9%)	5 (4.7%)	χ^2=15.275 df=1, p=0.000
	Score > 10	87 (82.1%)	101 (95.3%)	
Ability to comprehend nutrition related text	Score ≤10	69 (65.1%)	29 (27.4%)	χ^2=30.36 df=1, p=0.000
	Score > 10	37 (34.9%)	77 (72.6%)	

Interpreting nutrition related information and data in the form of tables ,charts, pictures, symbols and maps	Score ≤10	76 (71.7%)	46 (43.4%)	χ^2=17.37 df=1, p=0.000
	Score > 10	30 (28.3%)	60 (56.6%)	
Completing nutrition related computations	Score ≤10	49 (46.2%)	14 (13.2%)	χ^2=27.66 df=1, p=0.000
	Score > 10	57 (53.8%)	92 (86.8%)	
Making nutrition related inferences based on the information presented	Score ≤10	54 (50.9%)	20 (18.8%)	χ^2=23.99 df=1, p=0.000
	Score > 10	52 (49.1%)	86 (81.2%)	

These findings confirm that there is a statistically significant improvement in the all skills of concern ($p<0.001$), following the intervention in the study participants.

4.4.3 Cluster level analysis to assess the effectiveness of the intervention to improve nutrition literacy level

For the cluster level analysis proportion of the participants with inadequate nutrition literacy level in the intervention and control clusters was assessed for the pre intervention and post intervention assessment (Annexure XXXIV.)

The comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention and control groups in the pre intervention assessment using Mann Whiteney U test is shown in Table 4.60.

Table 4.60: Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention and control clusters in the pre intervention assessment

Category	Number of clusters	Mean Rank	Significance
Intervention Clusters	12	11.12	Mann-Whitney U=55.500
Control Clusters	12	13.88	Z=-.959 p<0.338

As shown in the Table 4.59, the difference in the proportion of the participants with inadequate nutrition literacy in the intervention and control clusters in the pre intervention assessment was not statistically significant (p<0.338)

The comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention and control groups in the post intervention assessment using Mann Whitney U test is shown in Table 4.61.

Table 4.61: Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention and control clusters in the post intervention assessment

Category	Number of clusters	Mean Rank	Significance
Intervention Clusters	12	8.79	Mann-Whitney U=27.5
Control Clusters	12	16.21	Z= -2.577 p<0.010

As shown in the Table 4.60, the difference inthe proportion of the participants with inadequate nutrition literacy in the intervention and control clusters is statistically significant in the post intervention assessment (p<0.010).

The comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention cluster in the pre and post intervention assessmentsis shown in Table 4.62.

Table 4.62: Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention clusters in the pre and post intervention assessments

Category	Number of clusters	Mean Rank	Significance
Pre Intervention Clusters	12	16.92	Mann-Whitney U=19.000, Z= -3.067 p<0.002
Post Intervention Clusters	12	8.08	

As shown in the Table 4.61, the difference in the proportion of the participants with inadequate nutrition literacy in the intervention clusters in the pre and post intervention assessment, was statistically significant (p<0.002).

The comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the control clusterin the pre and post intervention assessmentsis shown in Table 4.63.

Table 4.63: Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the control clusters in the pre and post intervention assessments

Category	Number of clusters	Mean Rank	Significance
Pre Intervention Clusters	12	14.54	Mann-Whitney U=47.500, Z= -1.419 p<0.156
Pre Intervention Clusters	12	10.46	

As shown in the Table 4.62, the difference in the proportion of the participants with inadequate nutrition literacy in the control clusters in the pre and post intervention assessment, is statistically significant (p<0.002)

Statistically significant improvement if nutrition literacy among the intervention clusters following the intervention in the absence of a significant improvement in the control clusters can be taken as evidence of effectiveness of the intervention.

4.4.4 Acceptability of the intervention Acceptability of the intervention was assessed at the end of the second intervention session by using a feedback form.The results are shown in Table 4.64.

Table 4.64: The descriptive analysis of the feedback of the study units who underwent the intervention

Assessment of the conduction of the session	**No. (%)**
Preference to the participatory approach of the intervention	
Like very much	106(100%)
like	0. (0.0%)
dislike	0. (0.0%)
Dislike very much	0. (0.0%)
The way that facilitator explained the facts	
Very good	106(100%)
good	0. (0.0%)
average	0. (0.0%)
poor	0. (0.0%)
How much do you like the group activities done	
Like very much	106(100%)
like	0. (0.0%)
dislike	0. (0.0%)
Dislike very much	0. (0.0%)
the extent to which you are able to explain what you learnt, to another person	
Can explain very well	78(73.6%)
Can explain on average	28(26.4%)
Little difficult to explain	0. (0.0%)

Very difficult to explain	0. (0.0%)

the most important benefit to you participation to this session	
Was able to know many new information	85(80.2%)
Was able to clarity known facts	21(19.8%)
Reminder of known facts	0. (0.0%)
No special advantage	0. (0.0%)

The results indicated that a great majority of the participants of the intervention had accepted the interventional activities and had perceived that the intervention was beneficial for them.

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CHAPTER 5

Discussion

LThe need for consumers to selectively identify appropriate nutrition information which would aid them to derive sound food decisions when selecting food for consumption is, undisputed in the field of nutrition. The degree to which individuals have the capacity to obtain, process, and understand nutrition information needed to make appropriate dietary decisions is, defined as nutrition literacy (Zoellner, 2009). Literacy encompasses a wide range of skills, from the ability to apply basic literacy skills in reading, writing and calculations in everyday health decision making, to the ability to apply more advanced literacy skills to independently obtain relevant health information, to derive their meaning and to critical analysethe obtained information.

5.1 Methodological issues

The study comprised three components. First component was development and validation of a test to assess nutrition literacy among females aged 25-45 years in district of Colombo. Second component was a descriptive cross-sectional study to determine the prevalence of nutrition literacy and correlates for inadequate nutrition literacy among the said study population. Third component was to design a skill development intervention package to improve nutrition literacy skills of females aged 25-45 years and to implement acluster randomized trial to assess the effectiveness of the designed intervention.

The present study selected females of 25- 45 years as the study poopulation in its assessment of nutrition literacy and its correlates. The body of literature amply emphasizes the importance of the nutrition literacy among females in the age group of 25-45 years of age in the view of their own health and their role in the families.

During the age period of 25-45 years, females experience major changes in their reproductive career. For many, this age period inviolves entering intothe marriage life and rearing of children. Demographic and Health Survey of Sri Lanka in 2006-2007 (DHS 2006/07), showed that in Sri Lanka, 74.1% of 25- 29 years age females, 89.2% of 30-34 years age females and 93.8% of 40-44 years age females are married indicating that a great majority of the females in this age category are married in Sri Lanka (Dept. of Census and Statistics, 2007).

The median age at first birth of a child in Sri Lanka is 25.4 years (Dept. of Census and Statistics, 2007) indicting that to most females, the entry point for the challenging role of a mother is initiated early within this period. There is adequate proof in literature regarding the importance of the female to be literate in nutritionto promote nutrition of their children (Moestue H1, 2008)and preventing NCD risk factors among the male and female family members of all ages (Seidel, 2012). Other than these reasons, the fact that health of Sri Lankan females themselves are at risk of dietary deficiency diseases and dietary related NCDs or risk factors (Dept. of Census and Statistics, 2007; Katulanda, 2008), also prompted the present study to choose this study population.

The study was conducted in the district of Colombo in western province. The district of Colombo comprise both urban and rural sectors, which are the main two sectors of the country. Residents of the district represent all the ethnic and religious groups in the country (Department of Census and Statistics, 2012). Easyaccessibility of the district as a study setting to the PI and the familiarity of the district to the PI were the factors that led to this selection. Selection of this study setting contributed to enhancement of the quality of data.

Use of a valid test to determine the prevalence of nutrition literacy was crucial for the success of the entire research. Existing literature indicated the lack of such a test that cover all facets of the construct of nutrition literacy. The present study aimed to fulfill this gap in the field of research in nutrition by developing a test that assess all the five major skill areas that a person requires to be nutritionally literate.

In keeping with widely accepted and used tests of health literacy(Baker,1999, (McCormack L, 2010.) and nutrition literacy(Weiss et al, 2005)which are objective assessment of the skills, the present study also developed and validated an objective assessment of nutrition literacy which was named, Nutrition Literacy Test. The development of the Nutrition Literacy Test was a stepwise processwhich involved a triangulation of quantitative and qualitative methods. Advices and opinion of the experts in the field of nutrition was sought at each step. Consultation of the experts in the respective fields in the development of tests to assess literacy, is a universally adopted process (Weiss, 2005; McCornmack, 2010, Cara Gormally, 2012). Steps that were

followed in developing the test aimed at ensuring cultural appropriateness and validity of the test being developed. Obtaining consensus on the definition of the nutrition literacy, selecting appropriate stimuli, designing single response multiple choice questions to assess the five skill areas of the nutrition literacy and designing the scoring system were these steps. The forward-backward translation methodology which is the acceptable method of translation (WHO, 2014) was employed in the translation of the test. The test was also adjusted to Grade 8 reading level to ensure its applicability to a majority of females in the Sri Lankan setting. Following development of the draft test a validation study was conducted to appraise the validity and reliability of the test to assess nutrition literacy among adult females.

Literature described procedures that had been adopted to appraise the criterion validity of the literacy tests using the available test that sufficiently predict the content specific type of literacy of concern; i.e. criterion validity of the Newest Vital Sign test had been appraised against Test of Functional Health Literacy, which is a widely used test to assess health literacy (Weiss, 20005). However, in the current study adoption of this method was not possible as there were no other tests developed or validated in Sri Lanka to assess nutrition literacy.

Taking into consideration that the Nutrition Literacy Test is a tool assessing a specified set of skills, the validationof the test was mostly based on item analysis. Usage of item analysis in development and validation of tests has been recommended by Tavakol and Dennick (2011) and Pedraza, (2011), Understanding Item Analysis Reports, 2005) Item analyses assess the item-total correlation, Item difficulty index, Item discrimination index, inspection of the item characteristic curve, distractor analysis and reliability analysis of the study items.Such analysis simulates the basic analyses discussed under the item response theory analysis, by Baker (2001). It was not possible to adapt other aspects of the item response theory in the current validation, as the distribution of the nutrition literacy score of the study population was non-normal and assumption of normality was needed for extensive analysis.

Other than the item analyses, the present validation study also appraised convergent validity of the Nutrition Literacy Test using selected parameters that had been identified as being closely correlated with nutrition literacy. These parameters were higher accessibility and higher usage of print material which has been identified to converge withnutrition literacy in resaerch by

Zoellner, (2009) and level of education identified to converge withliteracyby Zoellner, (2009) and by Shah(2010).

Reliability of the Nutrition Literacy Test was assessed with KR-20 coefficient. KR-20 coefficient had been used in the evaluation of internal consistency of measures with dichotomous choices (Stone, 1999). As the questions in the Nutrition Literacy Test specify single correct answer out of a set of responses, which lead to a dichotomous outcome, calculation of the KR-20 coefficient in the appraisal of internal consistency was considered appropriate.

In scoring the Nutrition Literacy Test, an equal score was allocated to the each of the five skills selected to be assessed by the test. The cumulative score for the items under the particular skill was adjusted to the allocated score for the skill. The system of scoring adopted was a compensatory scoring method rather than a conjunctive scoring method. Compensatory scoring, allows high scoring for one content area to compensate for the low scores for the other content areas. In conjunctive scoring each content area is separately scored requiring one to pass each of the areas, at a set cut score (Perie, 2006). One reason for selecting the compensatory scoring system in the Nutrition Literacy Test was the fact that it is designed to categorize respondents into different levels of nutrition literacy using a cumulative score. Selecting this method of scoring allowed those with higher nutrition literacy skills to score higher by correctly responding to more items than those with lower skills. Another reason was that Nutrition Literacy Test being a time unlimited test. In such tests adoption of the compensatory scoring will not hamper the proper evaluation of the level of nutrition literacy .Compensatory scoring method is the one that has been adopted by the other time unlimited literacy tests .

In establishing the cut off score for the Nutrition Literacy Test, multi ROCs were drawn. This method is an extension of the ROC curve analysis described by the Shultz(1987). This allowed the selection of the cut off at which the sensitivity and the specificity of the test were maximized to a sensitivity of 97% and a specificity of 95% for the lower cut off score and a sensitivity of 100% and a specificity of 98% for the upper cut off score.

Second component of the present study was a descriptive cross sectional study to determine the prevalence of nutrition literacy and correlates for inadequate nutrition literacy among the females aged 25-45 years in district of Colombo.

Thedescriptive study design design surveys the situation existing at a given point of time (Abramson and Abramson, 1999).This is the ideal study design to assess prevalence estimates of an issue. Estimating prevalence was considered important as it quantifies the magnitude of *nutrition literacyamong females aged 25-45 years, which in turn could be used in justifying* conducting interventions to improve nutrition literacy.

Correlates for inadequate nutrition literacy were also assessed among females aged 25-45 years. All efforts were made to make a comprehensive assessment of correlates. Identification of correlates to be assessed was based on an extensive review of literature ((Lisa Ciccarelli Shah, 2010;) (Jamie Zoellner, 2009; .) (Zoellner J1, 2011), (Anthony, 2010).

Every effort was made to include an adequate numbers of subjects representing the study populationin the study, minimizingerrors and bias of sampling. Inclusion of volunteers, errors in estimating the sample sizes, inappropriate sampling techniques and high non-response are the main mechanisms in which selection errors and bias can occur in cross-sectional studies(Hennekens and Buring, 1987). This study employed all possible measures to avoid these errors. The size of the sample to be included was based on estimation of the sample size for a prevalence study. In the absence of previous prevalence estimated of nutrition literacy among females,the estimate was taken as 50%*to maximize* the sample size. Standard normal deviation for alpha level of 0.05 was taken as 1.96 and the precision desired for margin of error was set at 0.05.It assured that the prevalence estimates from the present study wouldbe with acceptable precision (Lwanga and Lemeshow, 1991).

The study employed the most feasible technique to obtain the sample in a community based study, the cluster sampling technique. Cluster sampling was designed to obtain a sample probability proportionate to the size of the adult females in the age of 25-45 years living in different DS divisions of the district. Thisensured representation of females of all DS divisions, in the sample.

It is known that the cluster sampling makes it difficult to study some variables due to possible clustering of similar factors in neighborhoods (Abramson and Abramson, 1999). Bennett et al. (1991) explained possible ways to overcome the effects of clustering. Sample size calculation in cluster sampling method requires that the design effect (D) to be taken into consideration. D= 1+

(b-1) rho, where rho is the rate of homogeneity and b is the number of households visited in each cluster. As the value of rho has not been looked in previous studies in Sri Lankan setting, design effect was taken as threewith adequate allowance for the design effect. The cluster size was kept a modest number of 30 subjects. Only one eligible study unit was selectedfrom one household to the study. These measures further reduced the clustering effect in the present study. Consideration of non- response was done in the sample size calculation, making an allowance of 10%.This allowance was made to prevent loss of desired precision in the final estimate((L. Naing1, 2006;). The non-response of the cross-sectional study was kept to a minimum by visiting the households during the times of the day when the working/ employed study units are likely to be present at home. Use of female data collectors, assistance from PHM in being introduced to the communities, careful explanation of the purpose of the study, use of information sheets and consent forms also improved the response rate.

Many efforts were also made to ensure quality of data of prevalence estimates and assessment of correlates.

The most important measure was the use ofNutrition Literacy Test validated for the same population, in the assessment of the prevalence of nutrition literacy. The completion of Nutrition Literacy Test by the respondents was done under supervision to avoid discussions or reference to books by the respondents which would have affected the results. Information related to correlates were obtained using an interview administered questionnaire. Many measures were taken to administer the questionnaire uniformly. Data collectors were trained in administering the questionnaires uniformly. Certain variables required recalling of information. In these instances a reasonable period was specified. Encounters with health professionals and use of communication channels to obtain general information and nutrition related information were assessed for a period of six months while assessments of involvement in household work was made for a typical week to make it easier for the respondent to recall the required information, minimizing the recall bias.

Evaluation of knowledge on nutrition was using a set of questions prepared based on the food based dietary guidelines and general nutrition knowledge assessment questionnaires, which have been validated for measuring nutrition knowledge among adults. The terminology of questions was adjusted in such a way that it is matches the cultural norms of the country. Estimation of the

standard living index, was based on a recommended method of a local study (Jayasooriya, 2007; Disanayake, 2006).

Anthropometric measurements were based on standard guidelines. The instruments used were calibratedand the data collectors were trained on adhering to the standard guidelines.

Questionnaires were made to be user friendly to improve the quality of data gathered. The questionnaires consisted detailed introduction before each of its different section. By explaining each part, respondents were made comfortable and it made the respondents understand the questions better. Questions were worded with simple, common words that convey the idea and technical terms or jargon were not used. Stereotypes that suggest that there is a most desirable answer were avoided. The items of the questionnaire were sequenced to maintain a flow and sensitive questions were included towards the end of the questionnaire to make it easy for the respondents to answer. The interviewer instructions were placed within the questionnaire in each part of the questionnaire for easy reference of the data collectors. Further to the training, this was done to remind the interviewer of the, instructions to administer the questionnaire in a uniform manner further minimizing the interviewer bias. The study utilized a minimum number of data collectors to minimize inter-interviewer bias. The PI and the data collectors were females which improved the response to participate and also cooperation in providing the required information of the female study units.

The stage of data analysis was used to further improve the accuracy of identification of correlates. The role of confounders was minimized by using multivariate techniques ((Hennekens and Buring, 1987), in the analyses.

The component 3 was designing a skill development intervention to improve nutrition literacy of females aged 25-45 years and implementing a cluster randomized trial to assess the effectiveness of the intervention.

Many steps were taken to design an educationally sound culturally appropriate intervention. The design of the skill development intervention was based on evidence of literacy improving interventions. The designing followed the accepted principles of educational material

development (Holmes, 1968; Minor, 1978; Fetter et al, 1987; WHO, 1988). The training modules and supplementary material to be used were assessed for its validity by a panel of experts. A facilitator was carefully selected and was trained to conduct the training in a uniform manner at each of the training sessions. Prior to implementing, the intervention was pilot tested to ensure its smooth operation.

The intervention was implemented as a cluster randomized trial to assess its effectiveness. The best possible study design, an experimental study with randomization as the technique to allocate intervention to the study units, was employed for the study as it is considered the strongest evidence in evaluating the effectiveness of an intervention. The advantages of randomization in trials, include eliminating selection bias in assigning intervention and allowance to attribute the difference in outcome between the groups to chance. Having a control group reduces the interference by external circumstances to the assessment of intervention as these circumstances apply to both the control group and the intervention group. It therefore, allows a separation of the effect of the intervention from that of other circumstances (Loevinsohn, 1990).

Cluster randomized trials are being increasingly recommended for evaluation of group health interventions. The intervention designed to improve nutrition literacy of females aged 25-45 years in the present study, was designed to be applied for groups rather than individuals. Thus, the cluster randomized trial design in which the unit of application of intervention is a group rather than an individual, was selected for the present study. Administrative conveniences were also another advantage in this method (Allan Donner, 1994). Cost efficiency as per economy and feasibility was another major reason for adoption of the cluster randomized design (Ahmed, 2009). The sampling frame of clusters being readily available was one major advantage which allowed the use of sampling in the current study.

In cluster randomized trials several designs could be adopted to operationalise the randomization. They are completely randomized design, matched pair design, and stratified design.In the current study, the completely randomized design was adopted, as the clusters selected from the two adjacent DS divisions were expected to be homogenous. On the other hand for matched pair design, required detailed information on the matching criteria, that directly affects the outcome. Such information was not readily available for the considered clusters in the

intervention. Stratified design allocates two or more cluster to stratum, and then randomize. This design has not been used much so far (Allan Donner, 1994)

Several other methodological features adopted by the study also contributed to accurate assessment of effectiveness of the intervention in the present study.Outcome indicators used in the present study to assess the effectiveness of the intervention was, improvement in the nutrition literacy. This indicator could be measured objectively using the Nutrition Literacy Test which had been developed and validated in the present study. The fact this is the direct outcome expected from the intervention can also be considered a methodological feature which made the design of the study a strong one to assess the effectiveness of the intervention.

Possibility of variation of measurements due to instruments and data collectors at different points of measurement was kept at a minimum by utilizing the same instrument and same team of data collectors for pre and post-assessments in intervention and control groups. The post-assessments were carried out in an identical manner to the pre-assessment among both groups.

The post-assessment was conducted six months after the intervention to assess the sustained effect of the intervention. The timing of the post-assessments were based on accepted interval to assess the effectiveness of an educational intervention (Hettiarachchi, 2005; Davaridolatabadi et al., 2013).

Effectiveness of the intervention was assessed in multiple aspects. Other than the overall improvement of level of nutrition literacy, the ability of the intervention to improve literacy of different categories of participants and also whether the intervention was able to improve each skill it was aiming to improve were also assessed. Acceptability of the interventional activities to the participants is a key aspect which needs to be assessed in any intervention that is being proposed to be conducted within a health programme. The present study also generated evidence on the acceptability of the intervention to the participants.

5.2 Development and validation of the Nutrition Literacy Testto assess nutrition literacy among females aged 25-45 years

The experts assessing the content validity of the Nutrition Literacy Test agreed on suitability of each of the question to the skill that it was supposed to be assessing. They also agreed on theadequacy of the questions to assess the relevant skills, the cultural suitability of the questions and the scoring system.

Item total correlations of all items were satisfactory as the values were 0.3 or more for all items. Item difficulty ranged from 0.2-0.9 and the point biserial correlationswere above +0.20 for all items. These results confirmed that all the items in the test were appropriate to be retained.
None of the item characteristic curves were flat and all distractors were sufficiently efficient and none of the items were found to be ambiguous or confusing. Item characteristic curves were found to be satisfactory for all items.Thus, results of item analyses confirmed that the Nutrition Literacy Test demonstrates adequate validity
The test also demonstrated adequate internal consistency as per KR-20 coefficient of 0.913, which were greater than 0.9 which indicate excellent reliability (Ary et al, 2010)

Assessment of convergent validity found a statistically significant difference among nutrition literacy scores of with the users of print material to obtain general information compared to non-users(Mann-Whitney U=1623.500, $p<0.001$), with its usage frequency ($\chi^2=25.814$,df=4, $p<0.001$), with high accessibility and usage of print material on nutrition ($\chi^2= 19.45$, df=4, $p<0.001$).and higher education levels ($\chi^2=35.65$, df=5, $p<0.001$). These results indicateevidence of convergent validity the Nutrition Literacy Test.

Based on the findings of multi ROCs, lower cut off score of the test was set at 35 with a sensitivity of 97% and specificity of 95% and the upper cut off score of the test was set at 66, with a sensitivity,100% and specificity 98% .

Evidence of all component of item analyses confirmed that the Nutrition Literacy Test was a valid and a reliable test. The assessment of convergent validity confirmed that the Nutrition Literacy Test is a valid measure of nutrition literacy. The cut off values proposed to categorise the respondents into poor, marginal and adequate categories were shown highly sensitive and specific.

5.3Prevalence of nutrition literacy among females aged 25-45 years in Colombo district

The present study found that the prevalence of adequate nutrition literacy among females aged 25-45 years in Colombo districtto be 44.3% (95% CI 44.3-44.3). The prevalence of marginal and poor nutrition literacy level were 41.1% (95% CI 41.0-41.14)and (14.6% (95% CI 14.5-14.7), respectively.

The general literacy level of the females of the age 25-45 age in Colombo district range from 95.2-96%, which is based on the self-reported skills (Department of Census and Statistics, 2001). The wide difference in the literate proportions was expected due to nutrition literacy being a complex mix of several skills compared to general literacy. The absence of local research among any group precludes any other comparison of prevalence estimates of nutrition literacy among adult females.

Comparing the findings of the present study with the limited literature on nutrition literacy shows that the findings of the present study compares well with the findings of the assessment of the nutrition literacy level of adults in the Lower Mississippi Delta(n=177) which has shown that (48%) had adequate literacy skills(Zoellner et al, 2009).

The other study on the nutrition literacy was the descriptive study conducted among school nutrition managers who showed that the prevalence of adequate nutrition literacywas as high as 72.2 %(Zoellner & Carr, 2009). Being personnel involved in the field of nutrition the high level nutrition literacy was expected.

Further analysis of the prevalence of nutrition literacy was done to understand the issue of nutrition literacy among the females of 25-45 years in the Colombo district, in depth. The age adjusted prevalence of poor nutrition literacy for adequate and inadequate levels of nutrition literacy was calculated for the study population. Combining the categories of poor and marginal nutrition literacy levelsas inadequate nutrition literacy level simplified the understanding of the adjusted prevalence estimates. The age adjusted prevalence of inadequate nutrition literacy of the 25-45 year old females was nearly equal in all age categories indicating that females of any age within the 25-45 year old age group in Colombo district show similar pattern of nutrition literacy. (Anthony, 2010)This finding is supported by the study on developing predictive models

for health literacy by Martin (2009)) who declaered taht teher were no major differences in the health literacy levels of adults in the 25-39 years and 40-49 years groups. .

Then the prevalence of the inadequate nutrition literacy was further compared among the ethnic groups and the adjusted prevalence was calculated for population structure of Sinhalese or non-Sinhalese of the district of Colombo. The adjusted prevalence of inadequate nutrition literacy was higher in the Sinhalese (51.8%) compared to non-Sinhalese (48.2%). Other studies in field of health literacy and nutrition literacy (Zoellner, 2009) also have noted ethnic disparities of literacy levels.

Prevalence of poor nutrition lteracy level startified by age indicated a gradually declining trend in the proportion of females with inadequate level of nutrition litarcy with increasing levl of education. This finding is supported by the findings of many researchers of nutrition litercy and health literacy (Zoellner,J, 2009;.Laurie T. Martin, 2009)

When the prevalence of varying nutrition literacy level was compared with the wealth quintile, it could be seen that the poor nutrition literacy level was higher among the lowest wealth quintiles populations compared to the highest. Adequare nutrition literacy also showed a gradually incearsing trend with increasing wealth quintile.Other research also this findings that literacty is influenced byincome (Zoellner, 2009).

A comparison of the mean score for the each of the fivemajor skillareas assessed in the Nutrition Literacy Test obtained by the study units in different levels of nutrition literacywas also performed in the present study. The results shows that for all the skills assessed, the study units in poor nutrition literacy level had performed worst and those in adequate nutrition literacy level had performed best (Ability to identify nutrition related text (Kruskal-Wallis χ^2=538.09, df=2, p<0.001), ability to comprehend nutrition related text (Kruskal-Wallis χ^2=564.24,df=2, p<0.001), interpreting nutrition related information and data presented in the form of tables, charts, pictures, symbols and maps (Kruskal-Wallis χ^2=658.57,df=2, p<0.001), completing nutrition related computations (Kruskal-Wallis χ^2=693.40,df=2, p<0.001), making nutrition related inferences based on the information presented (Kruskal-Wallis χ^2=714.80, df=2, p<0.001). This

result indicated that the pattern of possession of each of the skills that comprised nutrition literacy also followed a pattern similar to the different levels of nutrition literacy. It also indicated that any interventions to improve nutrition literacy in this group should improve all the skills.

5.4Correlates of nutrition literacy among females aged 25-45 years in Colombo district

Among the basic socio-demographic and socio-economic characteristics assessed as correlates for inadequate nutrition literacy, being a non-sinhalese (p=0.037), an education level below G.C.E. A/LOR= 3.35(95% CI 2.57-4.38),being currently unemployed(OR= 1.97(95% CI 1.49-2.62), being in lowest three wealth quintile (OR= 1.52 (95% CI 1.21-1.92) were found to be significant correlates in the bivariate analysis. of these the only correlates that were found to be significant in the multivariate analysis were the education level below G.C.E. A/L(adjusted OR=2.43(95%CI1.81-3.27) and not being employed (adjusted OR=1.58(95%CI1.13-2.21).

The findings ofThe of low education and low income as correlates of nutrition literacy was a confirmation of the findings in the literature. Zollenger (2009) in his study among adults (n=177) in the lower Mississippi Deltaalso found that low education level (p=0.008) and low income (p<0.001) as significant correlates of poor nutrition literacy. This is further confirmed by the findings of von Wagner (2007) where low educational attainment (OR=7.46; 95% CI 3.35 to 16.58) and low income (OR=5, 95% CI 1.87 to 18.89) were found to be significant risk factors for limited health literacy. Furthermore, Zoellenger (2009) researching on the correlates of nutrition literacy levels has shown that age(p=0.16), sex (p=0.51)and ethnicity (p=0.21) were not significantly associated with nutrition literacy score.The findings of correlates of limited health literacy by, von Wagner (2007) revealed age as a risk factor (adjusted OR=1.04; 95% CI 1.02 to 1.06)(Zoellner,J., 2009;.)

Having a NCD of the participant was not a significant correlate of nutrition literacy in the present study (OR= 1.05(95% CI 0.80-1.37). This is contrary to the research evidence from other countries based on the health literacy studies where poor health literacy was shown to be associated with having a NCD and to its control((Schillinger D, 2002) (Battersby C, 1993).

Having a parent or a sibling with a NCD which need dietary interventions (OR= 1.57 (95% CI 1.25-1.97)) and having a household member with a NCD which need dietary interventions (OR=1.38 (95% CI 1.081.774)) were a found to be correlates of inadequate nutrition literacy in the bivariate analyses of the present study. Adult females were shown to be key persons in the households in managing diets of the family (Seidel, 2012) and this situation is of great concern to the control of NCDs. This unsatisfactory situation indicates the need of the improvement of nutrition literacy among the females of this age group.

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The bivariate analysis also found that more frequent involvement in household food purchasing (OR=1.59(95% CI 1.26-2.00)) and household cooking (OR=1.68(95% CI 1.34-2.12)) to be significant correlates of inadequate nutrition literacy. Involvement in household food purchasing for more than 4 days per week (adjusted OR 1.63 (95%CI 1.19-2.23)) was also a significant correlate of inadequate nutrition literacy among females of 25-45 years of age in Colombo district. This indicate that being simply involved in food related household work has not improved the nutrition literacy. This further emphasizes the importance of formal interventions to improve nutrition literacy among the females of this age group.

Frequent consumption of at least one main meal from an outside restaurant (OR=5.71(95% CI 2.99-10.89)) and consumption of all three main meals from an outside restaurant (OR=3.62(95% CI 1.66-7.87)) were also found to be correlates of inadequate nutrition literacy in the bivariate analyses of the present study.This can be considered as showing evidence that these study units lack nutrition literacy which had led to poor food choices. Similar findings were seen in the research by Zoellner (2011) where healthy eating index was seen to have a linear association with good health literacy level (OR=0.24; F=18.8; $p<0.01$).

Bivariate analyses of the present study found that non-receipt of formal education on nutrition related fields up to G.C.E. O/L(OR=1.54(95% CI 1.20-1.98)) and non-receipt of food and nutrition related instructions by health care workers within the past six months (OR=1.48 (1.14-1.81))to be correlates of inadequate nutrition literacy. Similar finding were noted by (Aihara Y1, 2011)when he found diet/nutrition information from health professionals (OR = 3.96 (95% CI =

1.97-7.95)) had a significant relation with adequate nutrition literacy among women.Non-receipt of formal education on nutrition related fields up to G.C.E. O/L was also a significant correlate of inadequate nutrition literacy in the multivariate analyses of the resent study (adjusted OR=1.58 (95% CI 1.15-2019)). This highlights the importance of formal school education as a vehicle of delivery for the skills related to nutrition literacy among females.

Bivariate analysis on accessibility and usage of main communication channels, non-accessibility to radio (OR=1.84 (95% CI 1.45-2.34)), non-accessibility to television (OR=3.34 (95% CI2.33-4.77)), non-accessibility to newspapers (OR=3.02 (95% CI 2.35-3.88)) and having access to internet (OR=2.02 (95% CI1.46-2.79)) showed that these weresignificant correlate for inadequate nutrition literacy. When use of these channels to obtain general information during the past six months was explored it showed that non-use of television(OR=2.07 (1.47- 2.92)), non-use of newspapers (OR=1.48 (95% CI 1.18-1.86))and non-use of internet(OR=1.96 (95% CI 1.27-3.02))were significant correlates of inadequate nutrition literacy.of these correlates not using of television to obtain nutrition informationduring the past six months (adjusted OR=2.47(95%CI1.37-4.43)), not using of newspapers to obtain nutrition informationduring the past six months were found to be significant even in the multivariate analyses. This further corroborates the well justified argument related to the relationship between access and use of communication channels to nutrition literacy.

Similar relationships were detected by other researchers. (Jamie Zoellner, 2009; .), Frequency of usage of television to obtain general information ($p<0.001$), use of television for nutrition information ($p=0.001$), using newspaper or magazine for nutrition information ($p<0.001$) and using internet for nutrition information ($p=0.008$) were significantly among adults in the lower Mississippi Delta (Zoellner, 2009).

When the language skills were considered, ability to speak in Tamil (OR=3.18(95% CI1.74-5.80)) and ability to write in Tamil (OR=2.60 (95% CI 1.44- 4.71)) were found to be significant correlates for inadequate nutrition literacy in bivariate analyses. This may be indicatinga situation disadvantagoues for the Tamil speaking feales. Similar finding has been detected in an

assessment of health literacyin USA (Olives T, 2011) , where non-english primary language (OR=6.97(95% CI, 2.76-17.6)) had been a risk factor for inadequate health literacy.

Level of adoption of health promoting behavior was not a significant correlate (OR=1.05(95% CI 0.83-1.32)) of nutrition literacy in the present study. This is contrary to many research evidence elsewhere. Health literacy study by Scott (2002)showed that adherence to screening services has been low in participants with low health literacy. The research by von Wagner C1, (2007) found that higher health literacy scale increased the likelihood of eating at least five portions of fruit and vegetables a day (OR= 1.02 (95% CI 1.003 to 1.03)).According to Zoellner (2011), health literacy significantly predicted sugar sweetened beverage consumption (OR=0.15,p<0.01).

Low level of knowledge on nutrition was a significant correlate of inadequate nutrition literacy (OR=2.86(95%CI 2.26-3.63)) in the bivariate as well as multivariate (adjusted OR=2.18(95%CI1.66-2.87)) analyses in the present study. In the conceptual model of health literacy Nutbeam, highlights the importance of knowledge on nutrition as a precursor to improved health literacy (Nutbeam, 2008).

5.5 Designing a skill development intervention package to improve nutrition literacy skills of females aged 25 to 45 years in Colombo district and the cluster randomized trial to assess the effectiveness of the intervention

In the assessment of effectiveness of interventional studies consisting of a control group and pre-post design, it is mandatory to identify the comparability of the intervention and control groups as far as the basic socio-demographic and service information that may influence the intervention are concerned (Taylor et al, 1978). The findings of pre- intervention assessment showed that there was no statistically significant difference in the two groups based on selected socio demographic parameters (age (χ^2= 3.886, *df* =3,p =0 .274), and ethnicity, (100% sinhalese in both), education level (χ^2= 5.575, df=4, p=0.233), marital status χ^2=0.958, df=1. p=0.328) and employment status.(χ^2=1.122, df=2,p=0.289). Most importantly, the nutrition literacy levels of the participants in the each group was also not significantly different in the pre- intervention assessment (χ^2=2.722, df=1, p=0.099).

The current intervention study showed response rate of 88.3% in the intervention and 91.7% in the control group with minimum loss to follow up rates indicating the validity of the results of the intervention.

Six months after completion of the intervention, at the post intervention assessment, using the same Nutrition Literacy Test it was shown that in the intervention group number of participants with inadequate nutrition literacy level had drastically significantly decreased from 67 (63.2%) to 31 (29.2%) ($p<0.001$) while participants in the control group with inadequate nutrition literacy level has only slightly decreased from 81 (73.6%) to 68 (61.8%). The decrease in the control group was not statistically significant (p =0 .061).

Furthermore, the difference in the intervention group and the control group in the post intervention assessment was also significantly different ($\chi^2=22.74$, df=1,$p<0.001$).

Statistically significant improvement of nutrition literacy among the intervention group following the intervention in the absence of a significant improvement in the control group clearly indicate that the intervention was effective in improving nutrition literacy among females of 25-45 years old in the Colombo district.

The present study also strengthened its evidence of the effectiveness of its intervention to improve nutrition literacy by assessing the effectiveness of the intervention on different categories of study units in the intervention group based on socio demographic and socio economic characteristics. Evidence showed that the intervention improved the effectiveness on nutrition literacy irrespective of the age (p=0.760) and educational level (p=0.185).

Further analysis was also performed to assess the effectiveness of the intervention in improving each of the skills related to nutrition literacy. These analyses showed that the intervention was successful in improving each skill (ability to identify nutrition related text ($\chi^2=15.275$,df=1,$p<0.001$), ability to comprehend nutrition related text ($\chi^2=30.36$,df=1,$p<0.001$), interpreting nutrition related information and data in the form of tables ,charts, pictures, symbols and maps ($\chi^2=17.37$,df=1,$p<0.001$),completing nutrition related computations ($\chi^2=27.66$,df=1,$p<0.001$), making nutrition related inferences based on the information presented ($\chi^2=23.99$,df=1,$p<0.001$).

Other than these evidence of the success of the intervention in improving nutrition literacy and also all the skills related to nutrition literacy, further evidence was sought for effectiveness by performing cluster level analysis to assess whether the intervention was successful in improving the nutritional literacy at group level.

Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention and control clusters showed no statistical significance difference in the pre intervention assessment (Mann-Whitney U=55.500, Z=-.959) while the difference was statistically significant in the post intervention assessment (Mann-Whitney U=27.5, p<0.010)

Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention clusters between pre and post intervention assessmentsshowed that the proportion of the participants with inadequate nutrition literacy in the intervention clusters had significantly decreased (Mann-Whitney U=19.000, Z=-3.067, p<0.002) while the corresponding difference in the control clusters was not significant (Mann-Whitney U=47.500, Z= -1.419, p<0.156).

Statistically significant improvement of nutrition literacy among the intervention clusters following the intervention in the absence of a significant improvement in the control clusters added to the pool of evidence of effectiveness of the interventionto improve nutrition literacy skills of females aged 25 to 45 years.

The present study also generated evidence that the females of 25-45 years old who underwent the intervention accepted the interventional activities well and perceived that participating in the study benefitted them.

5.6 .Limitations of the study

Developed and validated Nutrition Literacy Test, though can be applicable for most of the females in the intended age group, may exclude the females that do not have the ability of read the Sinhala text below grade 8.

The assessment of correlates for inadequate nutrition was performed using the data gathered in the cross-sectional descriptive study. This design precluded establishment of the temporal

relationship. Identification of the temporal relationship is useful for the planning interventions and decision making which could not be provided by the present study.

Furthermore, the present study was limited in performing a comprehensive assessment of correlates and was limited to the correlates described in perused literature on nutrition literacy.

Though the intervention was proven to be effective in developing the nutrition literacy skills of the study population, the long term effects could not be assessed in the present study. Other than the acceptability of the participants, the other aspects of logistic and financial feasibility of conducting the intervention were also not assessed in the present study.

CHAPTER 06

Conclusions and Recommendations

6.1 Conclusions

1. The Nutrition Literacy Test developed was found to be a valid and reliable test to assess nutrition literacy among females aged 25-45 years in Sri Lanka.

2. The sstudy revealed that inadequate nutrition literacy was a considerable problem among females aged 25-45 years in Colombo districtwith the prevalence of marginal and poor nutrition literacy level being 41.1% (95% CI 41.06-41.14)and (14.6% (95% CI 14.54-14.65), respectively. The prevalence of inadequate nutrition literacy was seen to be higher among non-sinhalese, low educated and poor who can be considered as socially and economically disadvantaged groups.

3. Correlates of inadequate nutrition literacy identified were mostly modifiable factors. They were related to socio-economic status of the females (an education level below G.C.F. A/L (adjusted OR=(2.43(95%CI1.81-3.27) and not being employed (adjusted OR=1.58 (95%CI1.13-2.21)), their non-use of nutrition related communication channels (not using of television to obtain nutrition informationduring the past six months (adjusted OR=2.47(95%CI1.37-4.43), not using of newspapers to obtain nutrition informationduring the past six months(adjusted OR=2.90(95%CI 1.96-4.28)), a gap in the formal education they received (non-receipt of formal education on nutrition related fields up to G.C.E. O/L (adjusted OR 1.58(95%CI1.15-2.19) and their poor knowledge in nutrition (adjusted OR=2.18(95%CI1.66-2.87)).

4. The intervention developed and implemented to improve nutrition literacy skills of the study population was found to be highly successful in improving nutrition literacy among adult females of 25-45 years in Colombo district. The intervention was proved to be effective in improving nutrition literacy both at individual and at group level. It was also

successful in improving nutrition literacy of females of varying age and educational levels. Other than overall improvements in the nutrition literacy the intervention was also effective in improving each of the skills required by an individual to be nutritionally literate. The interventional activities were acceptable to the females of 25-45 years and they perceived it as being beneficial.

6.2. Recommendations

1. The study recommends thatNutrition Literacy Test as a test that can be used to generate valid and reliable information on nutrition literacy among adult females of the country.
2. The problem of inadequate nutrition literacy among females should be should be brought to the notice of the relevant authorities of the Ministry of Health and corrective actions should be advocated.
3. Higher authorities should be lobbied to consider implementing the intervention toimprove nutrition literacy, which was found to be effective and acceptable in the present study, to improve nutrition literacy skills of adult females. Logistic and financial feasibility of delivering the intervention as a programme should be assessed on a pilot basis. Long term outcomes of the intervention should also be assessed further.
4. Steps should be taken to address the modifiable correlates of inadequate nutrition literacy identified in the study through broad interventions in the fields on health and education.

List of Annexure

Annexure I:

Cover letter to assess the judgmental validity of draft Nutrition Literacy Test

Dr. K.Y.P.K. Weerasekara
Post Graduate Trainee,
Department of Community Medicine,
Faculty of Medicine, University of Colombo.

10th February 2012

Through Dr.Nalika Gunawardena,
Senior Lecturer in Community medicine,
Department of Community Medicine,
Faculty of Medicine,
University of Colombo.

_____

_____

Dear Sir / Madam,

Research on Nutrition literacy, its correlates and effectiveness of a skill development intervention to improve nutrition literacy among females aged 25 to 45 years in the district of Colombo.

I am Dr. K.Y.P.K. Weerasekara, a post graduate trainee in Community Medicine, attached to the Faculty of Medicine, University of Colombo. I have planned to conduct the above indicated research. As a preliminary step, I am in the process of developing a test to assess nutrition literacy in adult females.

Nutrition literacy is defined as the degree to which people have the capacity to obtain, process, and understand basic nutrition information. Literature specifies wide range of skills one need to have to be nutrition literate (Annexure IA) and out of these, I have identified following skills in the assessment of the nutrition literacy in the test being developed.

1. Ability to identify nutrition related text.
2. Ability to comprehend nutrition related text.
3. Interpreting nutrition related information and data presented in the form of tables, charts, pictures, symbols and maps.
4. Completing nutrition related computations.
5. Making nutrition related inferences based on the information presented.

A test assessing nutrition literacy should aim to assess whether a person possess these skills r not. The proposed test consists of 30 questions based on 13 commonly available

nutrition related stimuli. That will enable measurement of skills needed to fulfil each aspect of nutrition literacy indicated below.

1. Ability to identify nutrition related text.
2. Ability to comprehend nutrition related text.
3. Interpreting nutrition related information and data presented in the form of tables, charts, pictures, symbols and maps.
4. Completing nutrition related computations.
5. Making nutrition related inferences based on the information presented.

It will be administered as s self-administered questionnaire and would be translated to Sinhala.

I have planned scoring system, so that the minimum mark that can be obtained for the test will be 0 while the maximum will be 100. Each skill areas being assessed is allocated 20 marks which will give equal score to each skill.

This is to respectfully request you to express your views on:

1. appropriateness of the questions to assess the relevant skills;
2. Adequacy of the questions to assess the relevant skills;
3. Cultural suitability of the questions;
4. Appropriateness of the scoring system of the nutrition literacy test.

This is to cordially invite you an expert in the field of nutrition/education, to be a resource person I assessing the validity of the draft Nutrition Literacy test that has been developed.

A draft tool has been provided to you (Annexure IB). I have also annexed an evaluation form to be used for your convenience with instructions on how to indicate your opinion (Annexure IC).

Confidentiality of all information is guaranteed and information will only be used for research purposes. No information by which you can be identified will be released or published.

I would be grateful if you would contact me for any comment or further information

Dr. K.Y.P.K. Weerasekara
Post Graduate Trainee in Community Medicine, Department of Community Medicine, Faculty of Medicine, University of Colombo
Phone: 0112 411028
E mail: yasoma.kumari@yahoo.com

I would be further grateful if you may give an appointment for discussion of the above in two weeks' time.

Thank you,

Yours faithfully,

Dr.YasomaWeerasekara

Annexure IA

List of identified skills pertinent to nutrition literacy

1. Interpreting information and/or data presented in the form of tables, charts, pictures, symbols, maps, and videos.
2. Completing simple computations mentally.
3. Making inferences based on information presented or applying given information to a specific scenario.
4. Seeking information from various sources and interactions on Internet websites
5. Analysing information critically.
6. Assessing validity and credibility of information.
7. Using information to exert greater control over life events and make changes in life situations.

Annexure IB

Draft Nutrition Literacy Test

Thank you for time taken to participate in this research. Please read the following carefully before writing answers to this test.

- This is a test to ascertain the ability understand nutrition information and make inferences based on commonly available nutrition information.
- You are required to answer all questions.
- To indicate your answer, please write an 'X' in the cage provided adjacent to the responses.
- For each question you can select only one response. There is one correct response to each question, given in the set of answers.
- In the event that you do not know the correct answer, please don't guess an answer. Then select the 'don't know' option as the response.

(A) "In Sri Lanka, Out of the children aged 6-59 months, 29.6% suffer from vitamin A deficiency and severe vitamin A deficiency is seen in 2.7% of them."	
Based on the information provided above please answer the following questions	
1	Out of 100 children in the age group of 6-59 months, nearly how many would be having sufficient vitamin A level? 1 Nearly 70 |___| 2 Nearly 50 |___| 3 Nearly 30 |___| 4 Do not know |___|
2	Out of 100 children in the age group of 6-59 months, nearly how many would be having severe vitamin A deficiency? 1 Nearly 3 |___| 2 Nearly 30 |___| 3 Nearly 10 |___| 4 Do not know |___|

(B) The index of a book recommending healthy food habits to the Sri Lankans is shown below

Chapter	Content
1	Consume grains three times per day
2	Consume fruits and vegetables
3	Consume pulses and animal based food
4	Control oil in your food
5	Limit salt consumption ;consume iodized salt
6	Increase drinking water
7	Maintain your body weight
8	Limit consumption of sugar, honey and sugar sweetened drinks

Based on the information provided above please answer the following questions
In which chapters of the book, do you thinkyou can find following information?

3	Fat content of the coconut oil 1 Chapter 3 |___| 2 Chapter 6 |___| 3 Chapter 4 |___| 4 Don't Know |___|
4	Nutrients in eggs 1 Chapter 2 |___| 2 Chapter 3 |___| 3 Chapter 4 |___| 4 Don't Know |___|
5	Normal range of Body mass index 1 Chapter 6 |___| 2 Chapter 7 |___| 3 Chapter 8 |___| 4 Don't Know |___|

(C) The main factor deciding the quality of corn is the amount of toxic substance named "aflatoxin" contained in it.
This toxic substance can be contained in Rice, corn, peanuts as well as crops such as chillies, which are produced, not adhering to proper quality. Unlike other toxic substances, "aflatoxin" cannot be destroyed by heat; hence it is not destroyed during cooking.

Based on the information provided above please answer the following questions

6	Aflatoxin" toxic substance can be ingested into the body by chillies in cooked food 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't Know |___|

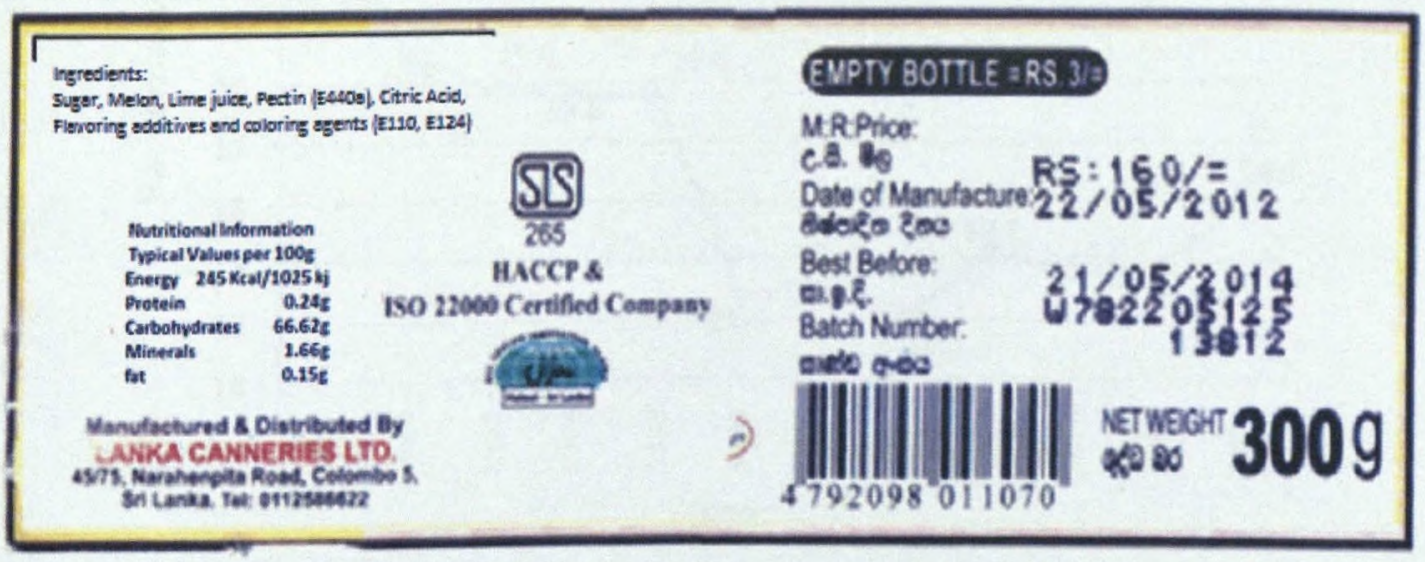
7	Aflatoxin" toxic substance can be ingested into the body by eating well boiled corn 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't Know |___|

(D) Maternal weight gain of 10-12 kg during the pregnancy aids delivery of a baby with good birth weight.
In Sri Lanka, average weight gain of a woman during pregnancy is 7.5Kg.

Based on the information provided above please answer the following questions

8	Out of these pregnant mothers, who has/have an adequate weight gain during the pregnancy to ensure a baby of good birth weight? 1 A mother with 12kg weight gain during pregnancy |___| 2 A mother with 7kg weight gain during pregnancy |___| 3 Both these mothers |___| 4 Don't know |___|
9	'In Sri Lanka , out of the pregnant women, 95% have weight gain below 7.5kg during pregnancy' Based on the above information this statement is 1 Correct |___| 2 Incorrect |___| 3 Can't say |___| 4 Don't Know |___|

(E) This is a part of a label of a jam bottle.



Based on the information provided above please answer the following questions

10	Out of these which is a colouring agent added to the jam in the above bottle? 1 E110 |___| 2 E120 |___| 3 E440a |___| 4 Don't Know |___|

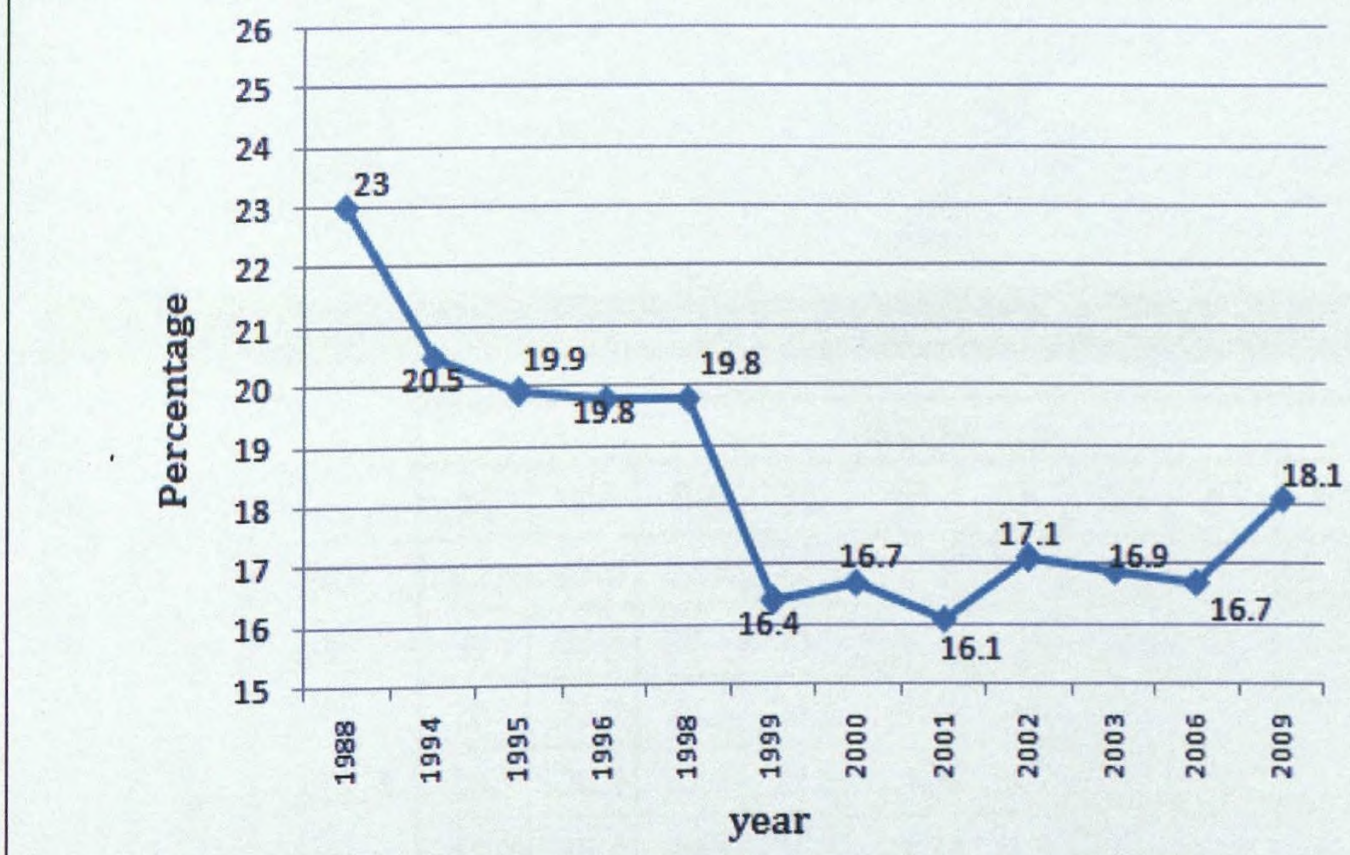
11	What is the expiry date of this food? 1 22/05/2012 |___| 2 13/08/2012 |___| 3 21/05/2014 |___| 4 Don't Know |___|

(F) Cholesterol in our blood is produced using existing body fat or dietary fat. Among food only food of animal origin contain cholesterol

Based on the information provided above please answer the following questions

12	Cholesterol is found in coconut oil 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't Know |___|
13	A person, who consumes only food with plant origin, cannot have a high level of blood cholesterol. This statement is 1 True |___| 2 False |___| 3 Can't say |___| 4 Don't know |___|

(G) The trend of low birth weight in Sri Lanka is shown below



Based on the information provided above please answer the following questions

14	Out of these periods, which one shows a decline of low birth weight? 1 From 1998 to 1999 |___| 2 From 2001 to 2002 |___| 3 From 2006 to 2009 |___| 4 Don't know |___|
15	What is the low birth weight percentage in the year 2001

	1	16.1	⎿__⏌
	2	18.1	⎿__⏌
	3	17.1	⎿__⏌
	4	Don't know	⎿__⏌

(G) The calcium content of some commonly consumed food items is shown below

Food item	Amount	Calcium Content (mg)
Milk	½ cup	115
Kathurumurunga	½ cup	1130
gingelly	1 Table spoon	350
Koonissan(a small dried fish)	3 Table spoons	508

Based on the information provided above please answer the following questions

16	The amount of calcium provided by one cup of milk is less than the amount of calcium provided by 3 table spoons of Koonissan(a small dried fish).This statement is		
	1	Correct	⎿__⏌
	2	Incorrect	⎿__⏌
	3	Can't say	⎿__⏌
	4	Don't Know	⎿__⏌
17	If you consume ¼ cup of Kathurumurunga and 3 table spoons of Koonissan (a small dried fish), what is the amount of calcium(mg) given to the body by these two foods?		
	1	1073	⎿__⏌
	2	558	⎿__⏌
	3	2508	⎿__⏌
	4	Don't know	⎿__⏌

(H) A table for measuring Body mass index is given below

Height (cm)	Wieght (kg) 45	48	50	53	55	58	60	63	65	68
145	21.4	22.6	23.8	25	26.2	27.3	28.5	29.7	30.9	32.1
147.5	20.7	21.8	23	24.1	25.3	26.4	27.6	28.7	29.9	31
150	20	21.1	22.2	23.3	24.4	25.6	26.7	27.8	28.9	30
152.5	19.3	20.4	21.5	22.6	23.6	24.7	25.8	26.9	27.9	29
155	18.7	19.8	20.8	21.9	22.9	23.9	25	26	27.1	28.1
157.5	18.1	19.1	20.2	21.2	22.2	23.2	24.2	25.2	26.2	27.2

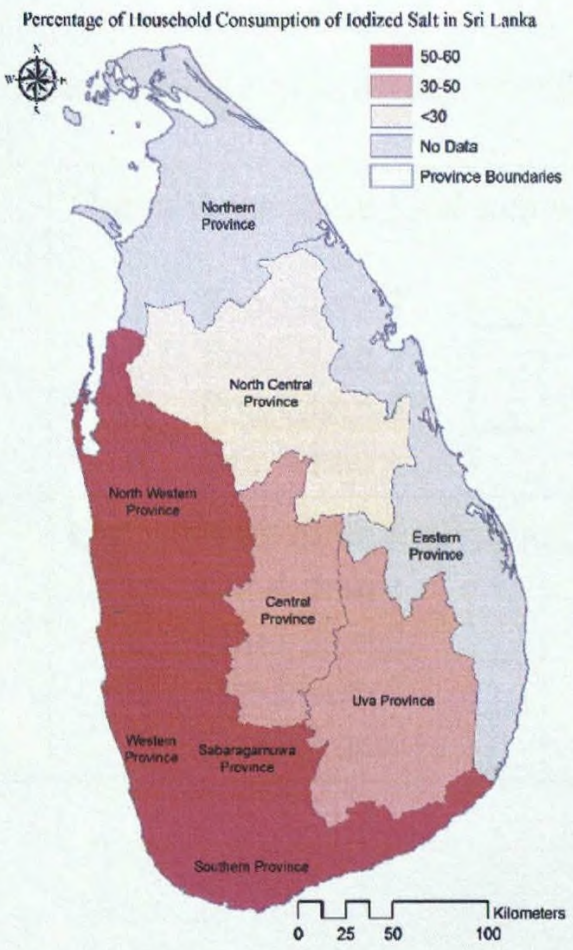
Low Normal Overweight Obese

Based on the information provided above please answer the following questions

18	What is the body mass index of a person with height 150 cm and weight 58kg?

	1 25.6 |___| 2 26.9 |___| 3 26.4 |___| 4 Don't know |___|
19	To which category of BMI, will a person with height 150 cm and weight 60kg will belong to? 1 Normal |___| 2 Low |___| 3 Over weight |___| 4 Don't know |___|
20	"When two persons with same weight are considered, the shorter person is more likely to be obese than the taller person". This statement is 1 Correct |___| 2 Incorrect |___| 3 Can't say |___| 4 Don't Know |___|

(J) The consumption of iodized salt in Sri Lanka is shown in the map below.



Based on the information provided above please answer the following questions

21. Out of these provinces ,which province has the highest consumption of iodized salt

1 North central |___|
2 North western |___|
3 Uva |___|
4 Don't know |___|

22. In Uva province, what is the percentage use of iodized salt?

1 50-60% |___|
2 30-50% |___|
3 <30% |___|
4 Don't know |___|

(K) Based on the amount of nutrient in 100g of food, colour code is assigned for the each nutrient as below.

	Nutrient
High	
moderate	
Low	

Based on the information provided above please answer the following questions

23	Out of these three food items, which one has low saturated fat amount? 1 Food item 1 |___| 2 Food item 2 |___| 3 Food item 3 |___| 4 Don't know |___|
24	Out of these three food items, which one has high salt amount? 1 Food item 1 |___| 2 Food item 2 |___| 3 Food item 3 |___| 4 Don't know |___|

(L) This is a label of a milk powder packet.

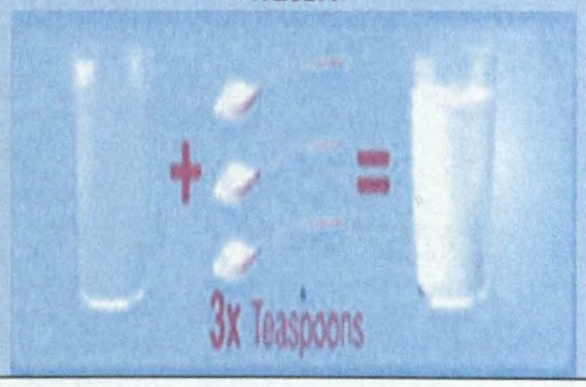
Full cream Milk powder
Enriched with Vitamin A&D

Nutrition Information

Nutrient		Per 100g powder	Per 25g serving
Energy	kcal	500	125
Protein	g	24	6
Carbohydrate	g	38	9.5
Fat	g	28	7
Calcium	mg	800	200

Preparation

To prepare 1 glass of milk
3 tablespoons (25g) of milk powder to be dissolved in 1 glass (200ml) of water.



Based on the information provided above please answer the following questions

25	If you drink two glasses of milk per day, prepared as per instructions, how much of energy will you get from milk? 1 125 kcal |___| 2 250 kcal |___| 3 500 kcal |___| 4 Don't Know |___|
26	If you have to take 400 mg calcium per day, how many glasses of milk, prepared as per instructions, do you have to take daily to obtain full requirement of calcium from this milk? 1 1 glass |___| 2 2 glasses |___| 3 3 glasses |___| 4 Don't Know |___|
27	If your diet gives you 2500 calories a day, and your diet includes 2 glasses of milk, prepared as per instructions what percentage of your daily value of calories will be from milk? 1 5% |___| 2 10% |___| 3 20% |___| 4 Don't Know |___|

(M) When food is labelled based on their nutrients, the levels of nutrients, that should be in the food, is specified by the government. Below shown is some of these levels.

Component	Claim	Condition
Energy	low	Below 40 kcal per 100 g (solids) or Below 20 kcal per 100 ml (liquids)
Fat	low	Below 3 g per 100 g (solids) Below 1.5 g per 100 ml (liquids)
	Free	Below 0.5 g per 100 g (solids) or 100 ml (liquids)
sodium	low	Below 0.12 g per 100 g

Part of a nutrient content details of a milk powder packet is shown below.

Nutrient		Per 100g powder
Energy	kcal	360
Protein	g	33
Carbohydrate	g	54
Fat	g	0.8
Calcium	mg	1340

Based on the information provided above please answer the following questions

28 Can this milk powder be considered as a low fat milk powder?

1 Yes |___|
2 No |___|
3 Can't say |___|
4 Don't Know |___|

29 Can this milk powder be considered as a fat- free milk powder?

1 Yes |___|
2 No |___|
3 Can't say |___|
4 Don't Know |___|

30 Can this milk powder be considered as a low- energy milk powder?

1 Yes |___|
2 No |___|
3 Can't say |___|
4 Don't Know |___|

Annexure IC

Distribution of the skills to be assessed by each question-evaluation form

(Please be kind enough to allocate a score of 1 to 5 for the each aspect of evaluation, 1=not suitable and 5=highly suitable)

Nutrition literacy skill	Number of questions	score for each question	Question numbers	Appropriateness of the question to assess the skill 1=not suitable and 5=highly suitable (*please to suggest alternate wordings / questions if you assigned a mark of 3 or less. Use the table below for this purpose)	Adequacy of the questions to assess the skills 1=not at all adequate and 5=highly adequate (*please to suggest alternate wordings / questions if you assigned a mark of 3 or less. Use the table below for this purpose)	Cultural suitability of the question 1=not suitable and 5=highly suitable (*please to suggest alternate wordings / questions if you assigned a mark of 3 or less. Use the table below for this purpose)	Agreement to the scoring and suggestions (*please to suggest alternate scoring method if you assign 3 or less marks. Use the table below for this purpose).
Identifying nutrition related text	5	4.00	3				
			4				
			5				
			10				
			11				
Ability to comprehend nutrition related text	7 (unequal score)	2.86	1				
		2.86	2				
		2.86	6				
		2.86	7				
		2.84	8				
		2.86	9				
		2.86	12				
Interpreting nutrition	8	2.50	14				
			15				

related information and data in the form of tables ,charts, pictures, symbols and maps			18 19 21 22 23 24			
Completing nutrition related computations	5	4.00	16 17 25 26 27			
Making nutrition related inferences based on the information presented.	5	4.00	13 20 28 29 30			
Total Score	100	100				

Question number	Suggested alternate wordings / questions	Suggested alternate score
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
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Annexure II

Study setting selected for the validation study

Annexure III

Information Sheet for Participants - I

Study on prevalence of Nutrition Literacy, its correlates among females aged 25-45 years of age in Colombo District- validation study

I am Dr. K.Y.P.K. Weerasekara, currently attached to the Post graduate Institute of Medicine as a post graduate trainee in Community Medicine. I would like to invite you to take part in the research study titled prevalence of nutrition Literacy, its correlates among females aged 25-45 years of age in Colombo District conducted by Dr. K.Y.P.K.Weerasekara and Dr N. Gunawardena, senior Lecturer of the Department of Community Medicine, Faculty of Medicine, University of Colombo.

1. Purpose of the study

The purpose of this research is toassess nutrition Literacy of the females in the age group of 25-45 years of age.It is expected that this study will reveal important information on nutrition literacy of community sample of adult females and its correlates.

2. **Voluntary participation**

Your participation in this study is voluntary. You are free to not participate at all or to withdraw from the study at any time despite consenting to take part earlier. If you decide not to participate or withdraw from the study you may do so at any time.

3. **Duration, procedures of the study and participant's responsibility**

The procedures to be carried out are an interviewer administered questionnaire and a self administered questionnaire, which is aimed to assess the nutrition literacy. There will be no follow up activities.

4. **Potential benefits**

Participation in this study may benefit you and your community as a whole since the findings will be provided to agencies and personnel in the respective field who are involved in further decision making and providing food and nutrition information. Further if your understanding on nutrition information is found to be inadequate you

may be selected for an intervention which would facilitate to upgrade your understanding on nutrition information.

5. **Risks, hazards and discomfort**

We ensure that there are no potential or actual risks to you by participating in this research. The only inconvenience you will have to experience is spending time in filling up the questionnaire.

6. **Reimbursements**

You will not be paid any allowances for participating in this study.

7. **Confidentiality**

Confidentiality of all the records is guaranteed and no information by which you can be identified will be released or published. These data will never be used in such a way that you could be identified in any public presentations or publications.

8. **Termination of study participation**

You may withdraw your consent to participate in this study at any time. Please notify the investigator as soon as you decide to withdraw your consent.

9. Clarification

If you need further clarifications, please feel free to contact me at,
Dr. K.Y.P.K. Weerasekara
Registrar in Community Medicine
No 108, Kadgugahawatta,
Gothatuwa,
Angoda.
Tel. 0112 411028

Annex IV

විස්තර පත්‍රිකාව - I

වලංගු කිරීමට අදාල අධ්‍යයනය

කොලඹ දිස්ත්‍රික්කයේ අවුරුදු 25-45 අතර කාන්තාවන්ගේ
පෝෂණ සාක්ෂරතාවය අධ්‍යයනය කිරීමේ සමීක්ෂණය- වලංගු කිරීමට අදාල අධ්‍යයනය.

වෛද්‍ය කේ. වයි. පී. කේ. වීරසේකර වන මම කොළඹ වෛද්‍යය පීඨයේ ප්‍රජා වෛද්‍යය දෙපාර්තමේන්තුවට, පශ්චාත් උපාධිය සඳහා අනුබද්ධවීසිටින වෛද්‍යවරයෙක්මි. මාවිසින් වෛද්‍ය එන්. එස්. ගුණවර්ධන මහත්මියගේ අධීක්ෂණය යටතේ කොළඹදිස්තක්කයේ අවුරුදු 25-45 අතර කාන්තාවන්ගේ පෝෂණ සාක්ෂරතාවය සෙවීම සඳහා කරනුලබන්නාවූ මෙම සමීක්ෂණයට සහභාගීවනලෙස ඉල්ලා සිටිමි.

1. **<u>පර්යේෂණයේ අරමුණ</u>**

මෙම සමීක්ෂණයේ අරමුණ පෝෂණසාක්ෂරතාවය පිළිබඳව අධයයනය කිරීමයි. මෙපිළිබඳවශ්‍රී ලංකාවේ මීට කලින් ගැඹුරට අධ්‍යයනයකර නොමැති බැවින් මෙම අධ්‍යයනය මගින් පෝෂණ සාක්ෂරතාවය පිළිබඳ වැදගත් තොරතුරු අනාවරණය කරනු ඇතැයි බලාපොරත්තුවේ.

2. **ස්වේච්ඡා සහභාගිත්වය**

මෙම සමීක්ෂණයට ඔබගේ සහභාගිත්වය ස්වේච්ඡාවෙන්ම සිදුවිය යුතුය. මෙයට සහභාගී නොවීමට හෝ සහභාගීවීමට ගත් තීරණය වෙනස්කොට ඉන් ඉවත්වීමට ඕනෑම අවස්ථාවකදී ඔබට හැකිය. ඔබ මෙයට සහභාගී නොවීමෙන් කිසිම වරපුසාදයක් ඔබට අහිමි නොවනුඇත.

3. **සහභගීවන්නාගේ වගකීමකට යුතුදෑ හා ගතවන කාලය**

සමීක්ෂණස හායිකාවක මගින් කරනු ලබන සම්මුඛ සාකච්ඡාමය ප්‍රශ්නාවලියකට පිලිතුරු ලබාගැනීම සිදුවේ.
පසු විපරමක් සිදුකරනු නොලැබේ.

4. **උදාවියහැකි වාසි**

ඉහත සමීක්ෂණය මගින් හඳුනාගන්නා ලබන කරුණු, අදාල පෝෂණ තොරතුරු සැලසුම්කිරීමේ හා බෙදාහරීමේ ආයතනවලට ලබා දෙනබැවින් එමගින් ඔබ හා මුළු මහත් ප්‍රජාවට මවා සිසලසෙනු ඇත.

5. **අවදානම්, ව්‍යාසන හා අපහසුතා**

මෙයට සහභාගිවීමේදී ඔබට කිසිදු අවදානමක්, ව්‍යාසනකාරී තත්වයක් හෝ අපහසුතාවයක් සිදුනොවනු ඇත.

6. **මූල්‍ය දායකත්වය**

ඔබට කිසිදු ගෙවීමක් සිදුකරනු නොලැබේ.

7. **රහස්‍යභාවය**

සියලුම වාර්තාවල රහසයභාවය අරක්ෂාකරන බවට සහතිකවන අතර, කිසිඳු ආකාරයකින් ඔබ ගැන සොයාගතහැකි විස්තර තවකෙනෙකුට ලබාදීමක් හෝ ප්‍රසිද්ධකිරීමක් නොවනු ඇත.

8. සමීක්ෂණයෙන් ඉවත්වීම

අවශ්‍ය ඕනෑම අවස්ථාවකදී මෙම සමීක්ෂණයෙන් ඉවත් විය හැකිය. ඔබගේ අනුමැතිය ඉවත්කරගැනීමට අවශ්‍යවූවිට ප්‍රධාන පරීක්ෂකට ඒ බව දන්වන්න.

9. වැඩි විස්තර ලබාගැනීමට

සමීක්ෂණයේ ක්‍රියාකාරකම් ගැන විස්තර හෝ වෙනත් කරුණක් ගැන විමසීමට අවශ්‍යනම් මා අමතන්න.

වෛද්‍ය කේ.වයි.පී.කේ.වීරසේකර
නො 108, කඳුගහවත්ත ගොතටුව,
අංගොඩ.
දුරකථන අංක: 0112-411028

Annexure V

Consent Form I - validation study

To be completed:

a. By the participant

The participant should complete the whole of this sheet herself

1 Have you read the information sheet? Yes/No

(Please keep a copy for yourself)

2 Have you had an opportunity to discuss this study and ask any questions? Yes/No

3 Have you had satisfactory answers to all your questions? Yes/No

4 Have you received enough information about the study? Yes/No

5 Who explained the study to you?

.....

6 Do you understand that you are free to withdraw from the study at any time, without having to give a reason Yes/No

7 Have you had sufficient time to come to your decision? Yes/No

8 Do you agree to take part in this study? Yes/No

Participant's Signature.....Date.....

Name (BLOCK CAPITALS) .....

b. By the investigator

I have explained the study to the above volunteer and she has indicated her willingnessto take part.

Signature of investigator .....Date .....

Name (BLOCK CAPITALS).....

Annex VI

කැමැත්ත ප්‍රකාශ කිරීමේ පත්‍රය I - වලංගු කිරීමට අදාල අධ්‍යයනය

a) සහභාගිවන්නා විසින් පිරවිය යුතුය

1	ඔබ විස්තර පත්‍රි කාව සම්පූර්ණයෙන් කියවුවාද? (ඔබ ළඟ පිටපතක් තබා ගන්න)	ඔව්/නැත
2	ඔබට මෙම මැදිහත්වීමේ පර්යේෂණය සම්බන්ධ සාකච්ඡා කිරීමට හා පශ්න ඇසීමට අවස්ථාවක් ලැබුනේද?	ඔව්/නැත
3	ඔබගේ සියලුම ගැටළු වලට සෑහීමට පත්විය හැකි පිලිතුරු ලැබුනේද?	ඔව්/නැත
4	ඔබට මෙම සමීක්ෂණය පිලිබඳව අවශය පමණ තොරතුරු ලැබුනේද?	ඔව්/නැත
5	ඔබට මෙම සමීක්ෂණය පිලිබඳව පැහැදිලි කලේ කවුරුන්ද?	
6	ඔබට කරුණු දැන්වීමකින් තොරව ඕනෑම අවස්ථාවක මෙම පර්යේෂණයෙන් ඉවත්වීමට හැකි බව ඔබ තේරුම් ගත්තේද?	ඔව්/නැත
7	ඔබට තීරණයක් ගැනීමට ප්‍රමාණවත් කාලයක් ලැබුනේද?	ඔව්/නැත
8	ඔබ මෙම පර්යේෂණයටසහභාගි වීමට එකඟ වන්නේද?	ඔව්/නැත

සහභාගිවන්නා ගේ අත්සන ..... දිනය .....

නම (පැහැදිලි අකුරෙන්) .....

b) පරීක්ෂකවරයා විසින් පිරවිය යුතුය

මා විසින් මෙමෙ පර්යේෂනය පිළිබඳව විස්තර කරන ලදී අනතුරුව ඇය විසින් පර්යේෂණයට කැමත්ත පල කරන ලදී.

පරීක්ෂකවරයාගේ අත්සන ..... දිනය .....

නම (පැහැදිලි අකුරෙන්) .....

Annexure VII

Questionnaire for Validation of Nutrition Literacy Test

GN division		Index No.	
Date of interview		Name of the interviewer	

Instructions to interviewer.

- Read out the following to the respondent.

  "Thank you for consenting to participate in this study. The information you provide is very important and try to answer as sincerely as accurately as possible.

  Your responses will be treated confidentially and only the researchers will have access to the forms. If you do not understand the questions, please tell me. If you have anything to ask from me about this study, you can ask them now."

- Mark the responses in the relevant box by cross (x). Please obtain responses to all the questions.

Demographic and socio-economic information of the participant	
1	Age in years (as at last birthday): |___||___||___|
2	Ethnicity 1 Sinhalese |___| 2 Tamil |___| 3 Muslim |___| 4 Other |___|
3	Religion 1 Buddhism |___| 2 Hindu |___| 3 Roman Catholic |___| 4 Cristian |___| 5 Islam |___| 6 Other |___|
4	Your highest educational achievement 1 No schooling |___| 2 Up to Grade 5 |___| 3 Grade 6-9 |___| 4 Up to G.C.E (O/L) |___| 5 Passed G.C.E. (O/L) |___| 6 Passed G.C.E. (A/L) |___| 6 University education and above |___|
5	What is your employment status? 1 Currently employed |___| 2 Previously employed |___| 3 Never employed |___|

Information on access and usage of health communication channels	
8	During the past six months, Did you have access to print media such as newspapers, magazines and books? 1 Newspapers Yes |___| No |___| 2 Magazines Yes |___| No |___| 3 Books Yes |___| No |___| If 'no' to all, go to question 10
9	During the past six months, which of the following print media such as newspapers, magazines and books were used by you to obtain general information (e.g. news, weather condition etc...)? 1 Newspapers Yes |___| No |___| 2 Magazines Yes |___| No |___| 3 Books Yes |___| No |___| If 'no' to all, go to question 11
10	How frequently did you use print media such as newspapers, magazines and books, to obtain general information (e.g. news, weather condition etc…)? 1 Not using |___| 2 Less than once a week |___| 3 Once a week |___| 4 2-4 times per week |___| 5 More than four times per week |___|
11	During the past six months, Did you obtain nutrition/food/diet related information through print media such as newspapers, magazines and books? 1 Yes |___| 2 No |___|
12	During the past six months, what were the mass media that gave you nutrition diet /food related information? (Mark all relevant cages with a "x") 1 Newspapers Yes |___| No |___| 2 Magazines Yes |___| No |___| 3 Books Yes |___| No |___|
13	How frequently did you use print media such as newspapers, magazines and books, nutrition diet /food related information? 1 Not using |___| 2 Less than once a week |___| 3 Once a week |___| 4 2-4 times per week |___| 5 More than four times per week |___|

Annexure VIII

පෝෂණ සාක්ෂරතාවය වලංගු කිරීමේ ප්‍රශ්න මාලාව

ග්‍රාම නිලධාරි වසම		අනුක්‍රමික අංකය:	
දත්ත එකතු කිරීමේ දිනය		සම්මුඛ පරීක්ෂකගේ නම	

<u>සම්මුඛ පරීක්ෂක සඳහා උපදෙස්</u>

- පිළිතුරු සපයන්නාට මෙය කියවන්න.

  "මෙම සමීක්ෂණයට සහභාගී වීමට එකඟ වීම පිළිබඳව ස්තුතිවන්ත වෙමි.ඔබ ලබාදෙන තොරතුරු ඉතාමත් වැදගත් වන බැවින් හැකි තරම් දුරට නිවැරදි හා සත්‍ය තොරතුරු ලබා දෙන්න.
  ඔබ සපයන තොරතුරු වල රහස්‍යභාවය ආරක්ෂා කරනු ලබන අතර , මෙම තොරතුරු පරිහරණ ය කරනු ලබන්නේ සමීක්ෂකයන් විසින් පමණි. ඔබට කිසියම් ප්‍රශ්නයක් තේරුම ගත නොහැකිනම්, කරුණාකර එය මට පවසන්න.ඔබට සමීක්ෂණය පිළිබඳව කිසියම් දෙයක් තවදුරටත් දැනගැනීමටඇත්නම් එය දැන්ඇසීමට හැකිය."
- පිළිතුරු සපයන්නා විසින් දෙනු ලබන පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.

පෞද්ගලික සහ සමාජ ආර්ථික පසුබිම සම්බන්ධ තොරතුරු	
1	වයස අවුරුදු (පසුගිය උපන්දිනයට): |__|__|__|
2	ජාතිය 1 සිංහල |__| 2 දෙමළ |__| 3 මුස්ලිම් |__| 4 වෙනත් |__|
3	ආගම 1 බුද්ධාගම |__| 2 හින්දු |__| 3 රෝමානු කතෝලික |__| 4 ක්‍රිස්තියානි |__| 5 ඉස්ලාම් |__| 6 වෙනත් |__|
4	ලබා ඇති උසසස්ම අධ්‍යාපන මට්ටම 1 පාසල් නොගිය |__| 2 ණිය දක්වාශ්‍රේ 5 |__| 3 -69 ශ්‍රේණිය දක්වා |__| 4 අදක්වා (පෙළ/ස).ස.පො. |__| 5 අසමත් (පෙළ/ස).ස.පො. |__| 6 අසමත් (පෙළ/උ).ස.පො. |__| 7 විශ්ව විද්‍යාල අධ්‍යාපනය හා ඉන් ඉහල |__|
5	ඔබගේ රැකියා පසුබිම කුමක්ද? 1 දැනට රැකියාවක නියුතු |__| 2 කලින් රැකියාවක නියුතු |__| 3 රැකියාවක් නොකළ |__|

ආහාර හා පෝෂණය පිළිබඳ තොරතුරු ලබා ගැනීමේ සහ භාවිතා කිරීමේ සන්නිවේදනය මාධ්‍යය	
8	පසුගිය මස හය තුලදී ,ඔබට පුවත්පත්, සඟරා හෝ පොත් වැනි මුද්‍රිත මාධ්‍ය ලබා ගැනීමේ හැකියාව තිබුනේද? 1 පුවත්පත් ඔව් |___| නැත |___| 2 සඟරා ඔව් |___| නැත |___| 3 පොත් ඔව් |___| නැත |___| නැතිනම් ,ප්‍රශ්න අංක 10 වෙත පිවිසෙන්න
9	පසුගිය මස හය තුලදී ,ඔබට සාමාන්‍ය තොරතුරු (ප්‍රවෘත්ති,කාලගුණ තොරතුරු) දැන ගැනීමට පුවත්පත්, සඟරා හෝ පොත් වැනි මුද්‍රිත මාධ්‍ය භාවිතා කලේද? 1 පුවත්පත් ඔව් |___| නැත |___| 2 සඟරා ඔව් |___| නැත |___| 3 පොත් ඔව් |___| නැත |___| නැතිනම් ,ප්‍රශ්න අංක 11 වෙත පිවිසෙන්න
10	පසුගිය මස හය තුලදී , ඔබ සාමාන්‍ය තොරතුරු (ප්‍රවෘත්ති, කාලගුණ තොරතුරු) දැන ගැනීමට කොපමණ වාර ගණනක් එම මාධ්‍ය භාවිතා කලේද? 1 භාවිතා නොකලේය |___| 2 සුමානයකට වරකට අඩුවෙන් |___| 3 සුමානයකට වරක් |___| 4 සුමානයකට 4-2 වාරයක් |___| 5 සුමානයකට 4 වාරයකට වැඩියෙන් හෝ අසන්න වශයෙන් දිනපතා |___|
11	පසුගිය මස හය තුලදී , ආහාර හා පෝෂණය පිළිබඳ තොරතුරු දැන ගැනීමට, පුවත්පත්, සඟරා හෝ පොත් වැනි මුද්‍රිත මාධ්‍ය භාවිතා කලේද? 1 ඔව් |___| 2 නැත |___|
12	පසුගිය මස හය තුලදී ,ඔබට සාමාන්‍ය තොරතුරු (ප්‍රවෘත්ති,කාලගුණ තොරතුරු) දැන ගැනීමට පුවත්පත්, සඟරා හෝ පොත් වැනි මුද්‍රිත මාධ්‍ය භාවිතා කලේද? (සියළු පිළිතුරු ඉදිරියෙන් "x"සලකුණ සඳහන් කරන්න) 1 පුවත්පත් ඔව් |___| නැත |___| 2 සඟරා ඔව් |___| නැත |___| 3 පොත් ඔව් |___| නැත |___|
13	පසුගිය මස හය තුලදී , ඔබ ආහාර හා පෝෂණය පිළිබඳ තොරතුරු දැන ගැනීමට, පුවත්පත්, සඟරා හෝ පොත් වැනි මුද්‍රිත මාධ්‍ය කොපමණ වාර ගණනක් භාවිතා කලේද? 1 භාවිතා නොකලේය |___| 2 සුමානයකට වරකට අඩුවෙන් |___| 3 සුමානයකට වරක් |___| 4 සුමානයකට 4-2 වාරයක් |___| 5 සුමානයකට 4 වාරයකට වැඩියෙන් හෝ අසන්න වශයෙන් දිනපතා |___|

Annexure IX

Validated Nutrition Literacy Test (English)

Thank you for time taken to participate in this research. Please read the following carefully before writing answers to this test.

- This is a test to ascertain the ability understand nutrition information and make inferences based on commonly available nutrition information.
- You are required to answer all questions.
- To indicate your answer, please write an 'X' in the cage provided adjacent to the responses.
- For each question you can select only one response. There is one correct response to each question, given in the set of answers.
- In the event that you do not know the correct answer, please don't guess an answer. Then select the 'don't know' option as the response.

(A) "In Sri Lanka, Out of the children aged 6-59 months, 29.6% suffer from vitamin A deficiency and severe vitamin A deficiency is seen in 2.7% of them."	
Based on the information provided above please answer the following questions	
1	Out of 100 children in the age group of 6-59 months, nearly how many would be having sufficient vitamin A level? 1 Nearly 70 |___| 2 Nearly 50 |___| 3 Nearly 30 |___| 4 Do not know |___|
2	Out of 100 children in the age group of 6-59 months, nearly how many would be having severe vitamin A deficiency? 1 Nearly 3 |___| 2 Nearly 30 |___| 3 Nearly 10 |___| 4 Do not know |___|

(B) The index of a book recommending healthy food habits to the Sri Lankans is shown below

Chapter	Content
1	Consume grains three times per day
2	Consume fruits and vegetables
3	Consume pulses and animal based food
4	Control oil in your food
5	Limit salt consumption ;consume iodized salt
6	Increase drinking water
7	Maintain your body weight
8	Limit consumption of sugar, honey and sugar sweetened drinks

Based on the information provided above please answer the following questions
In which chapters of the book, do you thinkyou can find following information?

3	Fat content of the coconut oil 1 Chapter 3 |___| 2 Chapter 6 |___| 3 Chapter 4 |___| 4 Don't Know |___|
4	Nutrients in eggs 1 Chapter 2 |___| 2 Chapter 3 |___| 3 Chapter 4 |___| 4 Don't Know |___|
5	Normal range of Body mass index 1 Chapter 6 |___| 2 Chapter 7 |___| 3 Chapter 8 |___| 4 Don't Know |___|

(C) The main factor deciding the quality of corn is the amount of toxic substance named "aflatoxin" contained in it.
This toxic substance can be contained in Rice, corn, peanuts as well as crops such as chillies, which are produced, not adhering to proper quality. Unlike other toxic substances, "aflatoxin" cannot be destroyed by heat; hence it is not destroyed during cooking.

Based on the information provided above please answer the following questions

6	Aflatoxin" toxic substance can be ingested into the body by chillies in cooked food 1 Yes |___| 2 No |___|

	3 Can't say |___| 4 Don't Know |___|
7	Aflatoxin" toxic substance can be ingested into the body by eating well boiled corn 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't Know |___|

(D) Maternal weight gain of 10-12 kg during the pregnancy aids delivery of a baby with good birth weight.
In Sri Lanka, average weight gain of a woman during pregnancy is 7.5Kg.

Based on the information provided above please answer the following questions	
8	Out of these pregnant mothers, who has/have an adequate weight gain during the pregnancy to ensure a baby of good birth weight? 1 A mother with 12kg weight gain during pregnancy |___| 2 A mother with 7kg weight gain during pregnancy |___| 3 Both these mothers |___| 4 Don't know |___|
9	'In Sri Lanka , out of the pregnant women, 95% have weight gain below 7.5kg during pregnancy' Based on the above information this statement is 1 Correct |___| 2 Incorrect |___| 3 Can't say |___| 4 Don't Know |___|

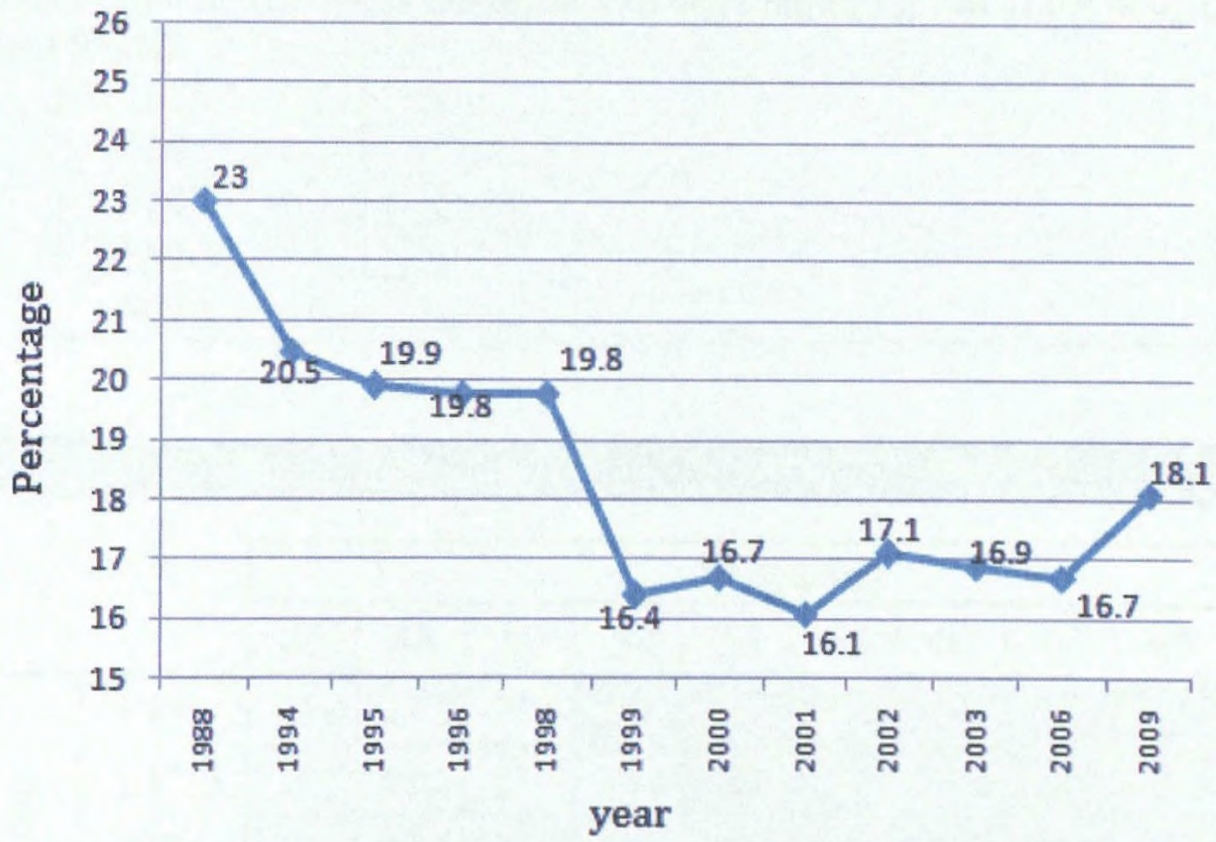
(E) This is a part of a label of a jam bottle.

Based on the information provided above please answer the following questions

10	Out of these which is a colouring agent added to the jam in the above bottle? 1 E110 |___| 2 E120 |___| 3 E440a |___| 4 Don't |___| Know
11	What is the expiry date of this food? 1 22/05/2012 |___| 2 13/08/2012 |___| 3 21/05/2014 |___| 4 Don't |___| Know

(F) Cholesterol in our blood is produced using existing body fat or dietary fat. Among food only food of animal origin contain cholesterol	
Based on the information provided above please answer the following questions	
12	Cholesterol is found in coconut oil 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't |___| Know
13	A person, who consumes only food with plant origin, cannot have a high level of blood cholesterol. This statement is 1 True |___| 2 False |___| 3 Can't say |___| 4 Don't |___| know

(G) The trend of low birth weight in Sri Lanka is shown below



Based on the information provided above please answer the following questions

14	Out of these periods, which one shows a decline of low birth weight? 1 From 1998 to 1999 |___| 2 From 2001 to 2002 |___| 3 From 2006 to 2009 |___| 4 Don't know |___|
15	What is the low birth weight percentage in the year 2001 1 16.1 |___| 2 18.1 |___| 3 17.1 |___| 4 Don't know |___|

(G) The calcium content of some commonly consumed food items is shown below

Food item	Amount	Calcium Content (mg)
Milk	½ cup	115
Kathurumurunga	½ cup	1130
gingelly	1 Table spoon	350
Koonissan(a small dried fish)	3 Table spoons	508

Based on the information provided above please answer the following questions

16	The amount of calcium provided by one cup of milk is less than the amount of calcium provided by 3 table spoons of Koonissan(a small dried fish).This statement is 1 Correct |___| 2 Incorrect |___| 3 Can't say |___| 4 Don't Know |___|

17	If you consume ¼ cup of Kathurumurunga and 3 table spoons of Koonissan (a small dried fish), what is the amount of calcium(mg) given to the body by these two foods? 1 1073 |___| 2 558 |___| 3 2508 |___| 4 Don't know |___|

(H) A table for measuring Body mass index is given below

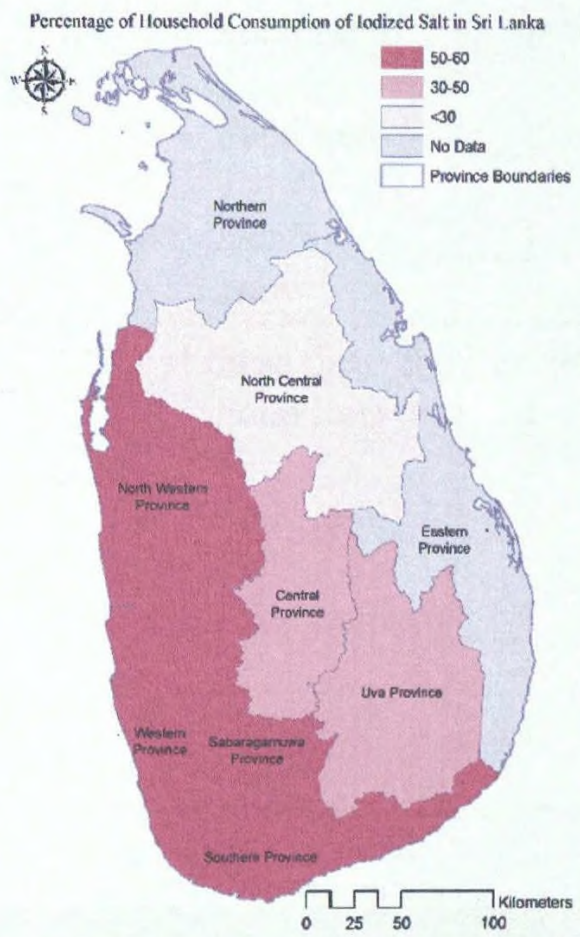
Height (cm)	Wieght (kg)									
	45	48	50	53	55	58	60	63	65	68
145	21.4	22.6	23.8	25	26.2	27.3	28.5	29.7	30.9	32.1
147.5	20.7	21.8	23	24.1	25.3	26.4	27.6	28.7	29.9	31
150	20	21.1	22.2	23.3	24.4	25.6	26.7	27.8	28.9	30
152.5	19.3	20.4	21.5	22.6	23.6	24.7	25.8	26.9	27.9	29
155	18.7	19.8	20.8	21.9	22.9	23.9	25	26	27.1	28.1
157.5	18.1	19.1	20.2	21.2	22.2	23.2	24.2	25.2	26.2	27.2

Low Normal Overweight Obese

Based on the information provided above please answer the following questions

18	What is the body mass index of a person with height 150 cm and weight 58kg? 1 25.6 |___| 2 26.9 |___| 3 26.4 |___| 4 Don't know |___|
19	To which category of BMI, will a person with height 150 cm and weight 60kg will belong to? 1 Normal |___| 2 Low |___| 3 Over weight |___| 4 Don't know |___|
20	"When two persons with same weight are considered, the shorter person is more likely to be obese than the taller person". This statement is 1 Correct |___| 2 Incorrect |___| 3 Can't say |___| 4 Don't Know |___|

(J) The consumption of iodized salt in Sri Lanka is shown in the map below.



Based on the information provided above please answer the following questions

21. Out of these provinces ,which province has the highest consumption of iodized salt

1	North central	|___|
2	North western	|___|
3	Uva	|___|
4	Don't know	|___|

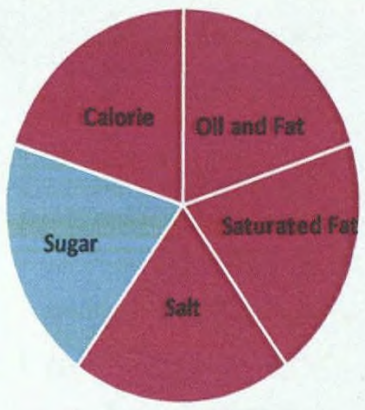
22. In Uva province, what is the percentage use of iodized salt?

1	50-60%	|___|
2	30-50%	|___|
3	<30%	|___|
4	Don't know	|___|

(K) Based on the amount of nutrient in 100g of food, colour code is assigned for the each nutrient as below.

	Nutrient
High	
moderate	
Low	

Food item 1



Food item 2

Food item 3

Based on the information provided above please answer the following questions

23	Out of these three food items, which one has low saturated fat amount?

	1 Food item 1 |___| 2 Food item 2 |___| 3 Food item 3 |___| 4 Don't know |___|
24	Out of these three food items, which one has high salt amount? 1 Food item 1 |___| 2 Food item 2 |___| 3 Food item 3 |___| 4 Don't know |___|

(L) This is a label of a milk powder packet.

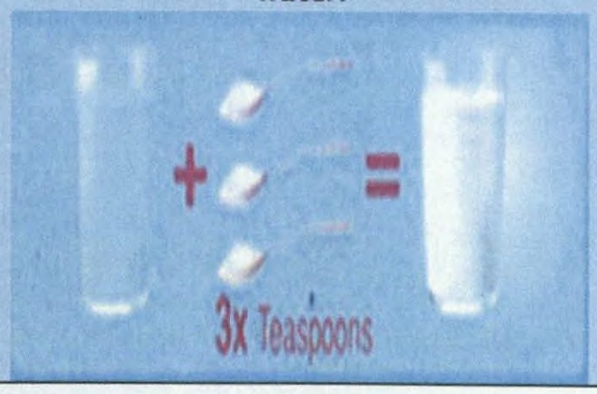
Full cream Milk powder
Enriched with Vitamin A&D

Nutrition Information

Nutrient		Per 100g powder	Per 25g serving
Energy	kcal	500	125
Protein	g	24	6
Carbohydrate	g	38	9.5
Fat	g	28	7
Calcium	mg	800	200

Preparation

To prepare 1 glass of milk
3 tablespoons (25g) of milk powder to be dissolved in 1 glass (200ml) of water.



Based on the information provided above please answer the following questions

25	If you drink two glasses of milk per day, prepared as per instructions, how much of energy will you get from milk? 1 125 kcal |___| 2 250 kcal |___| 3 500 kcal |___| 4 Don't Know |___|
26	If you have to take 400 mg calcium per day, how many glasses of milk, prepared as per instructions, do you have to take daily to obtain full requirement of calcium from this milk? 1 1 glass |___| 2 2 glasses |___| 3 3 glasses |___| 4 Don't Know |___|

27	If your diet gives you 2500 calories a day, and your diet includes 2 glasses of milk, prepared as per instructions what percentage of your daily value of calories will be from milk? 1 5% |___| 2 10% |___| 3 20% |___| 4 Don't Know |___|

(M) When food is labelled based on their nutrients, the levels of nutrients, that should be in the food, is specified by the government. Below shown is some of these levels.

Component	Claim	Condition
Energy	low	Below 40 kcal per 100 g (solids) or Below 20 kcal per 100 ml (liquids)
Fat	low	Below 3 g per 100 g (solids) Below 1.5 g per 100 ml (liquids)
	Free	Below 0.5 g per 100 g (solids) or 100 ml (liquids)
sodium	low	Below 0.12 g per 100 g

Part of a nutrient content details of a milk powder packet is shown below.

Nutrient		Per 100g powder
Energy	kcal	360
Protein	g	33
Carbohydrate	g	54
Fat	g	0.8
Calcium	mg	1340

Based on the information provided above please answer the following questions

28	Can this milk powder be considered as a low fat milk powder? 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't Know |___|
29	Can this milk powder be considered as a fat- free milk powder? 1 Yes |___| 2 No |___| 3 Can't say |___| 4 Don't Know |___|
30	Can this milk powder be considered as a low- energy milk powder? 1 Yes |___| 2 No |___|

	3 Can't say |___| 4 Don't |___| Know	

Annexure X

Validated nutrition literacy Test

ප්‍රාදේශීය ලේකම් කොට්ඨාශය		ග්‍රමනිලදාරි කොට්ඨාශය	
සමීක්ෂණ දිනය		අනුක්‍රමික අංකය	

(A) "ශ්‍රී ලංකාවේ, වයස මාස 59 - ත්6ත් අතර වයස් මට්ටමක සිටිනා දරුවන් අතරින් %29.6ක් 'විටමින් ඒ' ඌනතාවයෙන් පෙළෙන අතර, 2.7 %ක් තීව්‍ර 'විටමින් ඒ' ඌනතාවයෙන් පෙළේ ."

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

1	මාස 6ත් - 59ත් අතර වයස් මට්ටමක සිටිනා දරුවන් 100ක් අතුරින්, ආසන්න වශයෙන් කී දෙනෙකුට ප්‍රමාණවත් 'විටමින් ඒ' මට්ටමක් තිබිය හැකිද? 1 ආසන්න වශයෙන් 70 |___| 2 ආසන්න වශයෙන් 50 |___| 3 ආසන්න වශයෙන් 30 |___| 4 නොදනී |___|
2	මාස 6 -59 ත් අතර ඇති දරුවන් 100 ක් අතුරින්, ආසන්න වශයෙන් කී දෙනෙකුට තීව්‍ර 'විටමින් ඒ' ඌනතාවයක් තිබිය හැකිද? 1 ආසන්න වශයෙන් 3 |___| 2 ආසන්න වශයෙන් 30 |___| 3 ආසන්න වශයෙන් 10 |___| 4 නොදනී |___|

(B) මෙහි පහත දක්වා ඇත්තේ ශ්‍රී ලාංකික ජනතාවට සුදුසු සෞඛ්‍යමය ආහාර හුරු පුරුදු නිර්දේශ කරන පොතක පටුනයි.

පරිවිජේදය	අන්තර්ගතය
1	දිනකට තුන් වතාවක් ධාන්‍ය ආහාර ගන්න
2	එළවලු හා පලතුරු ආහාරයට ගන්න
3	මාංශ බෝග හා සත්ව ආහාර ආහාරයට ගන්න.
4	ඔබගේ ආහාරයේ තෙල් සීමා කරන්න
5	ලුණු පාවිච්චිය අවම කරන්න; අයඩීන් සහිත ලුණු භාවිත කරන්න
6	වතුර පානය වැඩි කරන්න
7	ශරීරයේ බර නියමිත ප්‍රමාණය තුළ පවත්වා ගන්න
8	සීනි, පැණි රස හා පැණි බීම භාවිතය අවම කරන්න

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.
පහත සඳහන් තොරතුරු කුමන පරිවිජේදය තුළ ඇතැයි ඔබ සිතන්නේද?

3	පොල් තෙල් වල ඇති මේද සංයුතිය 1 පරිවිජේදය 3 |___| 2 පරිවිජේදය 6 |___| 3 පරිවිජේදය 4 |___| 4 නොදනී |___|
4	බිත්තර වල ඇති පෝෂ්‍ය පදාර්ථ

	1 පරිච්ඡේදය 2 ___ 2 පරිච්ඡේදය 3 ___ 3 පරිච්ඡේදය 6 ___ 4 නොදනී ___
5	උසට සරිලන නියමිත බර ප්‍රමාණයේ, සාමාන්‍ය අගය පරාසය 1 පරිච්ඡේදය 6 ___ 2 පරිච්ඡේදය 7 ___ 3 පරිච්ඡේදය 8 ___ 4 නොදනී ___

(C)මද ඉරිහු වල ගුණාත්මය නිරණය කරන ප්‍රධාන සාධකයක් ලෙස එහි ඇති ඇප්ලටොක්සින් විෂ ද්‍රව්‍ය සලකන්න පුළුවන්.
නියම ගුණත්වයෙන් තොරව නිපදවන සහල්. මස ඉරිහු. රට කජු වාගේම. පිපිස් වැනි බෝගවලද මෙම විෂ ද්‍රව්‍ය ද්‍රව්‍ය අසංඝ වන්න පුළුවන් .
ඇප්ලටොක්සින් වෙනත් විෂ ද්‍රව්‍ය වගේ රත් කරලා විනාශ කරන්න බැරි ගින්ද .ආහාර පිසීමෙන් විනාශ නොවෙයි"

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

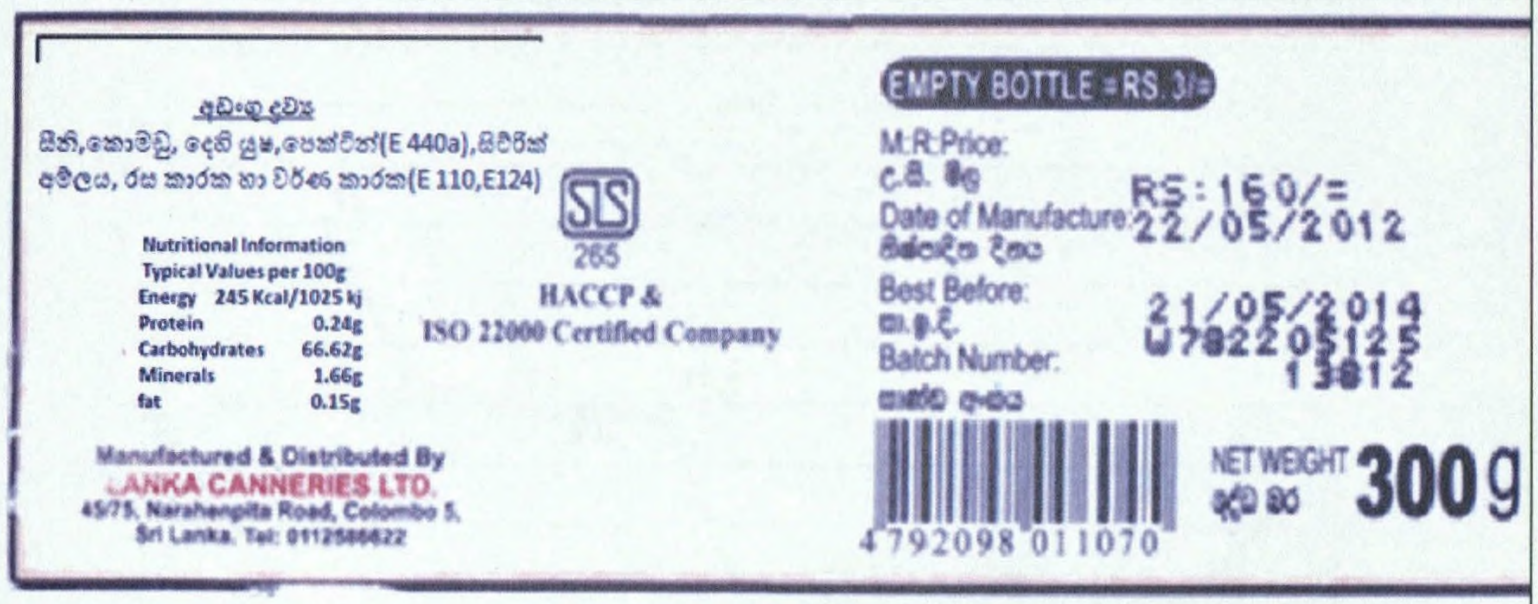
6	පිසූ ආහාර වල ඇති මිරිස් මගින් 'ඇප්ලටෝක්සින්' විෂ ශරීරයට ඇතුළු විය හැක. 1 නිවැරදියි ___ 2 වැරදියි ___ 3 හරියටම කිව නොහැක ___ 4 නොදනී ___
7	හොඳින් තම්බා ගත් බඩ ඉරිහු ආහාරයට ගැනීමෙන් පවා 'ඇප්ලටෝක්සින්' විෂ ශරීරයට ඇතුළු විය හැක. 1 නිවැරදියි ___ 2 වැරදියි ___ 3 හරියටම කිව නොහැක ___ 4 නොදනී ___

(E) "ගර්භණී සමයේ මවගේ බර සාමාන්‍යයෙන් කිලෝග්‍රෑම් 10 - 12 ක් පමණ ඉහළ යාම හොඳ උපත් බර ක් ඇති දරුවකු බිහිවීමට ඉවහල් වේ .
ශ්‍රී ලංකාවේ කාන්තාවන්ගේ ගර්භණී සමය තුල බර වැඩිවීමේ සාමාන්‍ය අගය කිලෝග්‍රෑම් ක 7.5 .වේ"

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

8	හොඳ උපත් බර ඇති දරුවන් ලැබීමට ප්‍රමාණවත් බර වැඩිවීමක් ඇත්තේ පහත කුමන මවුවරුන්ට ද? 1 ගර්භණී කාලය තුල බර වැඩිවීම **කිලෝග්‍රෑම්** ක් ඇති මවක්**12** ___ 2 ගර්භණී කාලය තුල බර වැඩිවීම **කිලෝග්‍රෑම්** ක් ඇති මවක් **7** ___ 3 ඉහත මව්වරු දෙදෙනාටම ___ 4 නොදනී ___
9	"ශ්‍රී ලංකාවේ, ගර්භණී කාන්තාවන්ගෙන්, සියයට 95කගේ පමණ ගර්භණී සමය තුල බර වැඩිවීම කිලෝග්‍රෑම් 7.5 ට අඩුය." ඉහත දත්ත අනුව මෙම කියමන, 1 නිවැරදියි ___ 2 වැරදියි ___ 3 හරියටම කිව නොහැක ___ 4 නොදනී ___

(E) ජෑම් බෝතලයක ලේබලයක කොටසක් පහත දැක්වේ.



ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

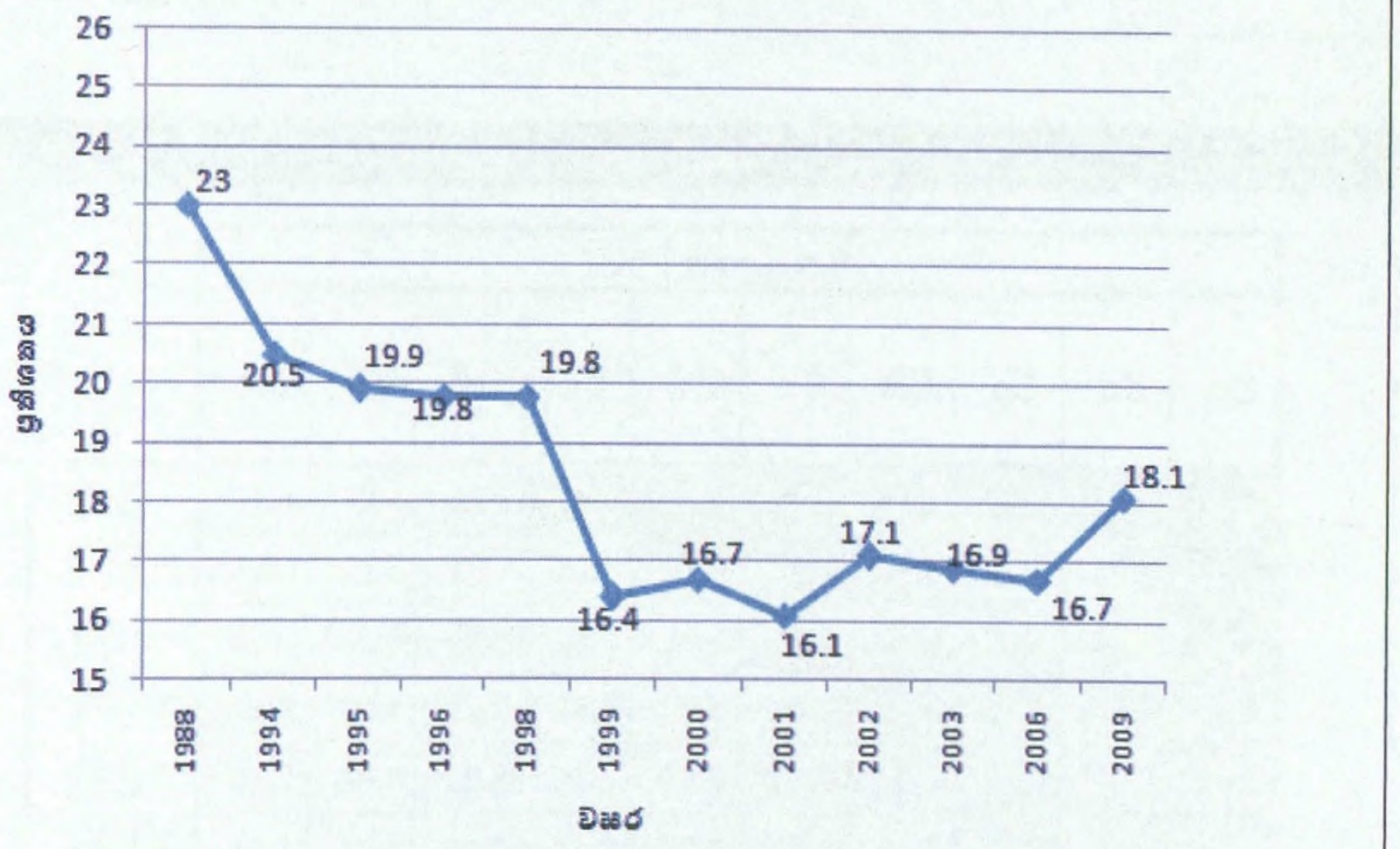
10	බෝතලයේ ඇති ජෑම් වල අඩංගු වර්ණ කාරකයක් වන්නේ මින් කුමක්ද? 1 E110 |___| 2 E120 |___| 3 E440a |___| 4 නොදනී |___|
11	මෙම ආහාරයේ කල් ඉකුත් වන දිනය කවදාද? 1 22/05/2012 |___| 2 13/08/2012 |___| 3 21/05/2014 |___| 4 නොදනී |___|

(F) "ලේ වල ඇති කොලෙස්ටෙරෝල් මිනිස් සිරුර තුලම නිපදවේ.ඒ සඳහා ශරීරයේම පවතින මේද කොටස් හෝ ආහාරයේ ඇති මේද භාවිතා වේ.
ආහාර අතුරින් කොලෙස්ටෙරෝල් ඇත්තේ සත්ව ආහාර වල පමණි.

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.
.

12	පොල් තෙල් වල කොලෙස්ටරෝල්, 1 ඇත |___| 2 නැත |___| 3 හරියටම කිව නොහැක |___| 4 නොදනී |___|
13	ශාක ආහාර පමණක් ගන්නා පුද්ගලයෙකුගේ, අධික රුධිර කොලෙස්ටරෝල් ප්‍රමාණයක් තිබිය නොහැක. මෙම කියමන, 1 වැරදියි |___| 2 නිවැරදියි |___| 3 හරියටම කිව නොහැක |___| 4 නොදනී |___|

(ඇ) ශ්‍රී ලංකාවේ අඩු උපත් බර ඇති ළදරුවන්ගේ ප්‍රවණතාව පහත දැක්වේ.



ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න

14	දී ඇති කාල සීමා අතුරින්, අඩු උපත් බර ප්‍රතිශතය අඩු වීමක් පෙන්නුම් කරන කාල සීමාව කුමක්ද? 1 1998 වසර සිට - 1999 වසර දක්වා |___| 2 2001 වසර සිට - 2002 වසර දක්වා |___| 3 2006 වසර සිට -2009 වසර දක්වා |___| 4 නොදනී |___|
15	2001 වසරේ අඩු උපත් බර ප්‍රතිශතය කොපමණද? 1 16.1 |___| 2 18.1 |___| 3 17.1 |___| 4 නොදනී |___|

(ඈ) සාමාන්‍යයෙන් ආහාරයට ගන්නා ආහාර කිපයක අඩංගු කැල්සියම් ප්‍රමාණ පහත දැක්වේ.

		අඩංගු කැල්සියම් මිලිග්‍රෑම් ගණන
කිරි	කෝප්ප 2/1	115
කතුරු මුරුංගා	කෝප්ප ½	1130
තල	මේස හැඳි 1	350
කුනිස්සන්	මේස හැඳි 3	508

ඉහත සපයා ඇති තො ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

16	‘කිරි කෝප්පයකින් ලැබෙන කැල්සියම් ප්‍රමාණය, කුනිස්සන් මේස හැඳි 3කින් ලැබෙන කැල්සියම් ප්‍රමාණයට වඩා අඩුය.’ මෙම කියමන, 1 වැරදියි |___| 2 නිවැරදියි |___| 3 හරියටම කිව නොහැක |___| 4 නොදනී |___|
17	ඔබ කතුරු මුරුංගා කෝප්ප *1/4*ක් හා කුනිස්සන් මේස හැඳි 3ක් ආහාරයට එක දිනක ආහාරයට ගත්තේ නම් කොපමණ කැල්සියම් මිලිග්‍රෑම් ප්‍රමාණයක් ශරීරයට ලැබේද? 1 1073 |___| 2 558 |___|

	3 2508	☐
	4 නොදනී	☐

(H) ශරීර ස්කන්ධ දර්ශක මැනීමේ සටහනක ආකෘතියක් පහත දැක්වේ

උස (මීටර්)	බර (කිලෝ ග්‍රෑම්)`									
	45	48	50	53	55	58	60	63	65	68
145	21.4	22.6	23.8	25	26.2	27.3	28.5	29.7	30.9	32.1
147.5	20.7	21.8	23	24.1	25.3	26.4	27.6	28.7	29.9	31
150	20	21.1	22.2	23.3	24.4	25.6	26.7	27.8	28.9	30
152.5	19.3	20.4	21.5	22.6	23.6	24.7	25.8	26.9	27.9	29
155	18.7	19.8	20.8	21.9	22.9	23.9	25	26	27.1	28.1
157.5	18.1	19.1	20.2	21.2	22.2	23.2	24.2	25.2	26.2	27.2

. ☐ අඩු බර ☐ සුදුසු බර ☐ අධි බර ☐ ස්ථූලතාවය

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

18 උස සෙන්ටි මීටර් 150ක් හා බර කිලෝග්‍රෑම් 58 ක් වන පුද්ගලයකුගේ ශරීර ස්කන්ධ දර්ශකය කීයක් විය යුතුද?

1 25.6 ☐
2 26.9 ☐
3 26.4 ☐
4 නොදනී ☐

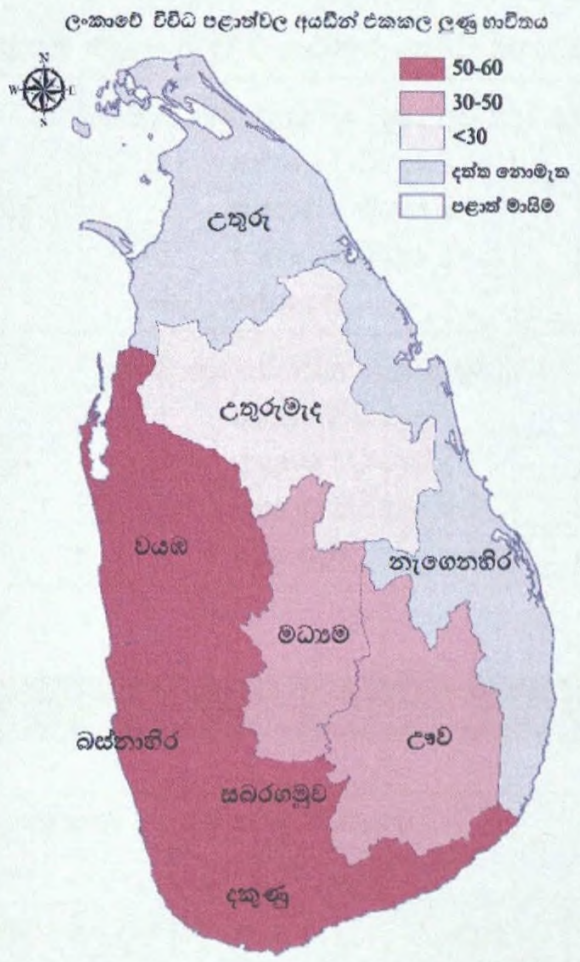
19 උස සෙන්ටි මීටර් 150ක් හා බර කිලෝග්‍රෑම් 60ක් වන එම පුද්ගලයකුගේ ශරීර ස්කන්ධ දර්ශකය පහත කුමන වර්ගයට අයිති වෙයිද?

1 සුදුසු බර ☐
2 අඩු බර ☐
3 අධි බර ☐
4 නොදනී ☐

20 "එකම බර ඇති පුද්ගලයින් දෙදෙනෙකු සැලකූ විට උසින් අඩු පුද්ගලයා ස්ථූල වීමේ හැකියාව, උසින් වැඩි පුද්ගලයාට වඩා වැඩිය." මෙම කියමන,

1 නිවැරදියි ☐
2 වැරදියි ☐
3 හරියටම කිව නොහැක ☐
4 නොදනී ☐

(J) ලංකාවේ විවිධ පළාත්වල අයඩීන් එක කල ලුණු භාවිතය පිළිබඳ සිතියමක් පහත දැක්වේ.



සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න

21. පහත පළාත් අතුරින් අයඩීන් එක් කල ලුණු භාවිතය වැඩිම කුමන පළාතේද

1	උතුරු මැද	☐
2	වයඹ	☐
3	ඌව	☐
4	නොදනී	☐

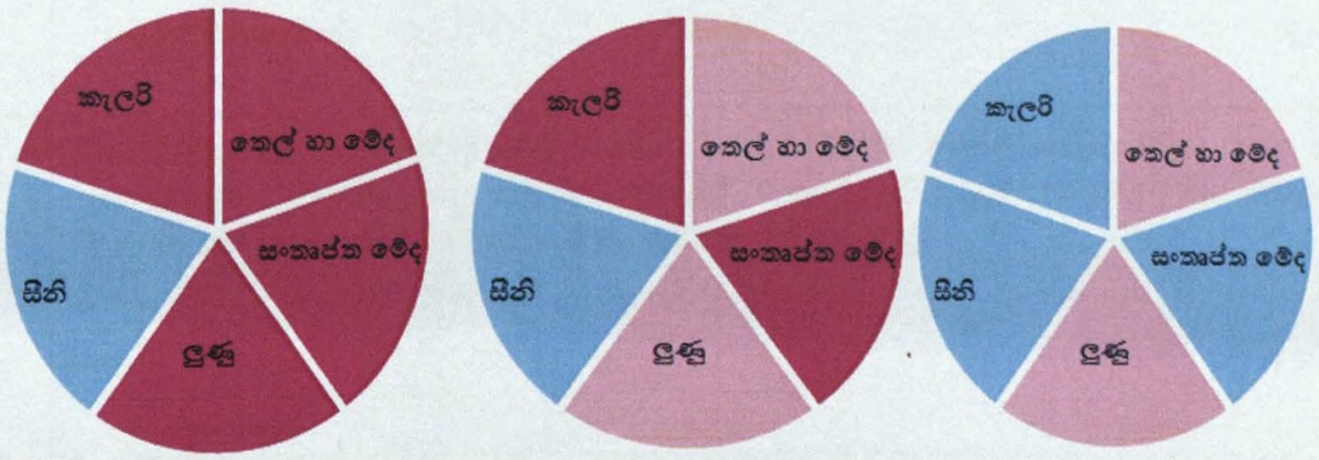
22. ඌව පළාතේ දල වශයෙන් කවර ප්‍රතිශතයක් අයඩීන් එක කල ලුණු භාවිතා කරයිද?

1	50-60%	☐
2	30-50%	☐
3	<30%	☐
4	නොදනී	☐

(K) ආහාරයේ ග්‍රෑම් මාණ අනුව එම පෝෂණ ක අඩංගු එක් එක් පෝෂණ සංඝටකයේ ප්‍ර100 සංඝටකය සඳහා රතු, නැඹිලි හෝ කොළ වර්ණය ලබා දී ඇත.

ආහාර වර්ග තුනකට එසේ ලබාදී ඇති සංකේත වර්ණ පහත දැක්වේ.

	පෝෂණ සංඝටකය
අධික	
සාමාන්‍ය	
අඩු	



	ආහාර වර්ගය 1	ආහාර වර්ගය 2	ආහාර වර්ගය 3
ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.			
23	මෙම ආහාර වර්ග තුන අතුරින් අඩු සංතෘප්ත මේද ප්‍රමාණයක් ඇත්තේ කුමන ආහාර වර්ගයේද? 1 ආහාර වර්ගය 1 ☐ 2 ආහාර වර්ගය 2 ☐ 3 ආහාර වර්ගය 3 ☐ 4 නොදනී ☐		
24	මෙම ආහාරවර්ග තුන අතුරින් අධික ලුණු ප්‍රමාණයක් ඇත්තේ කුමන ආහාර වර්ගයේද? 1 ආහාර වර්ගය 1 ☐ 2 ආහාර වර්ගය 2 ☐ 3 ආහාර වර්ගය 3 ☐ 4 නොදනී ☐		

.

(L) කිරිපිටි ලේබලයක කොටසක් පහත දැක්වේ.

පෝෂණ සංඝටක තොරතුරු			
පෝෂණ සංඝටකය		ග්‍රෑම් 100ක අන්තර්ගත ප්‍රමාණය	ග්‍රෑම් ක 25 අන්තර්ගත ප්‍රමාණය
ශක්තිය	kcal	500	125
ප්‍රෝටීන්	g	24	6
කාබෝහයිඩ්‍රේට්	g	38	9.5
මේදය	g	28	7
කැල්සියම්	mg	800	200

පාවිච්චියට උපදෙස්

කිරි වීදුරුවක් සැදීමට කිරිපිටි මෙස හැඳි වතුර (ක් 25 ග්‍රෑම්) ක් 3 200 මිලිලීටර) වීදුරුවකටක් දමා (හොඳින් කලවම් කරන්න

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

25	ඔබ දිනකට, ඉහත උපදෙස් අනුව පිළියෙළ කල කිරි වීදුරු දෙකක් පානය කරයිනම්, ඔබට දිනකට කිරි වලින් කොපමණ ශක්ති ප්‍රමාණයක් ලැබෙද? 1 කිලෝ කැලරි *125* ☐ 2 කිලෝ කැලරි *250* ☐ 3 කිලෝ කැලරි *500* ☐ 4 නොදනී ☐
26	ඔබ දිනකට කැල්සියම් මිලිග්‍රෑම් 400ක ප්‍රමාණයක් ගතයුතුනම්,එම මුළු ප්‍රමාණයම කිරි වලින් ලබා ගැනීමට ඔබ ඉහත උපදෙස් අනුව පිළියෙළ කල කිරි වීදුරු කීයක් පානය කලයුතුද? 1 වීදුරු *1* ක් ☐ 2 වීදුරු *2* ක් ☐ 3 වීදුරු *3* ක් ☐ 4 නොදනී ☐
27	ඔබගේ දිනපතා ආහාර වේල් මගින් ශක්තිය කැලරි 2500ක් ලැබේ යයි සිතන්න, එයට ඉහත උපදෙස් අනුව පිළියෙළ කල කිරි වීදුරු දෙකක් ඇතුළත් වේ. එසේ නම් කිරි වලින් ඔබගේ දිනපතා ශක්ති ප්‍රමාණයෙන් කොපමණ ප්‍රතිශතයක් ලැබෙද? 1 5% ☐ 2 10% ☐ 3 20% ☐ 4 නොදනී ☐

(M) ආහාර පෝෂණ සංඝටක මත ලේබල් කිරීමේදී ඒ සඳහා තිබිය යුතු පෝෂක මට්ටම් රජයෙන් අනුමත කොට ඇතඒවා අනුමත පෝෂක මට්ටම් කිහිපයක් පහත දැක්වේ ..

සංඝටකය	ප්‍රකාශය	තිබිය යුතු මට්ටම
ශක්තිය	අඩු	ග්‍රෑම් 100 ක කිලෝ කැලරි 40 ක්(ඝන ද්‍රව්‍ය) හෝ මිලිලීටර් 100 ක කිලෝ කැලරි 20(ද්‍රව) කට අඩු
මේද	අඩු	ග්‍රෑම් 100 ක ග්‍රෑම් 3ක් (ඝන ද්‍රව්‍ය) හෝ මිලි ලීටර 100 ක ග්‍රෑම 1.5 (ද්‍රව ද්‍රව්‍ය) කට අඩු.
	රහිත	ග්‍රෑම් 100 ක (ඝන ද්‍රව්‍ය) හෝලි ලීටර 100 ක ග්‍රෑම් 1.5 (ද්‍රව ද්‍රව්‍ය) කට අඩු.
සෝඩියම්	අඩු	ග්‍රෑම් 100 ක ග්‍රෑම් 0.12 කට (ඝන ද්‍රව්‍ය) අඩු

කිරිපිටි වර්ගයක සංයුතිය අඩංගු කොටසක් පහත දැක්වේ

පෝෂණ සංඝටක		ග්‍රෑම් මාණයක අන්තර්ගත ප්‍ර 100
ශක්තිය	කිලෝ කැලරි	360
ප්‍රෝටීන්	ග්‍රෑම්	33
කාබෝහයිඩ්‍රේට්	ග්‍රෑම්	54
මේදය	ග්‍රෑම්	0.8
කැල්සියම්	මිලි ග්‍රෑම්	1340

ඉහත සපයා ඇති තොරතුරු අනුව පහත සඳහන් ප්‍රශ්න වලට පිළිතුරු සපයන්න.

28 ඉහත කිරි පිටි වර්ගය අඩු මේද සහිත කිරි පිටි වර්ගයක් ලෙස සැලකිය හැකිද?

1 ඔව් ☐
2 නැත ☐
3 හරියටම කිව නොහැක ☐
4 නොදනී ☐

29 ඉහත කිරි පිටි වර්ගය මේද රහිත කිරි පිටි වර්ගයක් ලෙස සැලකිය හැකිද?

1	ඔව්	☐
2	නැත	☐
3	හරියටම කිව නොහැක	☐
4	නොදනී	☐

30 ඉහත කිරි පිටි වර්ගය ශක්තිය අඩු කිරි පිටි වර්ගයක් ලෙස සැලකිය හැකිද?

1	ඔව්	☐
2	නැත	☐
3	හරියටම කිව නොහැක	☐
4	නොදනී	☐

Annexure XI.a

Information Sheet For Participants - II

Study on Nutrition Literacy, its correlates and effectiveness of a skill development intervention to improve nutrition literacy among females aged 25-45 years of age in Colombo District- *cross sectional study*

I am Dr. K.Y.P.K. Weerasekara, currently attached to the Post graduate Institute of Medicine as a post graduate trainee in Community Medicine. I would like to invite you to take part in the research study titled Nutrition Literacy, its correlates among females aged 25-45 years of age in Colombo District conducted by Dr. K.Y.P.K.Weerasekara and Dr. N. Gunawardena, Senior Lecturer of the Department of Community Medicine, Faculty of Medicine, University of Colombo.

1. Purpose of the study

The purpose of this research is toassess nutrition Literacy of the females in the age group of 25-45 years of age.It is expected that this study will reveal important information on nutrition literacy of community sample of adult females and its correlates

2. **Voluntary participation**

Your participation in this study is voluntary. You are free to not participate at all or to withdraw from the study at any time despite consenting to take part earlier. If you decide not to participate or withdraw from the study you may do so at any time.

3. **Duration, procedures of the study and participant's responsibility**

The procedures to be carried out are an interviewer administered questionnaire and a self administered questionnaire, which is aimed to assess the nutrition literacy. There will be no follow up activities.

4. **Potential benefits**

Participation in this study may benefit you and your community as a whole since the findings will be provided to agencies and personnel in the respective field who are involved in further decision making and providing food and nutrition information. Further if your understanding on nutrition information is found to be inadequate you

may be selected for an intervention which would facilitate to upgrade your understanding on nutrition information.

5. **Risks, hazards and discomfort**

We ensure that there are no potential or actual risks to you by participating in this research. The only inconvenience you will have to experience is spending time in filling up the questionnaire.

6. **Reimbursements**

You will not be paid any allowances for participating in this study.

7. **Confidentiality**

Confidentiality of all the records is guaranteed and no information by which you can be identified will be released or published. These data will never be used in such a way that you could be identified in any public presentations or publications.

8. **Termination of study participation**

You may withdraw your consent to participate in this study at any time. Please notify the investigator as soon as you decide to withdraw your consent.

9. Clarification

If you need further clarifications, please feel free to contact me at,

Dr. K.Y.P.K. Weerasekara
Registrar in Community Medicine
No 108, Kadgugahawatta,
Gothatuwa,
Angoda
Tel. 0112 411028

Annex XI.a

විස්තර පත්‍රිකාව - II

කොලඹ දිස්ත්‍රික්කයේ අවුරුදු 25-45 අතර කාන්තාවන්ගේ පෝෂණ සාක්ෂරතාවය හා එහි සහ සාධක අධ්‍යයනය කිරීමේ සමීක්ෂණය -

විස්තරාත්මක අධ්‍යයනය

වෛද්‍ය කේ. වයි. පී. කේ. වීරසේකර වන මම කොළඹ වෛද්‍යය පීඨයේ ප්‍රජා වෛද්‍යය දෙපාර්තමේන්තුවට, පශ්චාත් උපාධිය සඳහා අනුබද්ධවීසිටින වෛද්‍යවරයෙක්මි. මාවීසින් වෛද්‍ය එන්. එස්. ගුණවර්ධන මහත්මියගේ අධීක්ෂණය යටතේ කොළඹ දිස්තක්කයේ අවුරුදු 25-45 අතර කාන්තාවන්ගේ පෝෂණ සාක්ෂරතාවය සෙවීම සඳහා කරනු ලබන්නාවූ මෙම සමීක්ෂණයට සහභාගීවන ලෙස ඉල්ලා සිටිමි.

1. **<u>පර්යේෂණයේඅරමුණ</u>**

මෙම සමීක්ෂණයේ අරමුණ පෝෂණ සාක්ෂරතාවය පිළිබඳව අධයයනය කිරීමයි. මෙය පිළිබඳව ශ්‍රීලංකාවේ මීට කලින් ගැඹුරට අධ්‍යයනය කර නොමැති බැවීන් මෙම අධ්‍යයනය මගින් පෝෂණ සාක්ෂරතාවය පිළිබඳ වැදගත් තොරතුරු අනාවරණය කරනු ඇතැයි බලාපොරත්තුවේ.

2. **ස්වේච්ඡා සහභාගිත්වය**

මෙම සමීක්ෂණයට ඔබගේ සහභාගිත්වය ස්වේච්ඡාවෙන්ම සිදුවිය යුතුය. මෙයට සහභාගී නොවීමට හෝ සහභාගී වීමට ගත්තීරණය වෙනස්කොට ඉන් ඉවත්වීමට ඕනෑම අවස්ථාවකදී ඔබට හැකිය. ඔබ මෙයට සහභාගී නොවීමෙන් කිසිම වරපුසාදයක් ඔබට අහිමි නොවනු ඇත.

3. **සහභගිවන්නාගේ වගකීමකට යුතුදෑ හා ගතවන කාලය**

සමීක්ෂණ සහායිකාවක මගින් කරනු ලබන සම්මුඛ සාකච්ඡාමය ප්‍රශ්නාවලියකට පිලිතුරු ලබාගැනීම සිදුවේ.

පසු විපරමක් සිදුකරනු නොලැබේ.

4. **උදාවිය හැකි වාසි**

ඉහත සමීක්ෂණය මගින් හඳුනාගන්නා ලබන කරුණු, අදාල පෝෂණ තොරතුරු සැලසුම්කිරීමේ හා බෙදාහරීමේ ආයතනවලට ලබාදෙන බැවින් එමගින් ඔබ මුළු මහත්ප්‍රජාවටම වාසි සලසෙනු ඇත.

5. **අවදානම්,** **ව්‍යාසන හා අපහසුතා**

මෙයට සහභාගිවීමේදී ඔබට කිසිදු අවදානමක්, ව්‍යාසනකාරී තත්වයක් හෝ අපහසුතාවයක් සිදුනොවනු ඇත.

6. **මූල්‍ය දායකත්වය**

ඔබට කිසිදු ගෙවීමක් සිදුකරනු නොලැබේ.

7. **රහස්‍යභාවය**

සියලුම වාර්තාවල රහසයභාවය අරක්ෂාකරන බවට සහතික වන අතර, කිසිදු ආකාරයකින් ඔබ ගැන සොයාගත හැකි විස්තර තවකෙනෙකුට ලබාදීමක් හෝ ප්‍රසිද්ධ කිරීමක් නොවනු ඇත.

8. සමීක්ෂණයෙන් ඉවත්වීම

අවශ්‍ය ඕනෑම අවස්ථාවකදී මෙම සමීක්ෂණයෙන් ඉවත්විය හැකිය. ඔබගේ අනුමැතිය ඉවත්කරගැනීමට අවශ්‍යවූ විට ප්‍රධාන පරීක්ෂකට ඒ බව දන්වන්න

9. වැඩි විස්තර ලබාගැනීමට

සමීක්ෂණයේ ක්‍රියාකාරකම් ගැන විස්තර හෝ වෙනත් කරුණක් ගැන විමසීමට අවශ්‍යනම් මා අමතන්න.

වෛද්‍ය කේ.වයි.පී.කේ.වීරසේකර
නො 108, කජුගහවත්ත ගොතටුව,
අංගොඩ
දුරකථන අංක: 0112-411028

Annexure XI.b

Consent Form-Descriptive study

To be completed:

a. By the participant

The participant should complete the whole of this sheet herself

1 Have you read the information sheet? Yes/No

(Please keep a copy for yourself)

2 Have you had an opportunity to discuss this study and ask any questions? Yes/No

3 Have you had satisfactory answers to all your questions? Yes/No

4 Have you received enough information about the study? Yes/No

5 Who explained the study to you?

.....

6 Do you understand that you are free to withdraw from the study at any time, without having to give a reason Yes/No

7 Have you had sufficient time to come to your decision? Yes/No

8 Do you agree to take part in this study? Yes/No

Participant's Signature.....Date.....

Name (BLOCK CAPITALS) .....

b. By the investigator

I have explained the study to the above volunteer and she has indicated her willingnessto take part.

Signature of investigator .....Date .....

Name (BLOCK CAPITALS).....

Annexure XI.b

කැමැත්ත ප්‍රකාශ කිරීමේ පත්‍රය II- විස්තරාත්මක අධ්‍යයනය

a) සහභාගිවන්නා විසින් පිරවිය යුතුය

1	ඔබ විස්තර පත්‍රිකාව සම්පූර්ණයෙන් කියවුවාද? (ඔබ ළඟ පිටපතක් තබා ගන්න)	ඔව්/නැත
2	ඔබට මෙම මැදිහත්වීමේ පර්යේෂණය සම්බන්ධ සාකච්ඡා කිරීමට හා ප්‍රශ්න ඇසීමට අවස්ථාවක් ලැබුනේද?	ඔව්/නැත
3	ඔබගේ සියලුම ගැටළු වලට සෑහීමට පත්විය හැකි පිලිතුරු ලැබුනේද?	ඔව්/නැත
4	ඔබට මෙම සමීක්ෂණය පිලිබඳව අවශ්‍ය පමණ තොරතුරු ලැබුනේද?	ඔව්/නැත
5	ඔබට මෙම සමීක්ෂණය පිලිබඳව පැහැදිලි කලේ කවුරුන්ද?	
6	ඔබට කරුණු දැන්වීමකින් තොරව ඕනෑම අවස්ථාවක මෙම පර්යේෂණයෙන් ඉවත්වීමට හැකි බව ඔබ තේරුම් ගත්තේද?	ඔව්/නැත
7	ඔබට තීරණයක් ගැනීමට ප්‍රමාණවත් කාලයක් ලැබුනේද?	ඔව්/නැත
8	ඔබ මෙම පර්යේෂණයටසහභාගි වීමට එකඟ වන්නේද?	ඔව්/නැත

සහභාගිවන්නා ගේ අත්සන ..... දිනය .....

නම (පැහැදිලි අකුරෙන්) .....

b) පරීක්ෂකවරයා විසින් පිරවිය යුතුය

මා විසින් මෙමෙ පර්යේෂනය පිළිබඳව විස්තර කරන ලදී අනතුරුව ඇය විසින් පර්යේෂණයට කැමත්ත පල කරන ලදී.

පරීක්ෂකවරයාගේ අත්සන ..... දිනය .....

නම (පැහැදිලි අකුරෙන්) .....

Annexure XII.a

Questionnaire to assess the socio-demographic information and correlates of nutrition literacy

Section A

DS Division		GN division	
Index No.			
Date of interview		Name of the interviewer	

Instructions to interviewer.

- Please Read out the following to the respondent.

  "Thank you for consenting to participate in this study. The information you provide is very important and try to answer as sincerely as accurately as possible.

  What you tell is completely confidential and only the researchers will have access to the forms. If you do not understand the questions, please tell me. If you have anything to ask from me you can answer them now."

- Mark the responses in the relevant box by cross (x) or write in the space given.
- Where more than one option is given, please indicate that to the respondent.
- Obtain responses to all the questions.

1. Demographic and socio-economic information of the participant	
	Read out the following to the respondent "I would like to ask few questions on personal and socio-demographic information"
1	Age in years (as at last birthday): |___||___||___|
2	Ethnicity 1 Sinhalese |___| 2 Tamil |___| 3 Muslim |___| 4 Other |___|
3	Religion 1 Buddhism |___| 2 Hindu |___| 3 Roman Catholic |___| 4 Cristian |___| 5 Islam |___| 6 Other |___|
4	Your highest educational achievement 1 No schooling |___| 2 Up to Grade 5 |___| 3 Grade 6-9 4 Up to G.C.E (O/L) |___| 5 Passed G.C.E. (O/L) |___| 6 Passed G.C.E. (A/L) |___| 6 University education and above |___|
5	Are you currently doing a job or engaged in any part-time or fulltime income generating activity? 1 Yes |___| 2 No |___| If no go to question 8
6	If yes, what is the occupation or the income generating activity? ..... *(Ask the respondent for a description of the occupation or the income generating activity and write briefly.* *Please make sure to include private &public sector employment, daily paid jobs, self-employment, small scale businesses etc.)*
7	Your marital status at present 1 Currently in marriage |___| 2 Unmarried |___| 3 Separated |___| 4 Widowed |___| 5 Divorced |___| If unmarried go to question 14
8	Do you have children? 1 Yes |___| 2 No |___| If No go to question 11

9	No of children 1 One child |___| 2 Two children |___| 3 Three children |___| 4 Four children |___| 5 Five or more |___|
10	Ages of children (in years)..... *(Indicate the ages in the order from eldest to youngest.* Children aged 5 years or over 5 years old indicate the number of years and for the children less than 5 years indicate the completed years and months) 1 1st child |___||___|/|___||___| 2 2nd child |___||___|/|___||___| 3 3rd child |___||___|/|___||___| 4 4th child |___||___|/|___||___| 5 5th child |___||___|/|___||___|
11	Are you currently pregnant? 1 Yes |___| 2 No |___| If answer is no, go to question 13
12	If yes, what is the time period in weeks after cessation of menses up to now ? ||___||___|
13	Are you currently breast feeding a child? 1 Yes |___| 2 No |___|

2. Socio-economic status of the household	
	Read out the following to the respondent "I would like to ask few questions on situation of the household"
14	What is the main source of drinking water for your household? 1 Tap/piped water in residence |___| 2 Outside tap(piped water)with household |___| 3 Public tap |___| 4 Well water, with household |___| 5 Outside, public well |___| 6 Spring water |___| 7 River/stream/pond/lake/dam |___| 8 Tanker/truck/water vendor |___| 9 Other (specify)..... |___|
15	What kind of toilet facility does your household have? 1 Own flush toilet |___| 2 Shared flush toilet |___| 3 Ventilated improved pit latrine |___| 4 Traditional pit toilet/latrine |___| 5 River/canal |___| 6 No facility/bush/field |___| 7 Other (specify)..... |___|
16	What are the main materials used in the roof?

	(Record observation) 1 Roof from natural materials |___| 2 Rudimentary roof(plastic/carton) |___| 3 Asbestos/sheet |___| 4 Tiled or concrete roof |___| 5 Other (specify)..... |___|
17	Does your household have? Yes No 1 Electricity |___| |___| 2 A radio |___| |___| 3 A television |___| |___| 4 A telephone |___| |___| 5 A refrigerator |___| |___|
18	Does any member of your household own? Yes No 1 A bicycle |___| |___| 2 A motorcycle |___| |___| 3 A car |___| |___| 4 Van |___| |___| 1 Lorry |___| |___| 2 Bus |___| |___| 3 Tractor |___| |___| 4 Three wheeler |___| |___| Other specify....
19	What is the monthly household income of your family? **Read out the following to the respondent** *"Please tell me the average income of your household.* *It means the money you get for a month one or more different sources such as your salary from the job/, interest of deposits/loans given to others, vehicles/buildings you have rented to others, business shares, income from lands etc. This includes the overall earning from all members of the household.* *When you give us the amount, add all these income sources and estimate an average amount for a month."* Monthly household income: Rs. |___||___||___|,|___||___||___|

3. Exposure to a nutrition education or special training of the participant	
	Read out the following to the respondent ***"I would like to ask few questions on exposure to nutrition education or a special training in a field related to nutrition by you"***
20	**Have you done following subjects for the ordinary level examination?** **Mark all relevant cage with a "X"?** **Yes No** **1 Health |___| |___|**

	2 Nutrition	|___|	|___|
	3 Science	|___|	|___|
	4 Home science	|___|	|___|
21	Have you done following subjects for the Advanced level examination? Mark all relevant cage with a "X"?		
		Yes	No
	1 Health	|___|	|___|
	2 Nutrition	|___|	|___|
	3 Science	|___|	|___|
	4 Home science	|___|	|___|
	5 Agriculture/	|___|	|___|
22	Have you done a degree or diploma on following subjects? Mark all relevant cage with a "X"		
		Yes	No
	1 Health	|___|	|___|
	2 Nutrition	|___|	|___|
	3 Science	|___|	|___|
	4 Home science	|___|	|___|
	5 Agriculture/ home gardening	|___|	|___|
	6 animal husbandry/inland fisheries	|___|	|___|
	7 Food preparation/food handling	|___|	|___|
23	Within last six months have you ever got an opportunity to participate in a nutrition or food/diet related programme conducted by any of the following organizations??		
		Yes	No
	1 a clinic for pregnant mothers	|___|	|___|
	2 a child clinic	|___|	|___|
	3 at a preschool/school of the child	|___|	|___|
	4 Programmes conducted by local societies	|___|	|___|
	5 At a health camps	|___|	|___|
	6 Hospital clinic/ out patient Dept of a hospital	|___|	|___|
	7 Other (specify).....	|___|	|___|

5. Presence of non-communicable diseases that require dietary modification in the participant or a family member

	Read out the following to the respondent *'I would like to ask few questions on Presence of non-communicable diseases and their risk factors in you or your family members'*
24	Has you ever been told that you have high blood cholesterol level? **Mark "X" in front.** *Mark "X" in front. There can be more than one response.* 1 yes |___| 2 No |___|
25	Have you ever been told that you suffer from any of the following diseases Mark "X" in front. There can be more than one response. 1 Diabetes |___|

	2 Hypertension |___| 3 Malignant disease |___| 4 Ischaemic heart disease |___| 5 Chronic renal disease |___| 6 Other illness (specify)..... |___|
26	**During past six months**, in a medical encounter with regard to any of above disease, did you receive any information on nutrition or diet control? Mark "X" in front.. 1 Yes |___| 2 No |___| 3 have had no medical encounters |___|
27	Has any of your parents or siblings are/were diagnosed with any of the following risk factors for **non-communicable diseases?** **Mark "X" in front. There can be more than one response.** 1 Hypercholesterolemia |___| 2 have been told to reduce weight |___|
28	Has any of your parents or siblings are/were diagnosed with any of the following **non communicable diseases**? 1 Diabetes |___| 2 Hypertension |___| 3 Malignant disease |___| 4 Ischaemic heart disease |___| 5 Chronic renal disease |___| 6 Other illness (specify)..... |___|

6. Responsibility and involvement in household food related issues/ affairs of the participant	
	Read out the following to the respondent *'I would like to ask few questions on your responsibility and involvement in household food related issues/ affairs'*
29	*During a typical week, how many days would you be deciding the food items to be purchased or cooked for your family?* |___| *days per week*
30	*During a typical week, how many days would you cook for you and your family?* |___| *days per week*
31	During a typical week, how many days would you consume at least one full main meal that is prepared in a take away/instant food outlet/restaurant/canteen*?* |___| *days per week*
32	During a typical week, on how many days would you consume all 3 main meals prepared in a take away/instant food outlet/restaurant/canteen*?* |___| *days per week*

7. Contact with health care personnel by the participant	
	Read out the following to the respondent *"I would like to ask few questions on contact with health care personnel during past six months"*
33	During past six months, have you had at least one contact with any of the following

	medical personnel? Yes No 1 Medical officer |___| |___| 2 Nutritionist |___| |___| 3 Public Health Midwife |___| |___| 4 Other (specify)..... |___| |___| *If "no" for all in question 37, go to question 40*
34	In any of these encounter with any of the above personnel,, were you given advice /instructions on nutrition / food/diet related issues 1 Yes |___| 2 No |___|
35	During past six months, were you subjected to any of the following anthropometric measurement in the any of the above encounters? Yes No 1 weight |___| |___| 2 height |___| |___| 3 Waist circumference |___| |___|
36	Possession of a health insurance as a correlate of nutrition literacy **Read out the following to the respondent** *"I would like to ask few questions on Possession of a health insurance and its utilization"* Do you possess a health insurance policy / are you entitled for health insurance scheme? 1 Yes |___| 2 No |___| If "no" go to question 42.
37	Did you ever utilize above health insurance scheme to Yes No 1 Obtain services of a nutirtionist |___| |___| 2 Obtain services of a medical officer/ consultant specifically to get nutrition/ diet advice |___| |___| 3 Screen yourself for any chronic disease |___| |___|

8. Access and usage of health communication channels	
	Read out the following to the respondent *'I would like to ask few questions on your access and usage of health communication channels"*
38	Did you have access to any of the following Yes No 1 Television |___| |___| 2 Radio |___| |___| 3 Newspaper/magazines |___| |___| 4 Internet |___| |___| If 'no' to all, go to question 48.
39	During the past six months, which of the following mass media were used by you to obtain general information (e.g. news, weather condition etc.)? Yes No 1 Television |___| |___| 2 Radio |___| |___| 3 Newspaper/magazines |___| |___|

	4 Internet |___| |___| *If 'no' to all, go to question 48.*
40	During the past six months, Did you obtain nutrition/food/diet related information through any mass media? 1 Yes |___| 2 No |___| If "no" go to question 48.
41	During the past six months, What were the mass media that gave you nutrition diet /food related information? (Mark all relevant cages with a " √ ") Yes No 1 Television |___| |___| 2 Radio |___| |___| 3 Newspaper/magazines |___| |___| 4 Internet |___| |___|
42	What is your opinion on the effective mass media to receive nutrition/diet/food related information for you? (Mark all relevant cages with a "X") 1 Discussions with experts IN TV |___| |___| 2 Radio discussions with experts |___| |___| 3 TV advertisements |___| |___| 4 newspaper advertisements |___| |___| 5 documentary films |___| |___| 6 written reports/articles |___| |___| 7 Information in the internet |___| |___|

9. Language ability

	Read out the following to the respondent "I would like to ask few questions on .your Language abilities"
43	What are the languages that you can speak? *(Mark "X" in front. There can be more than one response.)* Yes No 1 Sinhala |___| |___| 2 English |___| |___| 3 Tamil |___| |___|
44	What are the languages that you can read and write? (Mark "X" in front. There can be more than one response.) Yes No 1 Sinhala |___| |___| 2 English |___| |___| 3 Tamil |___| |___|
45	During past six months, did you come across at least one incident in which you could not read/understand nutrition /diet/food related information in print material (book, leaflet, newspaper article) which you thought was very important to you as it was written in a language that you can't to read? 1 Yes |___| 2 No |___|
46	During past six months, did you come across at least one incident in which you could not understand nutrition /diet related discussion in television/radio, which you thought was very important to you, as it was discussed in a language that you can't understand? 1 Yes |___|

	2 No |___|
47	During past six months, did you come across at least one incident in which you could not decide on a food item, as the nutrition label was written in a language that you can't to read? 1 Yes |___| 2 No |___|

10. Adherence to health promoting behaviours

Read out the following to the respondent
"I would like to ask few questions on your adherence **to health promoting behaviors. Please tell me a response out of** Always, Most of the time, Sometimes, or Never to each question I ask, considering your behavior during last six months."
Please allocate the score for each item as below;
4 = Always,
3 = Most of the time,
2 = Sometimes,
1 = Never.

48

1	I limit the amount of fat in my diet	
2	I try to avoid foods with a high salt content	
3	I am concerned about how much sugar I eat.	
4	I make a special effort to get enough fiber in my diet.	
5	I try to eat fresh fruits and vegetables daily	
6	I always use a lot of low calorie or calorie reduced products.	
7	I try to select foods that contain or fortified with vitamins and minerals	
8	I am careful about what I eat in order to keep my weight under control.	
9	I try to avoid foods that have additives in them	
10	I am concerned about getting enough calcium in my diet.	
11	I watch and listen for the latest information about health issues	
12	I always read the nutrition labels on packaged foods for nutritional content	

10. Nutrition knowledge

	Read out the following to the respondent *"I would like to ask few questions on your knowledge on food and nutrition .Please listen carefully to the question and then I will read the tentative answers to the questions. Out of these answers you can select only one answer. If the question or answers are not clear to you, Please ask me. Don't guess the answers. If you don't know the answer select the don't know option."*
49	In cooking, When should you add iodized-salt? 1 While cooking |___| 2 As soon as cooking is over |___| 3 Once food is cold |___| 4 Don't know |___|
50	What is the advantage of adding lime to dark green leafy vegetables? 1 Increase iron content |___| 2 increase calcium content |___| 3 Increase iron absorption |___| 4 Don't Know |___|

51	How long can you keep cooked vegetables in room temperature? 1 For more than one day |___| 2 Half a day |___| 3 About 4 hours |___| 4 Don't know |___|
52	A person with BMI value of 27 Kg/m^2 can be considered as? 1 Underweight |___| 2 Normal weight |___| 3 Overweight |___| 4 Don't know |___|
53	What can be the main effect vitamin A on body out of these? 1 Maintain good eye sight |___| 2 Helps teeth and bone growth |___| 3 helps blood clotting |___| 4 Don't know |___|
54	Of the following types of oils, which one is the most suitable for deep frying? 1 Coconut oil |___| 2 Sunflower oil |___| 3 Soya oil |___| 4 Don't know |___|
55	What is the component of food mostly found in fish, eggs and meat? 1 Calcium |___| 2 Protein |___| 3 carbohydrates |___| 4 Don't know |___|
56	How much salt is needed for a person per day? 1 5g per day /1 teaspoon |___| 2 10g per day/2 teaspoons |___| 3 Any amount |___| 4 Don't know |___|
	How much water should you drink a day? 1 1 to 3 glasses |___| 2 4 to 5 glasses |___| 3 7 to 8 glasses |___| 4 Don't know |___|
58	Which of the following food is fortified with iodine in Sri Lanka? 1 Bread |___| 2 Table salt |___| 3 Powdered milk |___| 4 Don't know |___|
59	How many fruits and vegetables is recommended to be eaten by a healthy person per day? 1 There is no need to eat fruits and vegetables daily |___| 2 2-3 fruits and vegetables a day |___| 3 5 fruits and vegetables everyday |___| 4 Don't know |___|
60	What is the period of a life of a woman which would require the highest daily energy requirement? 1 Pregnancy |___| 2 Adolescent |___| 3 Lactation |___| 4 Don't know |___|

61	From which group of foods should most of your food come? 1 Bread, rice |___| 2 Bananas, carrots |___| 3 Chicken, fish |___| 4 Don't know |___|
62	Out of these which item should not be added to the food of infants below one year? 1 oil |___| 2 salt |___| 3 eggs |___| 4 Don't know |___|
63	Out of these food items which one is safe for consumption? 1 Canned food with bloated lid |___| 2 Sprouting and green potatoes |___| 3 Once opened sterilized milk kept in refrigerator |___| 4 Don't know |___|

Section C
Assessment of anthropometric measurements

Read out the following to the respondent

'We have now come to the final part of the interview .Let us now record your height weight. I would be taking two readings of the same measurement to prevent any errors'

Before u proceed,

- *Make sure the subject is comfortable and dressed appropriately as per the interviewer guide. If not mention in the comments section.*
- *Ensure the manual of operation is strictly followed)*

Anthropometric measure	First measurement	Second measurement	Not taken(reason)
Weight (Kg)			
Height (Cm)			

Comments:

_____

_____

_____

_____

Thank you for your participation

Annexure XIII

Section C
Assessment of anthropometric measurements

Read out the following to the respondent

'We have now come to the final part of the interview .Let us now record your height weight.

I would be taking two readings of the same measurement to prevent any errors'

Before u proceed,

- Make sure the subject is comfortable and dressed appropriately as per the interviewer guide. If not mention in the comments section.
- Ensure the manual of operation is strictly followed)

Anthropometric measure	First measurement	Second measurement	Not taken(reason)
Weight (kg)			
Height (cm)			

Comments:

_____

_____

_____

Thank you for your participation

Annexure XIIb

පෝෂණ සාක්ෂරතාවයේ සහ සාධක සහ සමාජීය-ජනගහන තත්වය

ඇගයීමේ ප්‍රශ්න මාලාව

අ කොටස

ප්‍රාදේශිය ලේකම් වසම		ග්‍රාම නිලධාරි වසම	
අනුක්‍රමික අංකය:			
දත්ත එකතු කිරීමේ දිනය		සම්මුඛ පරීක්ෂකගේ නම	

සම්මුඛ පරීක්ෂක සඳහා උපදෙස්

- *පිළිතුරු සපයන්නාට මෙය කියවන්න.*

  ඔබ ලබාදෙන .මෙම සමීක්ෂණයට සහභාගී වීමට එකඟ වීම පිළිබඳව ස්තුතිවන්ත වෙමි" තොරතුරු තොරතුරු ඉතාමත් වැදගත් වන බැවින් හැකි තරම් දුරට නිවැරදි හා සත්‍ය .ලබා දෙන්න

  ඔබ සපයන තොරතුරු වල රහස්‍යභාවය ආරක්ෂා කරනු ලබන අතර මෙම තොරතුරු , පරිහරණ ය කරනු ලබන්නේ සමීක්ෂකයන් විසින් පමණිශ්නයක් ඔබට කිසියම් ප්‍ර . ඔබට සමීක්ෂණය පිළිබඳව . කරුණාකර එය මට පවසන්න ,තේරුම ගත නොහැකිනම් ".කිසියම් දෙයක් තවදුරටත් දැනගැනීමට ඇත්නම් එය දැන් ඇසීමට හැකිය

- *පිළිතුරු සපයන්නා විසින් දෙනු ලබන පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.*
- *එක ප්‍රශ්නයකට එක පිළිතුරකට වඩා තොර ගතහැකි ආවස්ථා වලදී එය පිළිතුරු සපයන්නට දැනුම දෙන්න.*
- *සියලු ප්‍රශන සඳහා පිළිතුරු ලබා ගන්න*

ආ කොටස

1. පෞද්ගලික හා සමාජීය-ජනගහන තොරතුරු	
පිළිතුරු සපයන්නාට මෙය කියවන්න *"ඔබ වෙතින් පෞද්ගලික හා සාමාජීය-ජනගහන තොරතුරු දැන ගැනීමට ප්‍රශ්න කීපයක් ඇසීමට කැමැත්තෙමි"*	
1	වයස (අවුරුදු පසුගිය උපන් දිනට): |___|___|___|
2	ජාතිය 1 සිංහල |___| 2 දෙමල |___| 3 මුස්ලිම් |___| 4 වෙනත් |___|
3	ආගම 1 බුද්ධාගම |___| 2 හින්දු |___| රොමානු කතෝලික |___| 4 ක්‍රිස්තියානි |___| 5 ඉස්ලාම් |___| 6 වෙනත් |___|

4	ඔබ ලබා ඇති උසස්ම අධ්‍යාපන මට්ටම 1 පාසැල් නොගිය |___| 2 පහ ශ්‍රේණිය දක්වා |___| 3 6-9 ශ්‍රේණිය දක්වා |___| 4 අ.පො.ස(සා.පෙලදක්වා) |___| 5 අ.පො.ස(සා.පෙල සමත්) |___| 6 අ.පො.ස(උ.පෙල සමත්) |___| 6 විශ්ව විදයාල හා ඉහල |___|
5	ඔබ දනට ආදායම් ඉපයීමේ මාර්ගයක නිරතවේද? 1 ඔව් |___| 2 නැත |___| නැත නම් ප්‍රශ්න අංක 7 ට යන්න.
6	ඔබගේ රැකියාව කුමක්ද? ..... *(සහභාගි වන්නාගේ රැකියාව අසා කෙටියෙන් විස්තර කරන්න.කරුණාකර රාජ්‍ය, පෞද්ගලික අංශයේ රැකියා,දිනපතා වැටුප් ලැබෙන රැකියා,ස්වයං රැකියා ආදී සියල්ල ඇතුලු කරන්න.)*
7	වත්මන් විවාහක අවිවාහක බව 1 දැනට විවාහක |___| 2 අවිවාහක |___| 3 වෙන්වූ |___| 4 වැන්දඹු |___| 5 දික්කසාද |___| අවිවාහක නම් ප්‍රශ්න අංක 14 ට යන්න.
8	ඔබට දරුවන් සිටීද? 1 ඔව් |___| 2 නැත |___| නැත නම් පුශ්න අංක 11 ට යන්න.
9	දරුවන් ගණන 1 1 |___| 2 2 |___| 3 3 |___| 4 4 |___| 5 5+ |___|
10	ඔවුන්ගේ වයස (අවුරුදු) (දරුන්ගේ වයස, වයස වැඩි සිට අඩු පිලි වෙලින් සටහන් කරන්න. වයස අවුරුදු පහ හෝ පහට වැඩි දරුන්ගේ වයස අවුරුදුවලින්ද, වයස අවුරුදු පහට අඩු දරුන්ගේ වයස සම්පූර්ණකල අවුරුදු සහ මාසවලින්ද සඳහන් කරන්න) 1 1 දරුව |___||___|/|___||___| 2 2 දරුව |___||___|/|___||___| 3 3 දරුව |___||___|/|___||___| 4 4 දරුව |___||___|/|___||___| 5 5 දරුව |___||___|/|___||___|
11	ඔබ දැනට දරුවෙකු බලාපොරොත්තුවෙන් සිටීද? 1 ඔව් |___| 2 නැත |___| නැත නම් පුශ්න අංක 13 ට යන්න
12	ඔව් නම් ගර්භයට සති කීයද: |___||___|
13	ඔබ දනට මව් කිරි දෙන මවක්ද? 1 ඔව් |___|

	2 නැත |___|

2. නිවසේ සමාජ ආර්ථික පසුබිම(ප්‍රශ්න 15-23)

පිළිතුරු සපයන්නාට මෙය කියවන්න
"ඔබ වෙතින් ගෘහස්ථ සමාජ ආර්ථික පසුබිම පිලිබඳව තොරතුරු දැන ගැනීමට කැමැත්තෙමි"

14	ඔබ නිවසේ පානීය ජලය ලබාගන්නේ කෙසේද? 1 නිවසේ පිහිටි ජල නල මඟින් |___| 2 පිටත පිහිටි පයිප්ප ජලය |___| 3 පොදු ජල නල |___| 4 නිවසේ පිහිටි ළිඳ |___| 5 පොදු ළිඳ |___| 6 උල්පත් ජලය |___| 7 ගඟ /ඇල/ පොකුණු |___| 8 ටැංකි / ජංගම ටැංකි /ජල විකුණුම්කරු |___| 9 වෙනත් (පැහැදිලි කරන්න)..... |___|
15	ඔබ නිවසේ වැසිකිලිය පහත කුමන ආකාරයකද? 1 තමාගේ කොමෝඩ් වැසිකිලිය |___| 2 පොදු කොමෝඩ් වැසිකිලිය |___| 3 ජල මුද්‍රිත වල වැසිකිලිය, |___| 4 සාම්ප්‍රදායික වල වැසිකිලිය |___| 5 ගඟ /ඇල |___| 6 පහසුකම් නොමැත/පඳුර |___| 7 වෙනත් (පැහැදිලි කරන්න)..... |___|
16	ඔබ නිවසේ වහලය සෙවිලි කිරීමට යොදා ඇති ප්‍රධාන ද්‍රව්‍යය කුමක්ද? (නිරීක්ෂණ සටහන් කරන්න) 1 ස්වාභාවික ද්‍රවය වලින් කල වහල |___| 2 ප්‍රාථමික වහළ-ප්ලාස්ටික් |___| 3 ඇස්බැස්ටෝස් තහඩු |___| 4 උළු කොන්ක්‍රීට් වහළ |___| 5 වෙනත්..... |___|
17	ඔබ නිවසේ පහත සඳහන් දෑ තිබේද? ඔව් නැත 1 විදුලි බල සැපයුම |___| |___| 2 ගුවන් විදුලිය |___| |___| රූපවාහිනිය |___| |___| 4 දුරකථනය |___| |___| 5 ශීතකරණය |___| |___|
18	ඔබ නිවසේ සාමාජිකයෙකුට පහත වාහන කිසිවක් අයිතිවේද? Yes No 1 බයිසිකලය |___| |___| 2 මොටර් සයිකලය |___| |___| 3 කාරය |___| |___| 4 වෑන් රිය |___| |___| 5 ලොරිය |___| |___| 6 බසය |___| |___| 7 ට්‍රැක්ටරය |___| |___| 8 ත්‍රී රෝදය |___| |___| 9 අනෙකුත් වාහන |___| |___|
19	ඔබගේ / ඔබ පවුලේ මාසික ආදායම?

	පිළිතුරු සපයන්නාට මෙය කියවන්න *"කරුණාකර ඔබගේ සාමාන්‍ය ගෘහස්ථ අදායම මාසිකව සඳහන් කරන්න.* *ඒ සඳහා මාසිකව ඔබවෙත ලැබෙන සියළු මුදල් එක්විය යුතුය. උදාහරණයක් ලෙස රැකියාවෙන් ලැබෙන වැටුප, තැම්පතු වලින් සහ අන් අය වෙත ලබාදුන් ණය වලින් ලැබෙන පොළිය, කුලියට දෙනලද නිවාස, වාහන අදායම, කොටස් ආයෝජනය අදායම්, ඉඩකඩම් වලින් ලැබෙන අදායම්, යනාදී වශයෙන්...* *ඉහත සියළු අදායම් එකතු කොට, සාමාන්‍ය මාසික ගෘහස්ථ දායම ලබාදෙන්න.* *සාමාන්‍ය ගෘහස්ථ අදායම මාසිකව: රුපියල්. |___||___||___|,|___||___||___|*

3. පෝෂණය හා සම්බන්ධ අධ්‍යාපනය හා විශේෂපුහුණුවීමක් ලබා තිබීම

	පිළිතුරු සපයන්නාට මෙය කියවන්න *"ඔබ පෝෂණය හා සම්බන්ධ අධ්‍යාපනය හා විශේෂපුහුණුවීමක් ලබා තිබීම පිළිබඳව තොරතුරු දැන ගැනීමට කැමැත්තෙමි"*
20	ඔබ අධ්‍යයන පොදු සහතිකසහතික පත්‍ර සාමාන්‍ය පෙළ සඳහා පහත විෂයන් අධ්‍යයනය කර තිබේද? ඔව් නැත 1 සෞඛ්‍යය |___| |___| 2 පෝෂණය |___| |___| 3 විද්‍යාව |___| |___| 4 ගෘහ විද්‍යාව |___| |___|
21	ඔබ අධ්‍යයන පොදු සහතිකසහතික පත්‍ර උසස්පෙළ සඳහා පහත විෂයන් අධ්‍යයනය කර තිබේද? ඔව් නැත 1 සෞඛ්‍යය |___| |___| 2 පෝෂණය |___| |___| 3 විද්‍යාව |___| |___| 4 ගෘහ විද්‍යාව |___| |___| 5 කෘෂි කර්මය |___| |___| /
22	ඔබ පහත විෂයන්වලට ඩිප්ලෝම හෝ උපාධියක් ලබා තිබේද? | | | ඔව් | නැත | |---|---|---|---| | 1 | සෞඛ්‍යය | |___| | |___| | | 2 | පෝෂණය | |___| | |___| | | 3 | විද්‍යාව | |___| | |___| | | 4 | ගෘහ විද්‍යාව | |___| | |___| | | 5 | කෘෂි කර්මය/ගෙවතු වගාව | |___| | |___| | | 6 | සත්ව පාලනය /මිරිදිය මත්සය වගාව | |___| | |___| | | 7 | අහර සැකසුම | |___| | |___| |
23	පසුගිය මස හය තුලදී , පහත සඳහන් ආයතන, පුද්ගලයන් කියාත්මක කරන ඔබට සෞඛයය /පෝෂණය පිලිබඳව වැඩසටනකට සාභාගීවීමට අවස්ථාව ලැබුනේද ඔව් නැත 1 ගර්භනී මවු සායනය |___| |___| 2 ළමා සායනය |___| |___| 3 පෙර පාසල්/පාසැල වැඩසටහන |___| |___| 4 ප්‍රාදේශීය සංගමය මගින් පැවැත්වූ වැඩසටහන් |___| |___| 5 සෞඛ්‍ය කඳවුර |___| |___|

	6	රෝහල් සායන / බාහිර රෝගී සායන	|___|	|___|
	7	වෙනත් (පැහැදිලි කරන්න	|___|	|___|

4. ඔබට හෝ ඔබගේ පවුලේ සාමාජිකයන්ට ආහාර පාලනය අවශ්‍යවන බෝනොවන රෝග තිබීම පිලිබඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි

	පිළිතුරු සපයන්නාට මෙය කියවන්න *"මා ඔබගෙන්, ඔබ පවුලේ බෝනොවන රෝග හා අවදානම සාධක පිලිබඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි"*
24	ඔබට කවදා හෝ අධික කොලෙස්ටෙරෝල් ඇතැයි හඳුනාගෙන තිබේද? *නිවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* 1 ඔව් |___| 2 නැත |___|
25	ඔබට කවදා හෝ පහත සඳහන් රෝගයක් ඇතැයි හඳුනාගෙන තිබේද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.එක පිළිතුරකට වඩා තිබිය හැක.* 1 දියවැඩියාව |___| 2 අධික රුධිර පීඩනය |___| 3 පිලිකා |___| 4 තරබාරුබව |___| 5 හෘද රෝග |___| 6 නිදන්ගත වකුගඩු ආබාධ |___| 7 වෙනත් රෝග |___|
26	පසුගිය මාස හය තුලදී,ඉහත සඳහන් රෝග පාලනය සම්බන්ධව ඔබට ආහාර/පෝෂණය පිළිබඳ උපදෙස් ලැබුනේද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* 1 **ඔව්** |___| 2 නැත |___| 3 රෝග කිසිවක් නැත |___|
27	ඔබගේ දෙමාපියන් හෝ සහෝදර සහෝදරියන් කිසිවෙකුට පහත සඳහන් බෝනොවෙන රෝගයක් ඇතයි හඳුනා ගෙන තිබේද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* 1 අධික කොලෙස්ටෙරෝල් |___| 2 බර අඩු කර ගැනීමට උපදෙස් දී තිබීම |___|
28	ඔබගේ දෙමව්පියන් /සහොදර සහොදරියන්කිසිවකු පහත සඳහන් රෝගයක් ඇතයි හඳුනා ගෙන තිබේද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* 1 දියවැඩියාව |___| 2 අධික රුධිර පීඩනය |___| 3 පිලිකා |___| 4 හෘද රෝග |___| 5 නිදන්ගත වකුගඩු ආබාධ |___| 6 වෙනත් රෝග |___|
29	ඔබ නිවසේ වාසය කරන කිසියම් පුද්ගලයෙකුට පහත සඳහන් රෝගයක් ඇතයි හඳුනා ගෙන තිබේද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* 1 දියවැඩියාව |___| 2 අධික රුධිර පීඩනය |___|

	3 පිලිකා	|___|
	4 හෘද රෝග	|___|
	5 නිදන්ගත වකුගඩු ආබාධ	|___|
	6 වෙනත් රෝග	|___|

5. නිවසේ ආහාර සම්බන්ධ කටයුතු වලදී ඔබේ සහභාගිත්වය / වගකීම පිලි බඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි	
	පිළිතුරු සපයන්නාට මෙය කියවන්න *"නිවසේ ආහාර සම්බන්ධ කටයුතු වලදී ඔබේ සහභාගිත්වය / වගකීම පිලි බඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි"*
30	සාමාන්‍ය සතියකදී , ඔබ පවුලේ පරිභෝජනය සඳහා දින කීයක් එලවලු ,පලතුරු, මාලු, මස්, බිත්තර සහ සිල්ලර ද්‍රව්‍ය මිලදී ගැනීම සිදු කරයිද?? සතියට දින |___|
31	සාමාන්‍ය සතියකදී , ඔබ දින කීයක් පවුලේ අය සඳහ ආහාර ද්‍රව්‍ය මිලදී ගැනීමෙහි හෝ මිලදී ගතයුතු ආහාර ද්‍රව්‍ය තීරණය කිරීමෙහි නිරතවේද ? සතියට දින |___|
35	සාමාන්‍ය සතියකදී ,දින කීයක් ඔබ ආපනශාලා හෝටල් ආදියෙහි පිළියෙල කල ආහාර එක සම්පූර්ණ ප්‍රධාන ආහාර වේලක් සඳහා ලබා ගන්නේද? සතියට දින |___|
36	සාමාන්‍ය සතියකදී ,ඔබ දින කීයක් ප්‍රධාන ආහාර වේල් තුනම ක්ෂනික ආහාර කඩ, ආපනශාල ,හෝටල් වලින් ලබා ගන්නේද? සතියට දින |___|

7. සෞඛ්‍යය සේවකයන් හමුවීමේ අවස්ථා පිලිබඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි			
	පිළිතුරු සපයන්නාට මෙය කියවන්න *ඔබ පසුගිය මස හය තුල සෞඛ්‍යය සේවකයන් හමුවීමේ අවස්ථා පිලිබඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි*		
33	පසුගිය මාස හය තුලදී, ඔබ පහත සඳහන් එක් සෞඛ්‍යය සේවකයකු හෝ මුණගැසී තිබේද?	ඔව්	නැත
	1 වෛද්‍යවරයා	|___|	|___|
	2 පෝෂණවේදිනිය	|___|	|___|
	3 පවුල්සෞඛය සේවිකාව	|___|	|___|
	4 වෙනත්	|___|	|___|
	සියලුම ප්‍රශ්න සඳහා පිලිතුර 'නැත' නම්, ප්‍රශ්න අංක 35 ට යන්න.		
34	පසුගිය මාස හය තුලදී , ඔබට ඉහත සේවකයන්ගෙන් ආහාර හා පෝෂණය පිළිබඳ උපදෙස් ලැබී තිබේද? 1 ඔව් |___| 2 නැත |___|		
35	*පිළිතුරු සපයන්නාට මෙය කියවන්න* ඔබට වෛද්‍ය රක්ෂණ සහතිකයක් තිබේද නැතහොත් වෛද්‍ය රක්ෂණ යෝජනා ක්‍රමයකට		

	ඇතුලත්ද 1 ඔව් |___| 2 නැත |___| පිලිතුර 'නැත' නම්, ප්‍රශ්න අංක 41 ට යන්න.
36	ඔබ එම රක්ෂණය පහත සඳහන් සේවා ලබා ගැනීමට භාවිතා කර ඇත්ද ඔව් නැත 1 පෝෂණවේදිනියකගේ සේවාව ලබා ගැනීම |___| |___| 2 ආහාර හා පෝෂණය පිළිබඳ උපදෙස් ලබාගැනීමට වෛද්‍යවරයකුගේ සේවාව ලබා ගැනීම |___| |___| 3 දියවැඩියාව ,අධික කොලෙස්ටොරෝල් ඇත්දැයි පරීක්ෂා කිරීම |___| |___|

8. මීලඟට සෞඛ්‍යය සන්නිවේදන මාධ්‍ය භාවිතය හා භාවිතය පිලිබඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි

	පිළිතුරු සපයන්නාට මෙය කියවන්න *"ඔබගෙන් සෞඛ්‍යය සන්නිවේදන මාධ්‍ය හා භාවිතය පිලිබඳව ප්‍රශ්න කීපයක් ඇසීමට කැමත්තෙමි."*
38	පසුගිය මාස හය තුලදී ,ඔබට පහත සඳහන් සන්නිවේදන මාධ්‍ය භාවිතා කිරීමේ හැකියාව ඔබට තිබුනේද? (ඔව් නැත 1 ගුවන් විදුලිය |___| |___| 2 රූපවාහිනිය |___| |___| 3 පුවත්පත්/සඟරා |___| |___| 4 අන්තර්ජාලය |___| |___| පිලිතුර 'නැත' නම්, ප්‍රශ්න අංක 43 ට යන්න.
44	පසුගිය මාස හය තුලදී , ඔබ එදිනෙදා තොරතුරු ලබා ගැනීමට (උදා පුවෘත්ති ,කාලගුණ පුවත්) භාවිතා කල සන්නිවේදන මාධය මොනවාද? ඔව් නැත 1 ගුවන් විදුලිය |___| |___| 2 රූපවාහිනිය |___| |___| 3 පුවත්පත්/සඟරා |___| |___| 4 අන්තර්ජාලය |___| |___| පිලිතුර 'නැත' නම්, ප්‍රශ්න අංක 43 ට යන්න.
38	පසුගිය මාස හය තුලදී , ඔබ ආහාර හා පෝෂණය පිළිබඳ තොරතුරු ලබා ගැනීමට සන්නිවේදන මාධය භාවිතා කලේද? 1 ඔව් |___| 2 නැත |___| පිලිතුර 'නැත' නම්, ප්‍රශ්න අංක 43 ට යන්න.
44	පසුගිය මාස හය තුලදී , ඔබ ආහාර හා පෝෂණය පිළිබඳ තොරතුරු ලබා ගැනීමට භාවිතා කල සන්නිවේදන මාධය මොනවාද? ඔව් නැත 1 ගුවන් විදුලිය |___| |___| 2 රූපවාහිනිය |___| |___| 3 පුවත්පත්/සඟරා |___| |___| 4 අන්තර්ජාලය |___| |___|
46	ඔබගේ අදහස අනුව ආහාර හා පෝෂණය පිළිබඳ තොරතුරු ලබා ගැනීමට වැඩිපුරම

	පුයෝජනවත් වූ මාර්ග මොනවාද? *කරුණාකර අදාල කොටුව තුල 'X' සලකුණු කරන්න* 1 පෝෂණ විශේෂඥයින් රූපවාහිනී සාකච්ඡා |___| 3 පෝෂණ විශේෂඥයින් සමඟ ගුවන්විදුලි සාකච්ඡා |___| 5 රූපවාහිනී වෙළඳ දැන්වීම් |___| 6 පුවත්පත් වෙළඳ දැන්වීම් |___| 7 වාර්තාමය චිත්‍රපට |___| 8 ලිඛිත වාර්තා /විස්තර |___| 9 අන්තර්ජාලයෙන් ලබා ගන්න ලද තොරතුරු

9. මීලඟට භාෂාමය ගැටලු නිසා ඔබට ඇතිවූ පුශ්න පිලිබඳව පුශ්න කීපයක් ඇසීමට කැමත්තෙමි.

	පිළිතුරු සපයන්නාට මෙය කියවන්න *ඔබගෙන්"භාෂාමය ගැටලු නිසා ඔබට ඇතිවූ පුශ්න පිලිබඳව පුශ්න කීපයක් ඇසීමට කැමත්තෙමි."*
43	ඔබට කථා කලහැකි භාෂා මොනවාද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* ඔව් නැත 1 සිංහල |___| |___| 2 දෙමළ |___| |___| 3 ඉංගීසි |___| |___|
44	ඔබට කියවීමට හා ලිවීමට හැකි භාෂා මොනවාද? *සියළු නැවැරදි පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.* ඔව් නැත 1 සිංහල |___| |___| 2 දෙමළ |___| |___| 3 ඉංගීසි |___| |___|
45	පසුගිය මාස හය තුලදී ,එක් වතාවක් හෝ ඔබට ඉතා වැදගත් වූ ආහාර හා පෝෂණය සම්බන්ධ වූ ලිඛිත තොරතුරු අඩංගු ලියවිල්ලක් (පොතක්,අත්පොතක්,පුවත්පත්, විස්තරයක්,) එය ලියා තිබූ භාෂාව කියවීමට/තේරුම් ගැනීමට නොහැකි වීම නිසා කියවීමට/තේරුම් ගනීමට නොහැකිවීද? 1 ඔව් |___| 2 නැත |___|
46	පසුගිය මාස හය තුලදී ,එක් වතාවක් හෝඔබට ඉතා වැදගත් වූ ආහාර හා පෝෂණය සම්බන්ධ වූ රූපවාහිනී හෝ ගුවන්විදුලි සාකච්ඡාවක්, එය මෙහෙයවූ භාෂාව තේරුම් ගැනීමට නොහැකි වීම නිසා තේරුම් ගැනීමට නොහැකිවීද? 1 ඔව් |___| 2 නැත |___|
47	පසුගිය මාස හය තුලදී ,එක් වතාවක් හෝ ඔබට ආහාර ද්‍රව්‍යයෙහි පෝෂණ ලේබලය ඔබට කියවා ගැනීමට නොහැකි භාෂාවකින් ලියා තිබීම නිසා එම ආහාර ද්‍රව්‍යය පිලිබඳව තීරණයක් ගැනීමට නොහැකිවීද? 1 ඔව් |___| 2 නැත |___|

10. සෞඛ්‍යය ප්‍රවර්ධන හැසිරීම් ඇතිකර ගැනීම පිළිබඳව ඇගයීම.

පිළිතුරු සපයන්නාට මෙය කියවන්න

ඔබගේ සෞඛ්‍ය ප්‍රවර්ධන හැසිරීම ඇගයීමට ප්‍රශ්න කීපයක් ඇසීමට කැමැත්තෙමි්ශ්න එම ප්‍ර. වලට ඔබගේ පසුගිය මස හයක කාලය තුල හැසිරීම පදනම කොට හැම විටම, බොහෝ විට, සමහර විට හෝ කෙසේ වත් නැත යන පිළිතුරු වලින් එකක් සපයන්න.

එම පිළිතුරු අනුව පහත පරිදි ලකුණු ලබා දෙන්න.

3= හැම විටම, 2= බොහෝ විට, 1=සමහර විට, 0= කෙසේ වත් නැත

48

1	මම ආහාරයට ගන්නා තෙල් පුමාණය සීමා කරමි්	
2	මම අධික ලුණු පුමාණයක් ඇති ආහාර මග හැරීමට උනන්දු වෙමි්	
3	මම ආහාරයට ගන්නා සීනි පුමාණය ගැන සිතා බලමි්	
4	මගේ ආහාරයට ඇති පමණ කෙඳි සහිත ආහාර ලබා ගැනීමට විශේෂයෙන් මහන්සි වෙමි්	
5	මම දිනපතා අලුත් එළවලු,හා පලතුරු ආහාරයට ගැනීමට උත්සාහ කරමි්	
6	මම ශක්ති(කැලරී) පමානය අඩුහෝ අඩුකල ආහාර ගැනීමට උනන්දු වෙමි්	
7	මම විටමින් සහ ඛණිජලවණ අඩංගු හෝ එකතු කල ආහාර තෝරා ගැනීමට උනන්දු වෙමි්	
8	මගේ බර පාලනය කර ගැනීම සඳහා මා ගන්නා ආහාර ගැන මම සලකිලිමත් වෙමි්	
9	කෘත්‍රිම රසකාරක එකතු කල ආහාර නොගෙන සිටීමට මම උනන්දු වෙමි්	
10	මගේ ආහාරය මගින් ඇති පමණ කැල්සියම් ලැබෙදැයි මම සලකා බලමි්	
11	මම සෞඛ්‍යය සම්බන්ධ අලුත් තොරතුරු බැලීමට හා ඇසීමට යොමුවෙමි්	
12	මම සකසා ඇති ආහාර වල අඩංගු පෝෂක පමාණය දැන ගැනීමට ලේබලය කියවමි්	

11. මිළහට ඔබගේ පෝෂණය පිළිබඳ දැනුම ඇගයීම සඳහා පුශ්න කිපයක් අසනු කැමත්තෙමි්.

පිළිතුරු සපයන්නාට මෙය කියවන්න

"ඔබගෙන් පෝෂණය පිළිබඳ දැනුම ඇගයීම සඳහා පුශ්න කීපයක් අසනු කැමත්තෙමි්. කරුණාකර සාවදානව මා අසන ප්‍රශ්නවලට සහ පිළිතුරුවලට සවන් දෙන්න. නිවැරදි පිළිතුරු ප්‍රවේසමෙන් තෝරා ගන්න. *නැවැරදි පිළිතුරු එකක් පමණක් තෝරාගන්න.*

මා අසන ප්‍රශ්නවල සහ පිළිතුරු පැහැදිලි නොවේනම් නැවත ඒවා අසන්න., ඔබ පිළිතුර නොදනීනම්, අනුමාන නොකරන්න.ඒබව සදහන් කරන්න.

49 ආහාර පිසීමේදී ඔබ අයඩින් එකතු කල ලුණු එකතු කල යුත්තේ කුමන වේලාවටද?

1 උයන අතරතුර ___
2 උයා අවසන් වූ විගස ___
3 ආහාර නිවුනුපසු ___
4 නොදනී ___

50 පලාකොල පිළියෙල කිරීමේදී දෙහි එකතු කිරීමෙන් ඇති වාසිය කුමක්ද?

1 යකඩ ප්‍රමාණය වැඩිවේ ___
2 කැල්සියම් පමාණය වැඩිවේ ___
3 යකඩ උරා ගැනීම වැඩිවේ ___
4 නොදනී ___

51 පිසූ එළවලු දළවශයෙන් පාවිච්චි කිරීමට සුදුසු තත්වයෙන් කොපමණ වේලා කාමර උෂ්ණත්වයේ (සාමාන්‍ය පරිසරයේ) තබා ගත හැකිද?

1 දිනකට වඩා ___
2 දින භාගයක් පමණ ___
3 පැය හතරක් පමණ ___

	4 නොදනී |___|
52	ශරීර ස්කන්ධ දර්ශකය 27 kg/m^2 වූ පුද්ගලයකු පිලිබඳව පහත කුමක් නිවැරදිද ? ඔහු? 1 අඩු බර |___| 2 සාමාන්‍ය බර |___| 3 අධි බර |___| 4 නොදනී |___|
53	පහත ඒවා බර අඩු කර ගත හැකිද?අතුරින් විටමින් ඒ මගින් ශරෙරයට ඇති කරණ ප්‍රධාන බලපෑම කුමක්ද? 1 ඇස පෙනීම පවත්වා ගැනීම |___| 2 දත් හා අස්ථි වර්ධනයර උපකරෙළුඑ වීම |___| 3 රුධිර කැටි ගැසීමට උපකාරී වීම. |___| 4 නොදනී |___|
54	පහත සඳහන් තෙල් වර්ග අතුරින් ගැඹුරු තෙලෙහි බැඳීමට සුදුසු තෙල් වර්ගය කුමක්ද? 1 පොල්තෙල් |___| 2 සන්ෆලවර් තෙල් |___| 3 සෝයා තෙල් |___| 4 නොදනී |___|
55	මා ළු, බිත්තර හා මස් වල ඇති ප්‍රධාන අහාර සංගටකය වන්නේ, 1 කැල්සියම් |___| 2 ප්‍රෝටීන් |___| 3 කාබෝහයිඩ්‍රේට් |___| 4 නොදනී |___|
56	එක් පුද්ගලයෙකුට දිනකට කොපමණ ලුණු පමාණයක් පරිහරණය අනුමත කොට ඇත්ද? ? 1 ගෑම් 5 /තේ හැඳි 1 |___| 2 ගෑම් 10 /තේ හැඳි 2 |___| 3 ඕනෑම පමාණයක් |___| 4 නොදනී |___|
57	ඔබ දිනකට කොපමණ වතුර පමානයක් පානය කල යුතුද? 1 දිනපතා පානය කලයුතු නැත |___| 2 වීදුරු 1-3 පමණ |___| 3 වීදුරු 4-6 පමණ |___| 4 වීදුරු 7-9 පමණ |___| 5 නොදනී
58	පහත සඳහන් ආහාර අතුරින් අයඩින් එකතු කර ඇති(සබලිකරණය) ආහාර වර්ගය කුමක්ද? 1 පාන් |___| 2 මේසලුණු |___| 3 කිරිපිටි |___| 4 නොදනී |___|
59	සෞකය සම්පන්න පුද්ගලයෙකු මගින් දිනපතා ආහාරයට ගැනීමටඅනුමත එළවලු හා පලතුරු ප්‍රමාණය කුමක්ද? 1 දිනපතා එළවලු හා පලතුරු අහරයටේ ගැනීම අවශ්‍ය නැත. |___| 2 දිනපතා එළවලු හා පලතුරු 2-3 පමණ |___| 3 දිනපතා එළවලු හා පලතුරු 5 ක |___| **4** නොදනී |___|

60	කාන්තාවන්ගේජීවිත කාලයේ දිනකට වැඩිම ශක්ති ප්‍රමාණයක් අවශය කාලය කුමක්ද? 1 ගර්භනී කාලය |___| 2 මව්කිරිදෙන කාලය |___| 3 නව යොවුන්විය |___| 4 නොදනී |___|
61	අප අහර වලින් වැඩි ම කොටසක් තිබිය යුත්තේ කුමන අහර වර්ගයද? පාන් හා බත් වැනි පිෂ්ටමය ආහාර |___| 2 එළවලු හා පලතුරු |___| 3 මස් , මාළු |___| 4 නොදනී |___|
62	පහත ඒවා අතුරින්, අවුරුද්දට අඩු ලදරුවන්ගේ ආහාරයට එකතු නොකළ යුත්තේ කුමක්ද? 1 තෙල් |___| 2 ලුණු |___| 3 බිත්තර |___| 4 නොදනී |___|
63	මෙම ආහාර අතුරින්කුමන ඒවා පරිහරනයට සුරක්ෂිත වේද? 1 පියන එලියට නෙර ඇති ටින් කල ආහර |___| 2 පැලවෙමින් ඇති කොල පැහැ ගැන්වුණු අර්තාපල් |___| 3 වරක් විවෘත කොට ශීතකරණයේ තැබූ ජීනනුහරණය ල්ක්කිරිකල කිරි |___| 4 නොදනී |___|

සහභාගිවූවාට ස්තුතියි!

ඇ කොටස

<u>උස හා බර ඇගයීම.</u>

පිළිතුරු සපයන්නාට මෙය කියවන්න

අප දැන් මෙමෙ සමීක්ෂණයේ අවසාන කොටසට ලංවී ඇත. අප දැන් ඔබගේ උස හා බර සලකුණු කර ගනිමු.

<u>කායික මිමි ගනීමට පෙර,</u>

- *පිළිතුරු සපයන්නා බර බැලීමට සුදුසු සැහැල්ලු ;ඇඳුමකින් සැරසී ඇති බව තහවුරු කර ගන්න.*
- *දී ඇති උපදෙස් හොඳින් අනුගමනය කරන බවට තහවුරු කර ගන්න.*

පහත සඳහන් මිනුම් අදාල කොටු තුල සඳහන් කරන්න

	පළමු අකයවීම	දෙවන කියවීම	මිමි නොගන්න ලදී.
බර (Kg)			
උස (Cm)			

විශේෂ සටහන්

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Annexure XIV

Indicators of the standard living index

Score	2	1	0
Water source	Pipe borne(piped into home / premises)	Common tap / street tap / private well / common well	Other (river / canal / spring / rain)
Type of toilet	Water seal/Pour flush	Pit / other	Common/none
Roofing	Tiles	Asbestos / sheets	Cadjan
Eelectricity	Yes	-	No
Radio	Yes	-	No
Television	Yes	-	No
Refrigerator	Yes	-	No
Telephone	Yes	-	No
	Car / van / lorry / bus / tractor	Three wheeler / motorcycle / bicycle	None

Table 1: Scoring method for Standard of Living Index*

* Dissanayaka 2006, Jayasuriya, 2007

Table 2: Allocation of score for the Standard of Living Index*

Score	**Standard of living**	**Social economic class**
22-31	High	I
11-21	Medium	II
1-10	low	III

Validated by Jayasuriya, 2007

Annexure XV

Interviewer guide and operation manual

Section A

Identification of subjects

Once the written informed consent is obtained from the participant, Please complete the information provided in the table.

The DS Division, and GN division will be already filled, and please ensure that index no also be assigned before initiating the interview.

- Mark the responses in the relevant box by a cross (x) or write in the space given.
- Where more than one option is given, please indicate that to the respondent.
- Obtain responses to all the questions

Section B

Q1.

Age ask for the last completed one year.

Q6;

Ask for the type of work

garment factory	incorrect	garment factory machine operator	Correct
Self -employment	incorrect	sewing as a self employment	Correct

Q 10.

Indicate the ages in the order from eldest to youngest

Children aged 5 years or over 5 years old indicate the no. of years, the children lesss than 5year indicate the completed years and months

Q14;

Please select only one response, the main source of drinking water

Q15;

Select best available type of toilet starting from the first response.

Q 16;

Consider the main materials used in the roof.

Q 19:

Ask for the average income of the household of the participant, which is inclusive of one or more different sources such as your salary from the job/, interest of deposits/loans given to others, vehicles/buildings rented to others, business shares, income from lands etc. This includes the overall earning from all members of the household.

Q 24- Q 28;

Mark "**x**" in front of each response. There can be more than one response, i.e one person can have one or more diseases.

Q 29-32;

Mention the number of days as complete numbers eg 3 days, not 3 ½ days

Q 43-44

Self reported skills only, not objectively assessed.

Q 52

Read the stem to the participant and ask her to mention the frequency.Then put the appropriate score in the cage given. If the participant is unable to comprehend any of the item read it again.

Q 54-68-

Tell the respondent that you are going tp assess the nutrition knowledge level based on 15 questions. Ask her not to guess the answers. If she does not know the answer select the don't know option.'

Read the question to the participant. Then ask whether she understood it properly. Then read the responses one by one .Ask her to mention the response that she assume correct.
In case participant is unable to comprehend any of the item read it again and the responses as well.

Section C

Anthropometric measurements

General instructions before taking measurements

Before taking measurements tell her that you want to record her height and weight. You will be taking two readings of the same measurement to prevent any errors'

Pre preparation;

Before taking measurements instruct her,

Be in light indoor clothing (thin skirt/cloth)

Loosen all tight clothing, including the belt

Remove footwear or heavy items in the pocket (eg keys or wallet)

Note: If subjects are in saree or any other completely clad clothing ask whether she could change into a light indoor clothing. If refused take measurements as usual, but indicate it **under section** D, comments.

Strictly follow the instructions in the given below in assessing the anthropometric measurements.

Instructions for measuring height and weight

Weight

Weight should be measured using the digital scale provided to you.

Place the digital scale on a firm level surface.DO not place it on a surface that is carpeted or uneven.

Ask the participant to stand in the center of the scale platform, as indicated by the marks made on it that ensures the proper position of the participant's feet, with arms relaxed at the sides head erect and eyes looking straight ahead.

When the digital readout stabilizes record the observed weight to the nearest 0.1 kg.

Height

Height should be measured using the stadiometer provided to you.

Fix the stadiometer and place the stadiometer on a firm level surface.

Ask the participant to stand with feet flat on the pedestal both heels together touching the base of the beam of stadiometer. To stand erect, with back shoulder blades and buttocks touching the beam.To evenly distribute weight on both feet with arms relaxed at the sides with palms facing

inward and look straight ahead in a horizontal plane.To inhale deeply and maintain a fully erect position without altering the load on the heels'

Then pull down the lever of the stsdiometer until it is gently touching the head

Keep your eyes fixed at the same level as the device (indicator)

Record the height in centimeters to the nearest 0.1 centimeter

Annexure XVII

Assessing the inter observer reliability

Test-retest reliability of selected categorical variables in the questionnaire

	% in agreement*	Cohen's Kappa coeficient
Age category	100	1.00
Highest level of education	100	1.00
Main material used in roof	95.3	0.84
Frequency of food purchase	95.3	0.84
Avoid food with high salt	95.3	0.84

*Number of subjects re-interviewed 64.

Inter observer reliability of anthropometric measurements

Measurement	Level of agreement between the principal investigator and observers*	
	Observer 1	Observer 2
Height	0.84	0.82
weight	0.99	0.99

*Expressed as pearson correlation coefficient

Annexure XVIII

Component 2- Certificate of ethical clearance

Ethics Review Committee
Faculty of Medicine
University of Colombo
P O Box 271, Kynsey Road, Colombo 8, Sri Lanka

Telephone: +94-11-2695300 ext 240 Fax: +94-11-2691581

Email: ethicscommitteemfc@gmail.com

REFERENCE: EC- 11-177

16th November 2011

Dr Yasoma Weerasekara
NO. 108,
Kadjugahawatta,
Gothatuwa,
Angoda.

Dear Dr. Weerasekara,

RE: Protocol No EC- 11-177

Title : Nutrition Literacy, its correlates and effectiveness of a skill development intervention to improve nutrition literacy among females aged 25-45 years of age in Colombo District"

Thank you for submitting the above research proposal, which was considered by the Executive Committee of the Ethics Review Committee, at its meeting on 16.11.2011.

Hereby approval is granted to proceed. However, this proposal will be submitted to the main Ethics Review Committee for final approval on 17.11.2011.

This approval relates to the following:

Research Protocol
Information sheets and consent forms
Data collection sheets

Ethics Review Committee
Faculty of Medicine
University of Colombo
P O Box 271, Kynsey Road, Colombo 8, Sri Lanka

Telephone: +94-11-2695300 ext 240 Fax: +94-11-2691581

Email: ethicscommitteemfc@gmail.com

You are asked to note the following:

- This approval is valid for one year, and the Committee requires that you furnish it with a final report.

- This approval relates to the ethical content of the study only, and you are responsible for the following:

  - negotiating individual arrangements with the Heads of service departments in those situations where the use of their resources is involved,
  - if appropriate, informing the study sponsor that the membership and procedures of the University of Colombo, Ethics Review Committee comply with the relevant guidelines of the Forum of Ethics Review Committees in Sri Lanka.

Yours sincerely,

Prof. Hemantha Senanayake
Chairperson
Ethics Review Committee
Faculty of Medicine
University of Colombo

Ethics Review Committee
Faculty of Medicine
University of Colombo
Kynsey Road
Colombo 8

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E-mail } pdhswp@sltnet.lk

2437154 } අධ්‍යක්ෂ
இயக்குனர்
Director

2434852 } මි. අධ්‍යක්ෂ (පරිපාලන)
உதவி இயக்குனர்(நிர்வாகம்)
D. Director (Adm.)

2437155 } ගණකාධිකාරී
கணக்காளர்
Accountant

5337896 } පරිපාලන නිලධාරී
நிர்வாக அதிகாரி
Adm. Officer

සෞඛ්‍ය සේවා අධ්‍යක්ෂ කාර්යාලය
බස්නාහිර පලාත

சுகாதார சேவை பணிப்பாளர் காரியாலயம்
மேல் மாகாணம்

OFFICE OF THE PROVINCIAL DIRECTOR OF HEALTH SERVICES
WESTERN PROVINCE

මාලිගාවත්ත සෞඛ්‍යාගාර කාර්යාලය, තැ.පෙ. 876, කොළඹ 10. மாளிகாவத்தை செயலகம், த.பெ.இ. 876, கொழும்பு10. Maligawatta Secretariat Building, P.O. Box 876, Colombo 10.

මගේ අංකය எனது இல. My No.	WP / PD/ PL / MISC/ 2012	ඔබේ අංකය உமது இல. Your No.		දිනය திகதி Date	2012. 04. 17

Regional Director of Health Services
Colombo

Permission to carry out a MD (Part II) Community Medicine -"Nutrition literacy among females aged 25-45 years in the district of Colombo and effectiveness of an intervention to improve nutrition literacy " research in Colombo District

This has reference to the letter dated 17.04.2012 of Dr.K.Y.P.K.Weerasekara regarding the above subject.

Dr. K.Y.P.K.Weerasekara has decided to carry out a research project titled "Nutrition literacy among females aged 25-45 years in the district of Colombo and effectiveness of an intervention to improve nutrition literacy "as a requirement of the MD (Part II) course in Community Medicine in Colombo RDHS Area .

Permission has been granted and please be good enough to inform relevant officers to extend their fullest cooperation and support to carry out the above study.

Also please ensure that a copy of the study report is submitted following completion of the study.

Dr. Amal Harsha De Silva
Provincial Director of Health Services
Western Province

DR. AMAL HARSHA DE SILVA
Provincial Director of Health Services
Western Province
Maligawatta, Colombo 10.

Copy

1. Dr.Hiranthi De Silva- (Course Director in Community Medicine) – For your information please.
2. Dr. K.Y.P.K.Weerasekara - Please be kind enough to submit a copy of the study report

Annexure XIX.a

The Intervention structure

Current intervention aimed to develop modules aiming to improve skills related to

- Ability to identify nutrition related text.
- Ability to comprehend nutrition related text.
- Interpreting nutrition related information and data presented in the form of tables, charts, pictures, symbols and maps.
- Completing nutrition related computations.
- Making nutrition related inferences based on the information presented.

To fulfill the above, two modules were developed with relevant content. Delivery of intervention was designed to facilitate development of the skills. .

MODULE 1

Expected outcomes

- Develop the ability to understand the importance of nutrition information, to maintain healthy dietary pattern and healthy life.
- Develop the ability to understand how food decisions can be affected by nutrition information.
- Understand commonly available sources of nutrition information and wide range of potential sources of nutrition information
- Develop the ability to assess the credibility of sources of nutrition information.
- Develop ability to utilize nutrition information from commonly available sources

To achieve these outcomes, six in-class activities were planned .The distribution of the activity for fulfilling the objective is shown in the table I;

Module I: Lesson overview

Outcome	Activity	Teaching learning methods	Background information-discussion points	Skill Development	time
Develops the ability to Understand the importance of nutrition information to maintain healthy dietary pattern and healthy life.	Activity 2	Individual activity and participatory group discussion	Nutrition information is essential for proper nutrition and healthy life, as for aiding optimum food decision making and minimize food related risk	Skills in in comprehending effect of nutrition information on healthy dietary pattern and healthy life	30 minutes
Develop the ability to Understand how food decisions can be affected by nutrition information	Activity 3	Individual activity and participatory group discussion	Nutrition information in the food items vary, it cannot be guessed.	Develop ability to compare nutrition contents of varying foods	30 minutes
Understand commonly available sources of nutrition information	Activity 4	Group discussion	Nutrition information is obtained by a wide range of print and electronic media.	Develop skills to identify wide range of potential sources of nutrition information	30 minutes
develop the ability to assess the credibility of sources of nutrition information	Activity 5	Individual activity and participatory group discussion	Nutrition information is obtained by a wide range of print and credibility of the information provided by each source vary, as the aim of the publication is different in different settings.	Ability to compare credibility of varying sources of nutrition information	45 minutes
Develop ability to utilize commonly available sources of nutrition information and make inferences based on the information provided.	Activity 6	Group Activity	Food guide pyramid provides basis for deciding the groups of food items and the serving sizes to be consumed to maintain health and well being	Accession g nutrition information and making inferences	45 minutes
	Activity 7	Individual activity and participatory group discussion	Food labeling is mandatory in Sri Lanka, and items that some items should be essentially mentioned in the label.	Accession g nutrition information	45 minutes

MODULE 2

Expected outcomes

- Develop ability to interpret and compare the basic nutrition information of food based on the serving sizes and calorie content and nutrient content.
- Develop the ability to perform simple calculations based on the nutrition information provided
- Develop ability to make compare the health claims based on the nutrition information provided in the food.

To achieve these outcomess, five in-class activities were planned .The distribution of the activity for fulfilling the objective is shown in the table 2;

Module 2: Lesson overview

Outcome	Activity	Teaching learning methods	Background information-discussion points	Skill Development	time
develop ability to interpret and compare the basic nutrition information based on the serving sizes and calorie content,	Activity 9	Group Activity	Comparison of nutrition information allows better selection of optimum food items.	Nutrition related comparison skills and decision making on optimum food selection	45 min
develop the ability to perform simple calculations based on the nutrition information provided	Activity 10	Group Activity	Ability to compare equivalent nutrition parameters of the food items facilitate better food selections, based on physiological needs.	Nutrition related computational skills	45 min
	Activity 11	Individual activity and participatory group discussion	Rough estimates of consumption of food items such as sugar sensitizes participants on the usage.	Nutrition related computational skills	30 min
	Activity 12	Group Activity	Assessment of the body mass index and calculation of the weight change needed to optimize BMI facilitate healthy life.	Nutrition related computational skills	45 min
develop ability to compare the health claims with accurate nutrition information	Activity 8	Individual activity and participatory group discussion	Health claims mentioned in the food labels should fulfill criteria for such mentioning .In most of the times consumers are unable to ascertain the credibility of such claims	Develop skills to ascertain he credibility of health claims	45 min

Annexure XIX b

උපකාරක සටහන්

හැඳින්වීම

- සියලුදෙනාටම ආයුබෝවන්!
- සුහදශීලීව පිළිගන්න.
- පිරිස කවාකාරව කණ්ඩායම් දෙකකට හෝ තුනකට අසුන් වල හිදවන්න.
- එකිනෙකාව හඳුනාගන්න.
- මේ සඳහා පහත ක්‍රමය අනුගමනය කරන්නකරන්න.

  පළමුව ඔබ හඳුන්වා දෙන්න.

  සියලුදෙනාට තමාගේ නම පැවසීමට ආරාධනා කරන්න.

- මුල සිටම පිරිස අතර විවෘත බව හා සුහද ශීලී බව වැඩිවන ආකාරයට කටයුතු කරන්න.යාවලිය පහසු වනු ඇතකණ්ඩායම් ක්‍රි එවිට මෙම .
- අද දින වැඩසටහනේ අරමුණ පැහැදිලි කර දෙන්න.

  මේ පර්යේෂණයේ අරමුණ සහභාගී වන්නන් ට පෝෂණ තොරතුරු ලබා ගත හැකි මාර්ග හඳුනා ගැනීමටත් , ඒවායේ ඇති තොරතුරු තම එදිනෙද අහර තොර ගැනීමේදී යොදා ගැනීම හා එමගින් වඩාත් හොඳ තීරණ ගැනීමට මග පෙන්වීමයි.

  කිසියම් ගැටලුවක් හෝ අපැහැදිලි තාවයක් ඇත්නම් එය වීමසන්න.

  මෙම වැඩ සටහන අවස්ථා දෙකකින් යුතු බවත්, මුල් කොටස අද දින සිදු කරන බවත් පවසන්න.

  අවස්ථා දෙකටම සහභාගී වීමේ වැදගත් කම අවධාරණය කරන්න.

ක්‍රියාකාරකම් 1

පිරිස අසුන් ගත් පසු,

- මුලින්ම මනා පෝෂණයක් පවත්වා ගැනීමේ වැදගත්කම කුමක්දැයි එක් එක් පුද්ගලයාගේ අදහස් සටහන් කිරීමට දී ඇති සටහන් පත ලබා දෙන්න.

- එක් එක් පුද්ගලයාට එක් අදහසක් බැගින් සඳහන් කරන ලෙස දන්වන්න

- ඒ අදහස් සියල්ල එකතු කොට මූලික කරුණු සංක්ෂිප්තව පුවරුවේ සටහන් කරන්න.

යහපත් සෞඛ්‍ය තත්වයක් පවත්වා ගැනීමටත්,බෝ නොවන රෝග වලින් වලක්වා ගැනීමට(දියවැඩියාව, හර්ද රෝග , අධික රුධිර පීඩනය, පිළිකා) හා ඌනතා රෝග වලින් වැලකීමට එහි වැදගත්කම සංක්ෂිප්තව සාකච්චා කරන්න.

ක්‍රියාකාරකම් 1

ඔබ මනා පෝෂණයක් පවත්වා ගැනීමේ ඇති වැදගත්කම ඔබට හැඟෙන පරිදි මෙහි සඳහන් කරන්න

ක්‍රියාකාරකම් 2

- මන පෝෂණයක් පවත්වා ගැනීමට පෝෂණ තොරතුරු වල ඇති වැදගත්කම කුමක්දැයි එක් එක් පුද්ගලයාගේ අදහස් සටහන් කිරීමට දී ඇති සටහන් පත ලබා දෙන්න .
- එක් එක් පුද්ගලයාට එක් අදහසක් බැගින් සඳහන් කරන ලෙස දන්වන්න
- ඒ අදහස් සියල්ල එකතු කොට මූලික කරුණු සංක්ෂිප්තව පුවරුවේ සටහන් කරන්න.
- මන පෝෂණයක් නිරෝගී ජීවින තත්වයක් පවත්වා ගැනීමට නිවැරදි පෝෂණ තොරතුර ලබා ගැනීම ඉතා වැදගත් බව සාකච්චා කරන්න.

එදිනෙද ජීවිත කට යුත් ආශ්‍රිතව මෙය සාකච්චා කරන්න

උදාහරණ අහ්හර වමිලදී ගැනීමේදී කල ඉකුත් වීමේ දිනය සලක බැලීම.

තහනම් කල රසකාරක අඩංගු අහර හඳුනා ගැනීම.

ළදරු ආහාර තොර ගැනීම-සබලකරණය කල ආහාර තොර ගැනීම.

මිල හා ගුණාත්මය සලකා බල වඩාත් සදුසු ආහාර තොර ගැනීම.

ක්‍රියාකාරකම් 2

මන පෝෂණයක් පවත්වා ගැනීමට පෝෂණ තොරතුරු වල ඇති වැදගත්කම ඔබට හැඟෙන පරිදි මෙහි සඳහන් කරන්න

ක්‍රියාකාරකම් 3

පෝෂණ තොරතුරු අනුව තීරණ වෙනස් වන අන්දම සලක බැලීමට ක්‍රියාකාරකම් සිදුකරන්න

- අවශ්‍ය ද්‍රව්‍ය;

  යෝගට් එකක්,

  ඇඹුල් කෙසෙල් ගෙඩියක් ,

  වටලප්පන් කෝප්පයක් ,

  කේක් කැබැල්ලක් තබන්න.

- එක් එක් පුද්ගලයාගේ අදහස් සටහන් කිරීමට දී ඇති සටහන් පත ලබා දෙන්න .

- මේවා අතුරින් වඩාත් ශක්ති ප්‍රමාණය අඩු එකෙහි සිට වැඩි එක දක්වා පිළිවෙලට ආහාර සඳහන් කරන ලෙස දන්වන්න

- අනතුරුව එක් එක් ආහාරයේ අඩංගු ශක්ති ප්‍රමාණය ඉදිරියෙන් සඳහන් කරන්න.
- දැන් ඔවුන් සඳහන් කල අනු පිළිවෙල හා නියමිත අනුපිලිවෙල සම වන්නේදැයි එක් එක් පුද්ගලයාගෙන් විමසන්න.
- මෙලෙස පෝෂණ තොරතුරු අනුව තීරණ වෙනස් වන අන්දම සාකච්චා කරන්න

ක්‍රියාකාරකම් 3

ශක්තිය	පෙර අනුපිලිවෙල	පසු අනුපිලිවෙල
අඩුම		
වැඩිම		

ක්‍රි

පෝෂණ තොරතුරු ලබා ගත හැකි මාර්ග සාකච්ඡා කරන්න.

- පිරිස කණ්ඩායම දෙකකට වෙනකොට ඔවුන් පෝෂණ තොරතුරු ලබා ගැනීමට භාවිතා කල මාධ්‍යදී ඇති (නිකත හා ඉලෙක්ට්‍රොමුද්‍රි) .ලියවිල්ලෙහි සඳහන් කරන ලෙස දන්වන්න
- මෙහිදී යෝජනා වූ සියලු මාධ්‍ය පුවරුවේ සඳහන් කරන්න.

ක්‍රියාකාරකම් 4

පෝෂණ තොරතුරු ලබා ගැනීමට බහුල වශයෙන් භාවිතා කල මාධ්‍ය	පෝෂණ තොරතුරු ලබා ගැනීමට හැකි නමුත් බහුල වශයෙන් භාවිතා නොකළ මාධ්‍ය

ක්‍රියාකාරකම් 5

එක එක මාධ්‍ය මගින් ලබා දෙන පෝෂණ තොරතුරු සැමවිටම නිවැරදි හා විශ්වාස දායක දැයි සාකච්ඡා කරන්න

- මේ සඳහා ලබා දී ඇති සහරා හා පුවත්පත් ලියවිලි හා දැන්වීම් පුද්ගලයන් දෙදෙනෙකුට එක ලියවිල්ලක් ලැබෙන සේ බෙදා දෙන්න.
- එම තොරතුරු පල කිරීමේ අරමුණු හා ඊවයේ නිවැරදි හා විශ්වාස දායක බව පිළිබඳව එක් එක් කණ්ඩායමේ දෙදෙනාට අදහස් ප්‍රකාශ කිරීමට අවස්ථාව ලබා දෙන්න.
- මෙහිදී එක් එක් කණ්ඩායමේ යෝජනා වූ මුද්‍රිත මාධ්‍ය හා තොරතුරු වල නිවැරදි හා විශ්වාස දායක බව පිළිබඳව එක් එක් කණ්ඩායමේ අදහස් පුවරුවේ සඳහන් කරන්න.
- කණ්ඩායමේ සියලු දෙන කොපමණ දුරට මෙම අදහස හා එකඟ වන්නේදැයි විමසන්න.

මෙහිදී වෙළඳ දැන්වීම් මගින් අලෙවි ප්‍රවර්ධනයක්, සහරා හා පුවත්පත් ලියවිලි හා අහර ලේබල් දැනුවත් කිරීමත් සිදුකිරීම අරමුණු කරන බව සාකච්ඡා කරන්න.

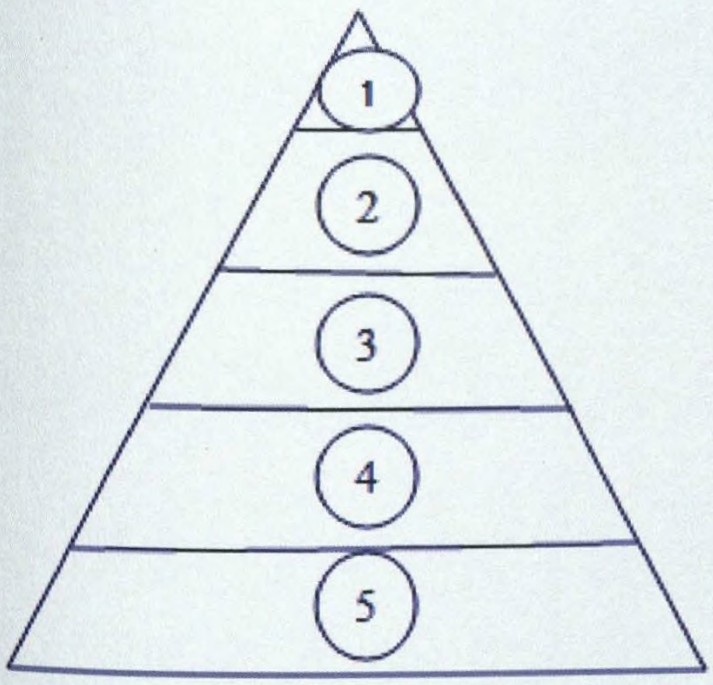
ක්‍රියාකාරකම් 6

- සෞඛය අමාත්‍යාංශය මගින් පිළියෙළ කල ආහාර නිවැරදිව තොර ගැනීමැ සඳහා මග පෙන්වීම පොත් කණ්ඩායම් දෙකට බෙදා දෙන්න.
- එක් එක් කණ්ඩායමට ආහාර කාන්ඩ හයට අයත් ආහාර වර්ග වල පින්තූර හා බ්‍රිස්ටල් බෝර්ඩ් එක ලබා දෙන්න.
- මෙම පොතෙහි ඇති කරුණු මත අහර පිරමිඩය තේරුම ගනිමින් දී ඇති අහර පින්තූරු පිරමිඩය මත ඇලවීමට අවස්ථාව ලබා දෙන්න
- කණ්ඩායම් දෙකෙහි ක්‍රියාකාරකම් පුවරුව මත සඳහන් කොට අඩුපාඩු සාකච්ච කරන්න.
- අහර පිරමිඩය තේරුම ගනිමින්එක එක් අහර කාණ්ඩයෙන් දිනපතා ගත ,

.වා කරන්නමාන සාකච්යුතු ප්‍ර

ක්‍රියාකාරකම් 6

දී ඇති පොතෙහි දක්වා ඇති කරුණු හා අහර පිරමිඩයේ සටහ පදනම කොට ගෙන අහර රූප සටහන් අදාල කොටස තුල අලවන්න. මෙහි 1-5 දක්වා කුමන ආහාර කන්ද අයත් වේදැයි සඳහන් කරන්න



	ආහාර කාණ්ඩය
1	
2	
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ක්‍රියාකාරකම් 7

- එක් එක් පුද්ගලයාට අහාර ලේඛලය බැගින් ලබා දෙන්න.
- එක් එක් පුද්ගලයාට තම ලේඛලයේ තිබෙනකොටස් එක බැගින් සඳහන් කරන ලෙස දන්වන්න.
- එක් එක් පුද්ගලයාගේ පිළිතුර දැන්වීම් පුවරුවේ සඳහන් කරන්න
- ඒ අනුව අහාර ලේඛලයක තිබෙන කොටස් විවිධ අංශ වලට බෙදා ඔවුන්ට පැහැදිලිවනසේ කරුණු ඉදිරිපත් කරන්න.
- අහාර ලේඛලයේ අඩංගු කොටස් වලින් අවම වශයෙන් වත තිබිය යුතු කොටස් වෙන කොට කියා දෙන්න.

පොදු නාමය, වෙළඳ නාමය, නිෂ්පාදිත දිනය, කල ඉකුත් වූ දිනය,

නිෂ්පාදකයාගේ නම හා ලිපිනය, පිටරටක නිපදවූ දෙයක් නම ආනයනය කල රට, අඩංගු ද්‍රව්‍ය , කාණ්ඩ අංකය, ගබඩා කිරීමේ උපදෙස් අවම වශයෙන් සඳහන් විය යුතු වේ.

ක්‍රියාකාරකම් 8

- අහාර ලේබල වල ඇති යෙදුම් හඳුනා ගැනීමට දී ඇති පුවත් පත දැන්වීම් හා ලේබල් වල ඇති කොටස් ඔවුන් අතර බෙදා දෙන්න.

- එක් එක් පුද්ගලයාට තම ලේබලයේ තිබෙන යෙදුම් සඳහන් කරන ලෙස දන්වන්න .

  උදාහරණ)

  මේද රහිත

  ස්වභාවික,

  පිරිසිදු,

  කොල්ස්ටෙරෝල් රහිත,

  සබලිකරණය කල)

- ඒවා කොතරම් දුරට නිවැරදි දැයි පරීක්ෂා කරන අන්දම සාකච්චා කරන්න.

- ඇතැම් යෙදුම් වලින් පාරිභෝගිකයා නොමග යවන සුළු අන්දම සාකච්චා කරන්න.

  උදාහරණ එළවලු තෙල් වල කොල්ස්ටෙරෝල් රහිත යන යෙදුම.

ක්‍රියාකාරකම් 9

- පිරිස කණ්ඩායම දෙකකට වෙනකොට දී ඇති එක සමාන කාණ්ඩයේ සංගටක සඳහන් කල ආහාර රූප සටහන් ඔවුන් අතර බෙදා දෙන්න
- දී ඇති සමාන කාණ්ඩයේ ආහාර වල සංගටක සංසන්දනය කරන්න .
- එක් කණ්ඩායමකින් එක් අයකුට මෙය ඉදිරිපත් කරන ලෙස දන්වන්න .

බත් හා පාන්

බටර් / මාගරින්

කිරිපිටි මේද අඩු / සම්පූර්ණ යොදය සහිත

පාන්පිටි හා ආටපිටි

- අහර තොර ගැනීමේදී මෙම තොරතුරු පදනම කොට නිවැරදි තොරා ගැනීමට යොමු කරන්න.
- අඩුපාඩු සාකච්ච කරන්න.

ක්‍රියාකාරකම් 10

- පිරිස කණ්ඩායම දෙකකට වෙන් කරන්න.
- ක්‍රියාකාරකම් 3 හි භාවිතා වූ අහර වර්ග හා ඒවායේ කැලරි ප්‍රමාණ නැවත ඉදිරිපත් කරන්නවටලප්පන් , ගෙඩියක් ඇඹුල් කෙසෙල් ,යෝගට් එකක්) . .(කේක් කැබැල්ලක් , කෝප්පයක්
- ඒවා අතුරින් වැඩිම ශක්තිය ලබා දෙන අහර වර්ගය තෝරාගන්න.
- එම ශක්ති ප්‍රමාණය ලබා ගැනීමට අනෙක් ආහාර වලින් කොපමණ ප්‍රමාණයක් දල වශයෙන් ලබා ගත යුතු දැයි ගණනය කිරීමට අවස්ථාව ලබා දෙන්න.
- කණ්ඩායම දෙකෙහි පිළිතුරු හා නිවැරදි පිළිතුර සසඳන්න.

ක්‍රියාකාරකම් 10

අහර වර්ගය	ශක්ති ප්‍රමාණය (කැලරි)	ශක්ති ප්‍රමාණය ලබා ගැනීමට අනෙක් ආහාර වලින් ගත යුතුප්‍රමාණය

ක්‍රියාකාරකම් 11

ඒකක ප්‍රමාණ අනුව ප්‍රමාණ ගණනය කිරීමට ක්‍රියාකාරකමක් සිදු කිරීම.

- සියලු දෙනාට තේ පැන් සංග්‍රහයකට ආරාධනා කරන්න.
- අවශ්‍ය ද්‍රව්‍ය

  සීනි නොදැමූ තේ භාජනය

  තේ කෝප්පය

  සීනි හා තේ හැඳි

- තමාගේ කෝප්පයට සීනි තේ හැඳි කොපමන එක් කලේදැයි මතක තබාගන්න ලෙස කියන්න
- ඒ අනුව තේ සඳහා මසකට කොපමණ සීනි අවශ්‍ය වේ දැයි ගණනය කරන්න.

  තේ කෝප්පයකට සාමාන්‍යයෙන් දමන සීනි තේ හැඳි ගණන

  දිනකට තේ කෝප්පය

  ග්‍රෑම් ගණනය කිරීමට එක සීනි හැන්දක් ග්‍රෑම් 5 ලෙස සළකා ගණනය කරන්න.

ක්‍රියාකාරකම් 11

තේ කෝප්පයකට සාමාන්‍යයෙන් දමන සීනි තේ හැඳි ගණන	ශක්ති ප්‍රමාණය ලබා ගැනීමට අනෙක් ආහාර වලින් ගත යුතුප්‍රමාණය
දිනකට තේ කෝප්පය	
මසකට සීනි තේ හැඳි	
ග්‍රෑම් ගණනය කිරීමට එක සීනි හැන්දක් ග්‍රෑම් 5 ලෙස සළකා ගණනය කරන්න	
මසක මුළු සීනි පරිභෝජනය	

- එක් එක් කණ්ඩායමෙන් පුද්ගලයන් දෙදෙනෙකු බැගින් ගෙන ඔවුන්ගේ උස හා බර මනින්න.
- එක් එක් කණ්ඩායමට කැල්කියුලේටරයක් හා ශරීර ස්කන්ධ දර්ශකය මැනීමේ රවුම බැගින් ලබා දෙන්න.
- ශරීර ස්කන්ධ දර්ශකය මැනීමේ ආකාරය ගණනය කිරීමට කියා දෙන්න.

$$\text{ශරීර ස්කන්ධ දර්ශකය} = \frac{\text{බර(කිලෝ ග්‍රෑම්)}}{\text{උස (මීටර්)} \times \text{උස (මීටර්)}}$$

- කැල්කියුලේටරයක් හා ශරීර ස්කන්ධ දර්ශකය මැනීමේ රවුම භාවිතයෙන් මෙම ඇගයීම සිදු කරන්න.
- එක් එක් ශරීර ස්කන්ධ දර්ශකය අනුව ඔවුන් අඩු බරඅදිබර , සාමාන්‍ය , හෝ තරබාරු ලෙස වෙන කරන අන්දම සාකච්චා කරන්න
- සියලු දෙනාටම මෙම ඇගයීම සිදී කිරීමට අවස්ථාව ලබා දෙන්න.
- එම ගනනය කිරීම අනුව ප්‍රශස්ත ශරීර ස්කන්ධ දර්ශකය වෙත ලඟා වීමට එම පුද්ගලයන්ගේ බරෙහි ඇතිවිය යුතු වෙනස ගණනය කරන්න.

ක්‍රියාකාරකම් 12

	උස (සේ.මී.)	බර (කි.ග්‍රෑම්)	ශරීර ස්කන්ධ දර්ශකය	ශරීර ස්කන්ධ දර්ශක කාණ්ඩය	තිබිය යුතු නියමිත බර
A					
B					

සාරාංශය

එක පුද්ගලයෙකු හෝ දෙදෙනෙකුට ඉදිරිපත වී මෙම සැසියේ සාරාංශයක් තමාටම හැඟෙන පරිදි ඉදිරිපත් කරන ලෙස ඇරයුම් කරන්න.

එය පුවරුව සටහන් කරන්න. සැසිය මෙහෙයවන ඔබ සියල්ලන්ගේ සාරාංශය ඉදිරිපත් කරන්න.

- යහපත් සෞඛ්‍යතත්වයක් පවත්වා ගැනීමටත්බෝ නොවන රෝග , අධික රුධිර , හර්ද රෝග ,දියවැඩියාව)වලින් වලක්වා ගැනීමට හා ඌනතා රෝග වලින් වැලකීමට මනා (පිළිකා ,පීඩනය මේ සදහා පෝෂණ . පෝෂණයක් පවත්වා ගැනීම වැදගත්වේ . වේවශ්‍යඅත්‍ය තොරතුරු
- පෝෂණ තොරතුරු ලබා ගත හැකි මාර්ග තමුදු -හා ඉලෙක්ට්‍රොනික මාධ්‍ය
- නිවැරදි හා විශ වාස තොරතුරු ලබා ගත හැකි මාර්ග
- මුද්‍රිත මාධ්‍ය වල දී ඇති තොරතුරු අවබෝධ කර ගැනීම
- මුද්‍රිත මාධ්‍ය වල දී ඇති තොරතුරු ඇසුරින් සරල ගණනය කිරීම් සිදු කිරීම

මේ පර්යේෂණයේ අරමුණ සහභාගී වන්නන්ගේ පෝෂණ තොරතුරු ලබා ගත හැකි මාර්ග හඳුනා ගැනීම , ඒවායේ ඇති තොරතුරු තම එදිනෙද අහර තොර ගැනීමේදී යොදා ගැනීම හා එමගින් වඩාත් හොඳ තීරණ ගැනීමට මග පෙන්වීමයි.

නිමාවට පෙර වදනක්

අද සැසිය ඔබ සැමට ප්‍රයෝජනවත් වූවා යයි සිතමු.

මෙම අදහස් ගෙදර අය සමගත් බෙදා ගන්න ලෙස උද්‍යෝගිමත් කරන්න

මෙම දැනුම භාවිතා කර සෞඛ්‍යමත ජීවිතයක් ළඟ කර ගැනීම ඔබගේ වගකීමක් බව අවධාරණය කරන්න.

නැවත හමුවනතුරු ආයුබෝවන්.

Annexure XX.a

Information Sheet For Participants III

Study on Nutrition Literacy, its correlates and effectiveness of a skill development intervention to improve nutrition literacy among females aged 25-45 years of age in Colombo District- Intervention study

I am Dr. K.Y.P.K. Weerasekara, currently attached to the Post graduate Institute of Medicine as a post graduate trainee in Community Medicine. I would like to invite you to take part in a research intervention aiming to improve nutrition literacy among females aged 25-45 years of age in Colombo District conducted by Dr. K.Y.P.K. Weerasekara and Dr. N. S. Gunawardena, Senior Lecturer of the Department of Community Medicine, Faculty of Medicine, University of Colombo.

1. Purpose of the study

The purpose of this research is toassess the effectiveness of a skill development intervention to improve nutrition literacy among females aged 25-45 years of age in Colombo District .It is expected that this intervention study help to plan such interventions in future.

2. **Voluntary participation**

Your participation in this study is voluntary. You are free to not participate at all or to withdraw from the study at any time despite consenting to take part earlier. If you decide not to participate or withdraw from the study you may do so at any time.

3. **Duration, procedures of the study and participant's responsibility**

The procedures to be carried out are an interviewer administered questionnaire, which is aimed to assess the nutrition literacy of you. Based on the score achieved by you in this assessment, if we find that your score is below the expected minimal score, you may be selected for the intervention.

The intervention is mainly educational and contains some activities that will help to improve your skills in using nutrition information to day today decision making. This will be conducted over a period of two months with one session per week. You will have to participate in these eight sessions and to answer an interviewer administered questionnaire at the completion of two months and four months afterwards.

4. **Potential benefits**

Participation in this study may benefit you as it will help to improve your skills in using nutrition information to day today decision making.Hence you will be able to more critically analyze nutrition information and make appropriate food choices.

It will be beneficial to your community as a whole since the findings will be provided to agencies and personnel in the respective field who are involved in further decision making and providing food and nutrition information.

5. **Risks, hazards and discomfort**

We ensure that there are no potential or actual risks to you by participating in this research. The only inconvenience to you will be to spend a selected slot of time for a period of two months to participate in the intervention and to spend time in answering the questionnaire.

6. **Reimbursements**

You will not be paid any allowances for participating in this study.

7. **Confidentiality**

Confidentiality of all the records is guaranteed and no information by which you can be identified will be released or published. These data will never be used in such a way that you could be identified in any public presentations or publications.

8. **Termination of study participation**

You may withdraw your consent to participate in this intervention at any time. Please notify the investigator as soon as you decide to withdraw your consent.

9. Clarification

If you need further clarifications, please feel free to contact me at,

Dr. K.Y.P.K. Weerasekara

Registrar in Community Medicine

No 108, Kadgugahawatta,

Gothatuwa,

Angoda

Tel. 0112_411028

Annexure XX.b

විස්තර පත්‍රිකාව III

කොලඹ දිස්ත්‍රික්කයේ අවුරුදු 25-45 අතර කාන්තාවන්ගේ පෝෂණ සාක්ෂරතාවය වැඩි දියුණු කිරීමට මැදිහත්වීමේ පර්යේෂණය

වෛද්‍ය කේ. වයි. පී. කේ. වීරසේකර වන මම කොළඹ වෛද්‍යය පීඨයේ ප්‍රජා වෛද්‍යය දෙපාර්තමේන්තුවට, පශ්චාත් උපාධිය සඳහා අනුබද්ධවීසිටින වෛද්‍යවරයෙක්මි. මාවිසින් වෛද්‍ය එන්. එස්. ගුණවර්ධන මහත්මියගේ අධීක්ෂණය යටතේ කොළඹ දිස්තක්කයේ අවුරුදු 25-45 අතර කාන්තාවන්ගේ පෝෂණ සාක්ෂරතාවය වැඩිදියුණු කිරීමට සිදු කරන මැදිහත්වීමේ පර්යේෂණයට සහභාගීවන ලෙස ඉල්ලා සිටිමි.

1. **<u>පර්යේෂණයේ අරමුණ</u>**

මෙම සමීක්ෂණයේ අරමුණ කොළඹ දිස්තක්කයේ තෝරාගත් පාදේශීය ලේකම් බලපදේශයක අවුරුදු 25-44 අතර කාන්තාවන්ගේ පෝෂණසාක්ෂරතාවය මැණබැලීම හා එම හැකියාව වැඩිදියුණු කිරීමට මැදිහත්වීමයි. දැනට එබඳු මැදිහත්වීම් පිලිබඳ අධයයන ඉතා සීමිත බැවින් ඉදිරිකාලයේදී එබඳු මැදිහත්වී මේපර්යේෂ ණසැලසුම් කිරීමට මෙය පයෝජනවත්වනු ඇත.

2. **ස්වේච්ඡා සහභාගිත්වය**

මෙම සමීක්ෂණයට ඔබගේ සහභාගිත්වය ස්වේච්ඡාවෙන්ම සිදුවිය යුතුය. මෙයට සහභාගී නොවීමටහෝ සහභාගීවීමට ගත් තීරණය වෙනස්කොට ඉන් ඉවත්වීමට ඕනෑම අවස්ථාවකදී ඔබට හැකිය. ඔබ මෙයට සහභාගී නොවීමෙන් කිසිම වරපූසාදයක් ඔබට අහිමි නොවනු ඇත.

3. **සහභගීවන්නාගේ වගකීමකට යුතුදෑ හා ගතවන කාලය**

සමීක්ෂණ සහායිකාවක මගින් කරනු ලබන පෝෂණ සාක්ෂරතාවය ඇගයීමේ සම්මුඛසාකච්ඡාමය පශ්නාවලියකට පිලිතුරුසැපයීමටද, එමගින් ඔබගේ පෝෂණ සාක්ෂරතාවය පමාණවත් නොවනබව හැඟීගියහොත්, මාස 2ක මැදිහත්වීමේ පර්යේෂණයකට සහභාගීවීමට සිදුවේ. මෙය සතියකට එක් වැඩමුලුවක් බැගින් මාස 2ක කාලයක්තුලපැ වැත්වෙනු ඇත.

4. **උදාවිය හැකි වාසි**

පර්යේෂණයට සහභාගීවීමෙන් ඔබට ආහාර හා පෝෂණය පිළිබඳ තොරතුරු ලබාගැනීමේ හැකියව වැඩිදි යුණුවන අතර, එම තොරතුරු තර්කානුකූලව සලකා බලා යහපත් ආහාර පුරුදු ඇතිකරගැනීමට උපකාරී කරගතහැකිය. තවද, පජාවතුල එබඳු මැදිහත්වී ම්සැලසුම් කිරීමට හැකිවනු ඇත.

5. **අවදානම්, වයසන හා අපහසුතා**

මෙයට සහභාගිවීමේදී ඔබට කිසිදු අවදානමක්, වයසනකාරීතත්වයක් හෝ අපහසුතාවයක් සිදුනොවනු ඇත.

6. **මූලය දායකත්වය**

මෙයට සහභාගිවීමේදී, ඔබ මැදහත් වීමේ කාණ්ඩයමට අයත් වුවහොත් , එහි සහභාගී වන සැසියක් සඳහා රුපියල් 100 ක ගෙවීමක් සිදුකරනු ලැබේ.

7. **රහසයභාවය**

සියලුම වාර්තාවල රහසයභාවය අරක්ෂා කරන බවට සහතික වන අතර, කිසිදු ආකාරයකින් ඔබ ගැන සොයාගතහැකි විස්තර තව කෙනෙකුට ලබාදීමක් හෝ ප්‍රසිද්ධ කිරීමක් නොවනු ඇත.

8. **සමීක්ෂණයෙන් ඉවත්වීම**

අවශය ඕනෑම අවස්ථාවකදී මෙම සමීක්ෂණයෙන් ඉවත්විය හැකිය. ඔබගේ අනුමැතිය ඉවත් කරගැනීමට අවශයවූවිට ප්‍රධාන පරීක්ෂකට ඒ බව දන්වන්න.

9. වැඩි විස්තර ලබාගැනීමට

සමීක්ෂණයේ ක්‍රියාකාරකම්ගැන විස්තර හෝ වෙනත් කරුණක් ගැන විමසීමට අවශයනම් මා අමතන්න.

වෛද්‍ය කේ. වයි. පී. කේ. වීරසේකර
නො 108, කජුගහවත්ත ගොතටුව,
අංගොඩ.
දුරකථනඅංක: 0112-411028

Annexure XXI.a

Consent Form III-Intervention study

To be completed:

a. By the participant

The participant should complete the whole of this sheet herself

1	Have you read the information sheet? (Please keep a copy for yourself)	Yes/No
2	Have you had an opportunity to discuss this study and ask any questions?	Yes/No
3	Have you had satisfactory answers to all your questions?	Yes/No
4	Have you received enough information about the study?	Yes/No
5	Who explained the study to you?	
6	Do you understand that you are free to withdraw from the study at any time, without having to give a reason	Yes/No
7	Have you had sufficient time to come to your decision?	Yes/No
8	Do you agree to take part in this study?	Yes/No

Participant's Signature.....Date.....

Name (BLOCK CAPITALS) .....

b. By the investigator

I have explained the study to the above volunteer and she has indicated her willingness to take part.

Signature of investigator ..... Date .....

Name (BLOCK CAPITALS).....

Annexure XXI.b

කැමැත්ත කාශ කිරීමේ පතය III- මැදිහත්වීමේ පර්යේෂණය

a) සහභාගිවන්නා විසින් පිරවිය යුතුය

1	ඔබ විස්තර පතිකාව සම්පූර්ණයෙන් කියවුවාද? (ඔබ ළඟ පිටපතක් තබා ගන්න)	ඔව්/නැත
2	ඔබට මෙම මැදිහත්වීමේ පර්යේෂණය සම්බන්ධ සාකච්ඡා කිරීමට හා පශ්න ඇසීමට අවස්ථාවක් ලැබුනේද?	ඔව්/නැත
3	ඔබගේ සියලුම ගැටළු වලට සෑහීමට පත්විය හැකි පිලිතුරු ලැබුනේද?	ඔව්/නැත
4	ඔබට මෙම සමීක්ෂණය පිලිබඳව අවශය පමණ තොරතුරු ලැබුනේද?	ඔව්/නැත
5	ඔබට මෙම සමීක්ෂණය පිලිබඳව පහදිලි කලේ කවුරුන්ද?	
6	ඔබට කරුණු දැන්වීමකින් තොරව ඕනෑම අවස්ථාවක මෙම පර්යේෂණයෙන් ඉවත්වීමට හැකි බව ඔබ තේරුම් ගත්තේද?	ඔව්/නැත
7	ඔබට තීරණයක් ගැනීමට ප්‍රමාණවත් කාලයක් ලැබුනේද?	ඔව්/නැත
8	ඔබ මෙම පර්යේෂණයටසහභාගි වීමට එකඟ වන්නේද?	ඔව්/නැත

සහභාගිවන්නා ගේ අත්සන ..... දිනය .....

නම (පැහැදිලි අකුරෙන්) .....

b) පරීක්ෂකවරයා විසින් පිරවිය යුතුය

මා විසින් මෙමෙ පර්යේෂනය පිළිබඳව විස්තර කරන ලදී අනතුරුව ඇය විසින් පර්යේෂණයට කැමත්ත පල කරන ලදී.

පරීක්ෂකවරයාගේ අත්සන ..... දිනය .....

නම (පැහැදිලි අකුරෙන්) .....

Annexure XXII.a

Questionnaire for Intervention study- Pre Intervention Evaluation

Section A

Questionnaire for Validation of Nutrition Literacy Test

GN division		Index No.	
Name		Contact No	
Address			
Date of interview		Name of the interviewer	

Instructions to interviewer.

- Read out the following to the respondent.

  "Thank you for consenting to participate in this study. The information you provide is very important and try to answer as sincerely as accurately as possible.

  Your responses will be treated confidentially and only the researchers will have access to the forms. If you do not understand the questions, please tell me. If you have anything to ask from me about this study, you can ask them now."

- Mark the responses in the relevant box by cross (x). Please obtain responses to all the questions.

Demographic and socio-economic information of the participant	
1	Age in years (as at last birthday): |___||___||___|
2	Ethnicity 1 Sinhalese |___| 2 Tamil |___| 3 Muslim |___| 4 Other |___|
4	Your highest educational achievement 1 No schooling |___| 2 Up to Grade 5 |___| 3 Grade 6-9 |___| 4 Up to G.C.E (O/L) |___| 5 Passed G.C.E. (O/L) |___| 6 Passed G.C.E. (A/L) |___| 6 University education and above |___|

7	Your marital status at present 1 Currently in marriage |___| 2 Unmarried |___| 3 Separated |___| 4 Widowed |___| 5 Divorced |___| If unmarried go to question 14
5	What is your employment status? 1 Currently employed |___| 2 Previously employed |___| 3 Never employed |___|

Instructions to Interviewer

Please fill the following information before administering questions to the participant.

Section B

- Read out the following to the respondent.

  "Thank you for consenting to participate in this study. The information you provide is very important and try to answer as sincerely as accurately as possible.

  Your responses will be treated confidentially and only the researchers will have access to the forms. If you do not understand the questions, please tell me. If you have anything to ask from me about this study, you can ask them now."

- Mark the responses in the relevant box by cross (x). Please obtain responses to all the questions.

Thank you for time taken to participate in this research. Please read the following carefully before writing answers to this test.

- This is a test to ascertain the ability understand nutrition information and make inferences based on commonly available nutrition information.
- You are required to answer all questions.
- To indicate your answer, please write an 'X' in the cage provided adjacent to the responses.
- For each question you can select only one response. There is one correct response to each question, given in the set of answers.
- In the event that you do not know the correct answer, please don't guess an answer. Then select the 'don't know' option as the response.

Section C

The validated nutrition literacy test was then administered

nnexure XXII.b

මැදහත් වීමේ පර්යේෂණය- පෙර ඇගයීම

කොටස 1

<u>සම්මුඛ පරීක්ෂක</u> <u>*සඳහා උපදෙස්*</u>
සම්මුඛ පරීක්ෂණයට පෙර පහත කොටස සම්පූර්ණ කරන්න.

ග්‍රාම නිලධාරි වසම		අනුක්‍රමික අංකය:	
නම		දුරකථන අංකය	
ලිපිනය			
දත්ත එකතු කිරීමේ දිනය		සම්මුඛ පරීක්ෂකගේ නම	

කොටස 2

- *පිළිතුරු සපයන්නාට මෙය කියවන්න.*
  "මෙම සමීක්ෂණයට සහභාගී වීමට එකඟ වීම පිළිබඳව ස්තුතිවන්ත වෙමි.ඔබ ලබාදෙන තොරතුරු ඉතාමත් වැදගත් වන බැවින් හැකි තරම් දුරට නිවැරදි හා සත්‍ය තොරතුරු ලබා දෙන්න.
  ඔබ සපයන තොරතුරු වල රහස්‍යභාවය ආරක්ෂා කරනු ලබන අතර , මෙම තොරතුරු පරිහරණ ය කරනු ලබන්නේ සමීක්ෂකයන් විසින් පමණි. ඔබට කිසියම් ප්‍රශ්නයක් තේරුම ගත නොහැකිනම්, කරුණාකර එය මට පවසන්න.ඔබට සමීක්ෂණය පිළිබඳව කිසියම් දෙයක් තවදුරටත් දැනගැනීමටඇත්නම් එය දැන්ඇසීමට හැකිය."
- *පිළිතුරු සපයන්නා විසින් දෙනු ලබන පිළිතුරු ඉදිරියෙන් "X"සලකුණ සඳහන් කරන්න.*

පෞද්ගලික සහ සමාජ ආර්ථික පසුබිම සම්බන්ධ තොරතුරු	
1	වයස අවුරුදු (පසුගිය උපන්දිනයට): |___||___||___|
2	ජාතිය 1 සිංහල |___| 2 දෙමළ |___| 3 මුස්ලිම් |___| 4 වෙනත් |___|
3	ලබා ඇති උසසස්ම අධ්‍යාපන මට්ටම 1 පාසල් නොගිය |___| 2 ණිය දක්වාශ්‍රේ 5 |___| 3 -69 ශ්‍රේණිය දක්වා |___| 4 අදක්වා (පෙළ/ස).ස.පො. |___| 5 අසමත් (පෙළ/ස).ස.පො. |___| 6 අසමත් (පෙළ/උ).ස.පො. |___| 7 විශ්ව විද්‍යාල අධ්‍යාපනය හා ඉන් ඉහල |___|
3	විවාහක තත්ත්වය 1 විවාහක |___| 2 අවිවාහක |___| 3 වැන්දඹු |___| 4 දික්කසාද |___| 5 නීතියෙන් වෙන්වූ |___|

5	ඔබගේ රැකියා පසුබිම කුමක්ද? 1 දැනට රැකියාවක නියුතු |___| **2** රැකියාවක් නොකළ |___|

කොටස 3; වලංගු කල පෝෂණ සාක්ෂර තාවය මැනීමේ පරීක්ෂණය දෙන ලදී.

Annexure XXIV

Distribution of the Corrected item-total correlation of the Nutrition Literacy Test

Table 1. Distribution of the Corrected item-total correlation of the Nutrition Literacy Test

Item number	Corrected Item-Total Correlation	Item number	Corrected Item-Total Correlation
1	0.47	16	0.57
2	0.53	17	0.59
3	0.69	18	0.61
4	0.56	19	0.52
5	0.56	20	0.42
6	0.41	21	0.55
7	0.53	22	0.53
8	0.33	23	0.63
9	0.32	24	0.56
10	0.26	25	0.58
11	0.43	26	0.43
12	0.49	27	0.49
13	0.30	28	0.44
14	0.30	29	0.53
15	0.55	30	0.57

Annexure XXV

Distribution of the item difficulty index of the items of the Nutrition Literacy Test

Table 1. Distribution of the item difficulty index of the items of the Nutrition Literacy Test

Item	Number of correct response (%)	Item difficulty index
1	50 (33.3%)	0.33
2	65 (43.3%)	0.43
3	92 (61.3%)	0.61
4	100 (66.7%)	0.67
5	106 (70.7%)	0.71
6	61 (40.7%)	0.41
7	73 (48.7%)	0.49
8	81 (54.0%)	0.54
9	49 (32.7%)	0.33
10	102 (68.0%)	0.68
11	135 (90.0%)	0.90
12	73 (48.7%)	0.49
13	55 (36.7%)	0.37
14	120 (80.0%)	0.80
15	131 (87.3%)	0.87
16	85 (56.7%)	0.57
17	81 (54.0%)	0.54
18	120 (80.0%)	0.80
19	99 (66.0%)	0.66
20	78 (52.0%)	0.52
21	97 (64.7%)	0.65
22	104 (69.3%)	0.69
23	89 (59.3%)	0.59
24	101 (67.3%)	0.67
25	77 (51.3%)	0.51
26	80 (53.3%)	0.53
27	37 (24.7%)	0.25
28	63 (42.0%)	0.42
29	64 (42.7%)	0.43
30	73 (48.7%)	0.49

Test

Annexure XXVI

Results of the assessment of the item discrimination of the draft Nutrition Literacy Test

Table 4.5.Distribution of the point bi-serial correlation estimates of the items of the Nutrition Literacy Test

Item	point bi-serial correlation
1	0.51
2	0.57
3	0.73
4	0.62
5	0.62
6	0.46
7	0.57
8	0.38
9	0.36
10	0.32
11	0.45
12	0.53
13	0.27
14	0.32
15	0.56
16	0.63
17	0.63
18	0.62
19	0.55
20	0.48
21	0.58
22	0.55
23	0.64
24	0.58
25	0.63
26	0.50
27	0.55
28	0.51
29	0.60
30	0.62

Annexure XXVII

Results of the assessment of the item discrimination of the Nutrition Literacy test

Table 4.1.5.Distribution of the discrimination index of the items of the Nutrition Literacy Test

Item		Incorrect response	Correct response	Difference in the percentages of correct response between High score group and low score group
1	High score group	32 (32.00%)	43 (86.00%)	72.00
	Low score group	68 (68.00%)	7 (14.00%)	
		100 (100.00%)	50 (100.00%)	
2	High score group	21 (24.71%)	54 (83.08%)	66.15
	Low score group	64 (75.3%)	11 (16.93%)	
		85 (100.00%)	65 (100.00%)	
3	High score group	5 (8.63%)	70 (76.09%)	52.17
	Low score group	53 (91.38%)	22 (23.92%)	
		58 (100.00%)	92 (100.00%)	
4	High score group	5 (10.00%)	70 (70.00%)	40.00
	Low score group	45 (90.00%)	30 (30.00%)	
		50 (100.00%)	100 (100.00%)	
5	High score group	2 (4.55%)	73 (68.87%)	37.73
	Low score group	42 (95.46%)	33 (31.14%)	
		44 (100.00%)	106 (100.00%)	
6	High score group	28 (31.47%)	47 (77.05%)	54.09
	Low score group	61 (68.54%)	14 (22.96%)	
		89 (100.00%)	61 (100.00%)	
7	High score group	17 (22.08%)	58 (79.46%)	58.91
	Low score group	60 (77.93%)	15 (20.55%)	
		77 (100.00%)	73 (100.00%)	
8	High score group	24 (34.79%)	51 (62.97%)	25.93
	Low score group	45 (65.22%)	30 (37.04%)	
		69 (100.00%)	81 (100.00%)	

Item		Incorrect response	Correct response	Difference in the percentages between High score group and low score group
9	High score group	38 (37.63%)	37 (75.52%)	51.03
	Low score group	63 (62.38%)	12 (24.49%)	
		101 (100.00%)	49 (100.00%)	
10	High score group	15 (31.25%)	60 (58.83%)	17.65
	Low score group	33 (68.75%)	42 (41.18%)	
		48 (100.00%)	102 (100.00%)	
11	High score group	15 (31.25%)	60 (58.83%)	17.65
	Low score group	33 (68.75%)	42 (41.18%)	
		48 (100.00%)	102 (100.00%)	
12	High score group	19 (24.68%)	56 (76.72%)	53.33
	Low score group	58 (75.33%)	17 (23.29%)	
		77 (100.00%)	73 (100.00%)	
13	High score group	39 (41.06%)	36 (65.46%)	30.91
	Low score group	56 (58.95%)	19 (34.55%)	
		95 (100.00%)	55 (100.00%)	
14	High score group	10 (33.34%)	65 (54.17%)	8.33
	Low score group	20 (66.67%)	55 (45.84%)	
		30 (100.00%)	120 (100.00%)	
15	High score group	0 (0%)	75 (57.26%)	14.51
	Low score group	19 (100.00%)	56 (42.75%)	
		19 (100.00%)	131 (100.00%)	
16	High score group	12 (18.47%)	63 (74.12%)	48.23
	Low score group	53 (81.54%)	22 (25.89%)	
		65 (100.00%)	85 (100.00%)	
17	High score group	14 (20.29%)	61 (75.31%)	55.31
	Low score group	55 (79.72%)	20 (24.7%)	
		69 (100.00%)	81 (100.00%)	
18	High score group	2 (6.67%)	73 (60.84%)	21.67
	Low score group	28 (93.34%)	47 (39.17%)	
		30 (100.00%)	120 (100.00%)	

Item		Incorrect response	Correct response	Difference in the percentages between High score group and low score group
19	High score group	11 (21.57%)	64 (64.65%)	29.29
	Low score group	40 (78.44%)	35 (35.36%)	
		51 (100.00%)	99 (100.00%)	
20	High score group	20 (27.78%)	55 (70.52%)	41.03
	Low score group	52 (72.23%)	23 (29.49%)	
		72 (100.00%)	78 (100.00%)	
21	High score group	10 (18.87%)	65 (67.02%)	34.03
	Low score group	43 (81.14%)	32 (32.99%)	
		53 (100.00%)	97 (100.00%)	
22	High score group	11 (23.92%)	64 (61.54%)	23.07
	Low score group	35 (76.09%)	40 (38.47%)	
		46 (100.00%)	104 (100.00%)	
23	High score group	9 (14.76%)	66 (74.16%)	48.30
	Low score group	52 (85.25%)	23 (25.85%)	
		61 (100.00%)	89 (100.00%)	
24	High score group	7 (14.29%)	68 (67.33%)	34.65
	Low score group	42 (85.72%)	33 (32.68%)	
		49 (100.00%)	101 (100.00%)	
25	High score group	16 (21.92%)	59 (76.63%)	53.25
	Low score group	57 (78.09%)	18 (23.38%)	
		73 (100.00%)	77 (100.00%)	
26	High score group	20 (28.58%)	55 (68.75%)	37.50
	Low score group	50 (71.43%)	25 (31.25%)	
		70 (100.00%)	80 (100.00%)	
27	High score group	44 (38.94%)	31 (83.79%)	67.57
	Low score group	69 (61.07%)	6 (16.22%)	
		113 (100.00%)	37 (100.00%)	
28	High score group	29 (33.34%)	46 (73.02%)	46.03
	Low score group	58 (66.67%)	17 (26.99%)	
		87 (100.00%)	63 (100.00%)	

Item		Incorrect response	Correct response	Difference in the percentages between High score group and low score group
29	High score group	25 (29.07%)	50 (78.13%)	56.25
	Low score group	61 (70.94%)	14 (21.88%)	
		86 (100.00%)	64 (100.00%)	
30	High score group	18 (23.38%)	57 (78.09%)	56.17
	Low score group	59 (76.63%)	16 (21.92%)	
		77 (100.00%)	73 (100.00%)	

Annexure XXVIII

Item characteristic curves drawn for each item of the Nutrition Literacy test

Item Characteristic Curves

Fig. 1: Item Characteristic Curve - Item 1

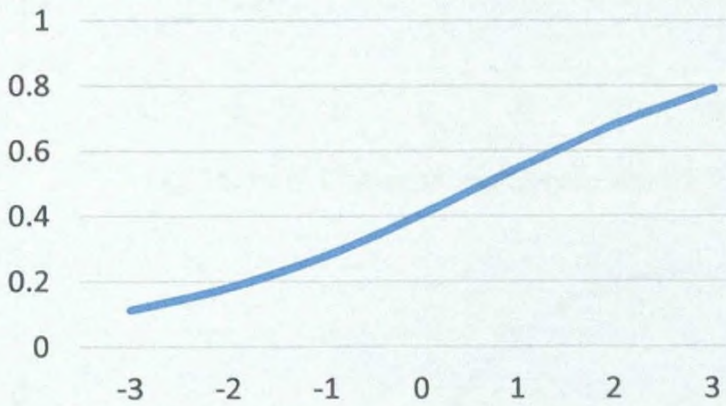


Fig. 2: Item Characteristic Curve - Item 2

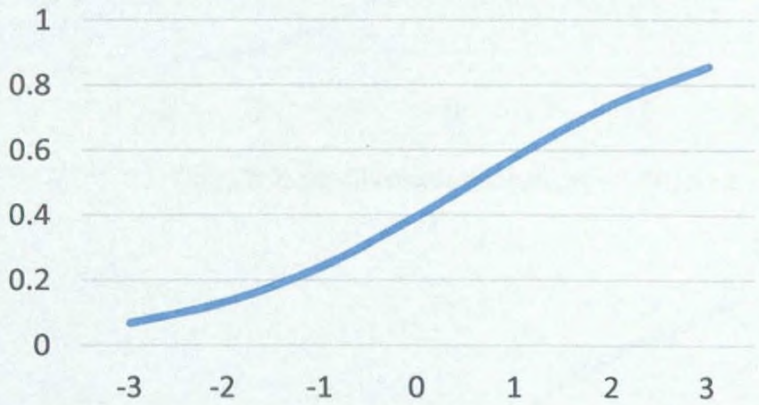


Fig. 3: Item Characteristic Curve - Item 3

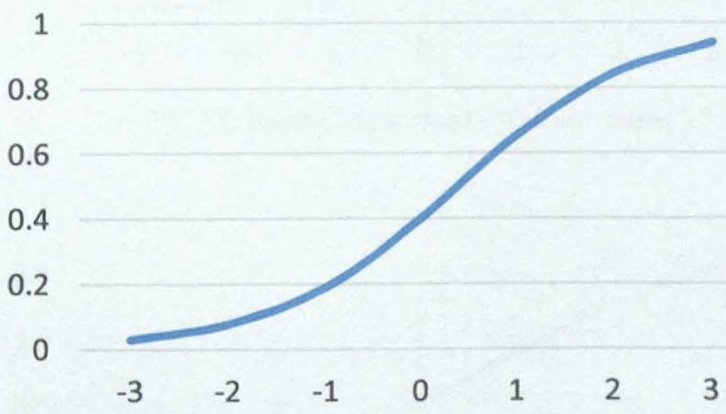


Fig. 4: Item Characteristic Curve - Item 4

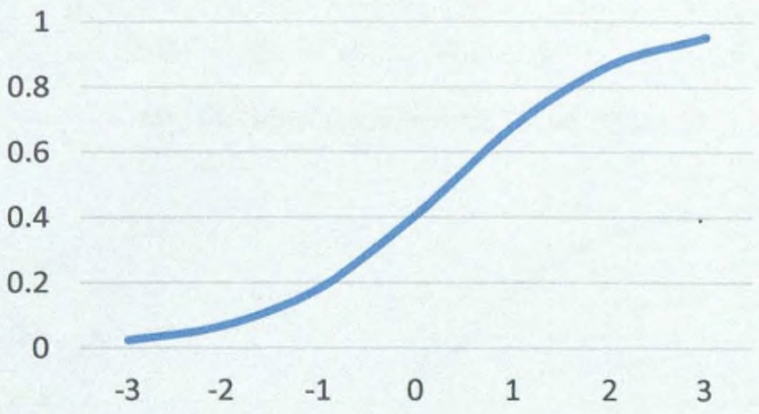


Fig. 5: Item Characteristic Curve - Item 5

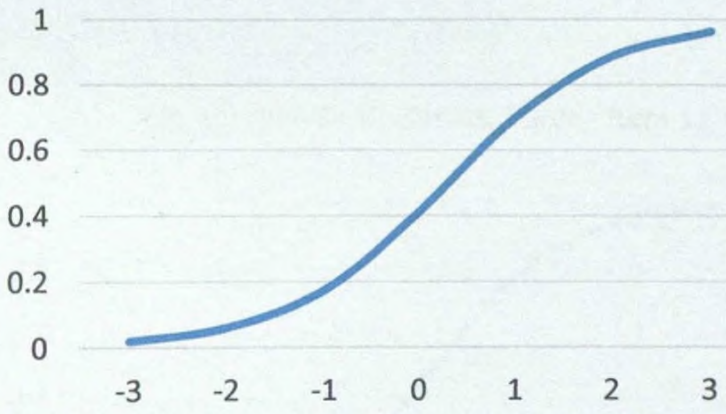


Fig. 6: Item Characteristic Curve - Item 6

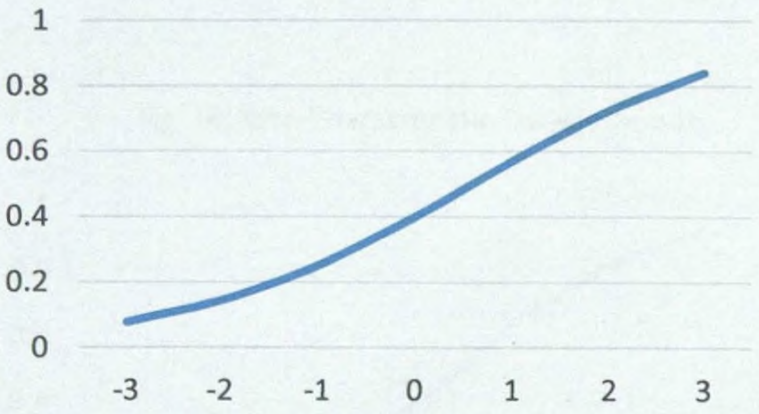


Fig. 7: Item Characteristic Curve - Item 7

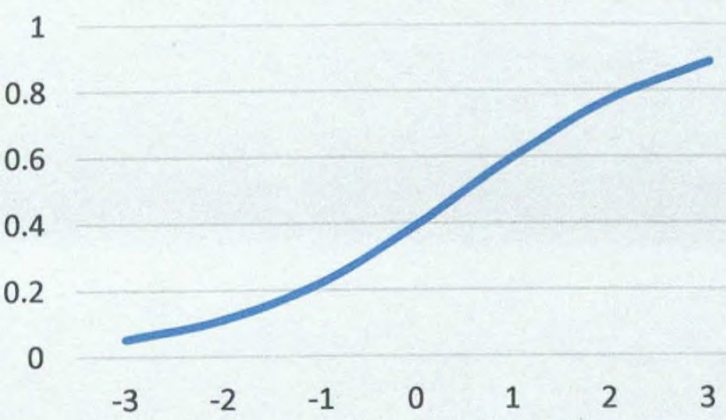


Fig. 8: Item Characteristic Curve - Item 8

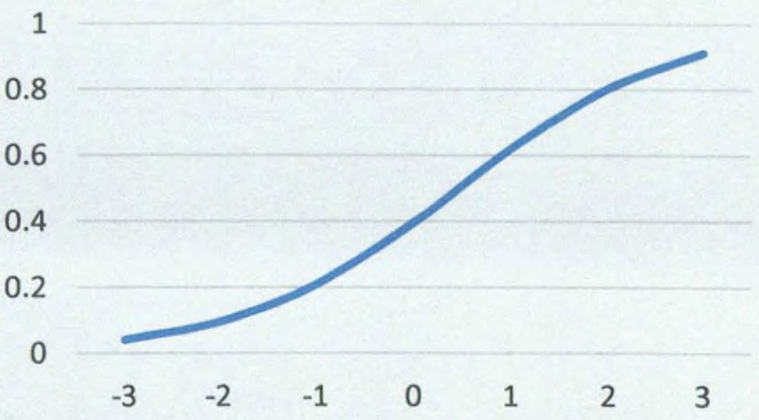


Fig. 9: Item Characteristic Curve - Item 9

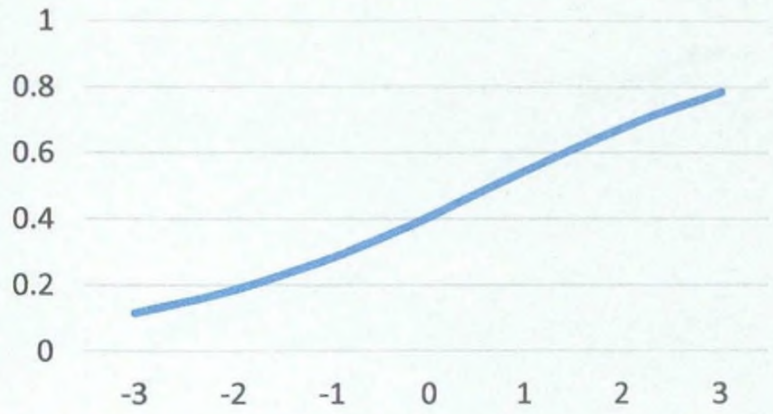


Fig. 10: Item Characteristic Curve - Item 10

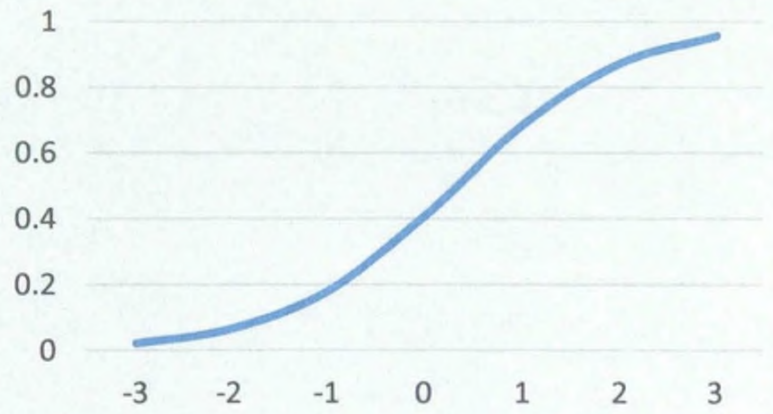


Fig. 11: Item Characteristic Curve - Item 11

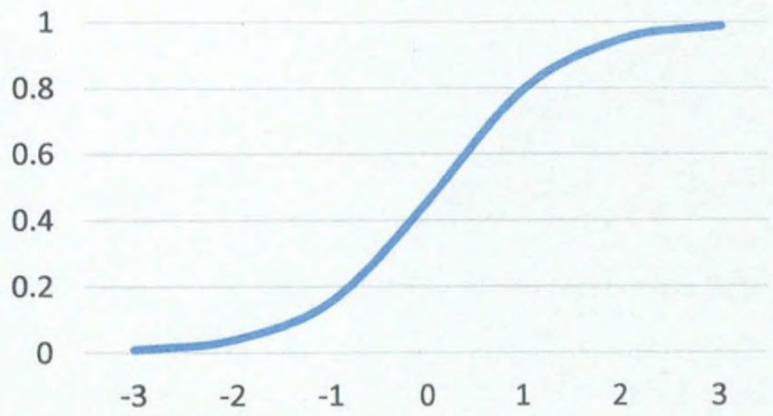


Fig. 12: Item Characteristic Curve - Item 12

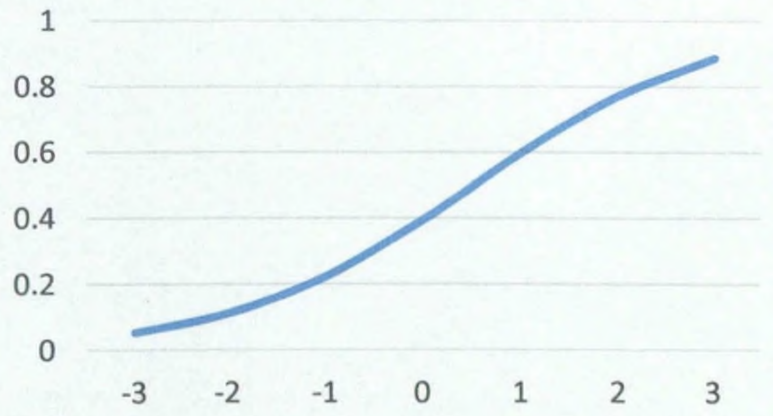


Fig. 13: Item Characteristic Curve - Item 13

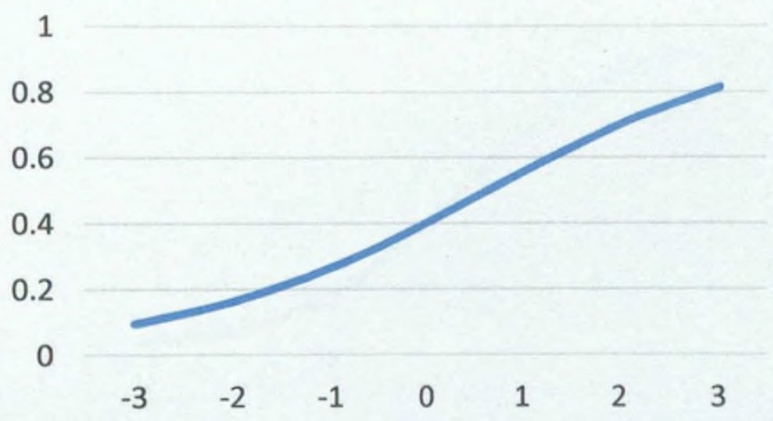


Fig. 14: Item Characteristic Curve - Item 14

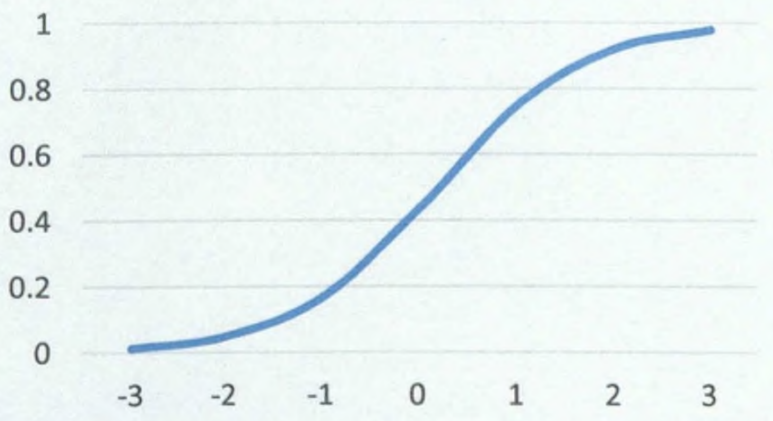


Fig. 15: Item Characteristic Curve - Item 15

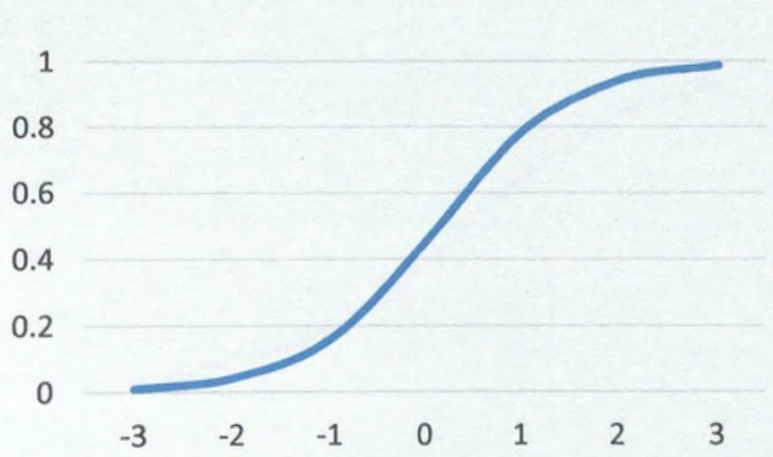


Fig. 16: Item Characteristic Curve - Item 16

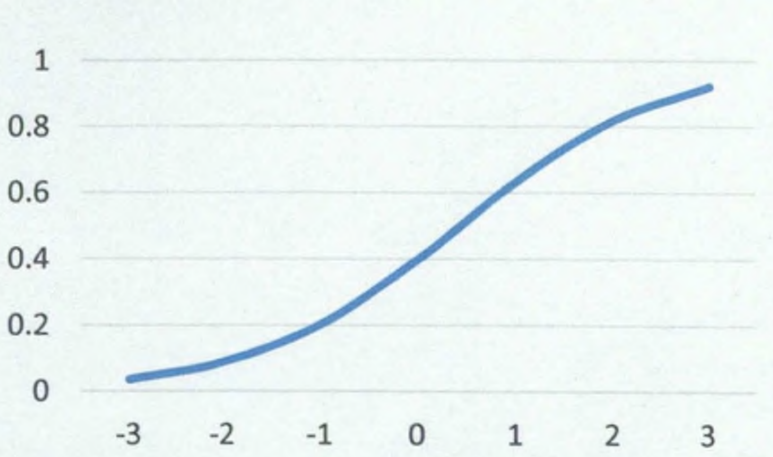


Fig. 17: Item Characteristic Curve - Item 17

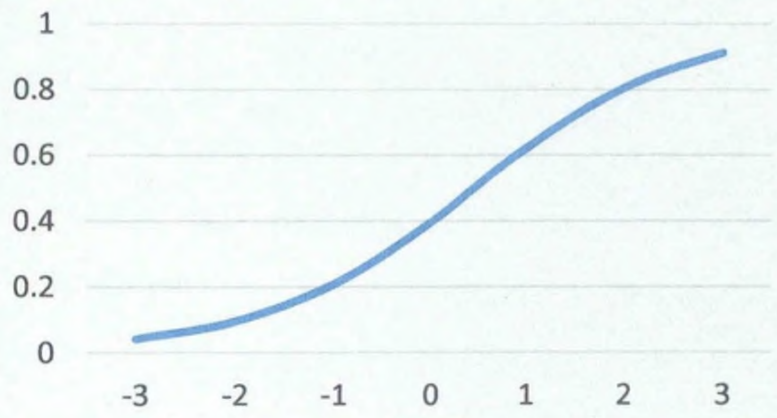


Fig. 18: Item Characteristic Curve - Item 18

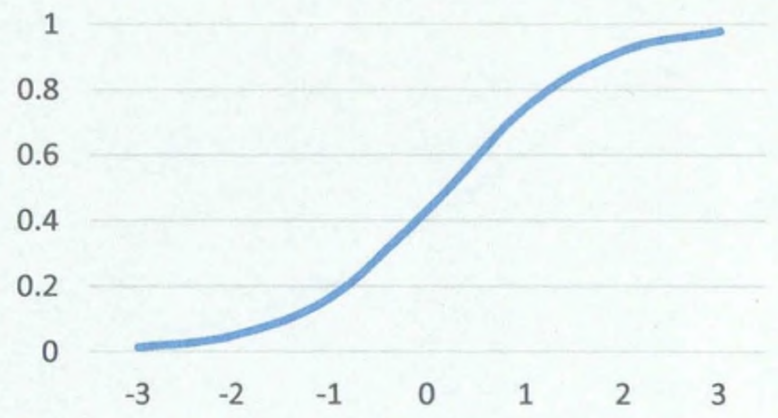


Fig. 19: Item Characteristic Curve - Item 19

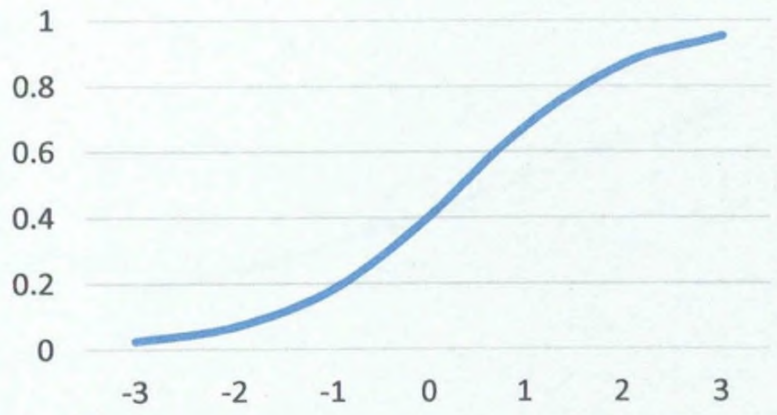


Fig. 20: Item Characteristic Curve - Item 20

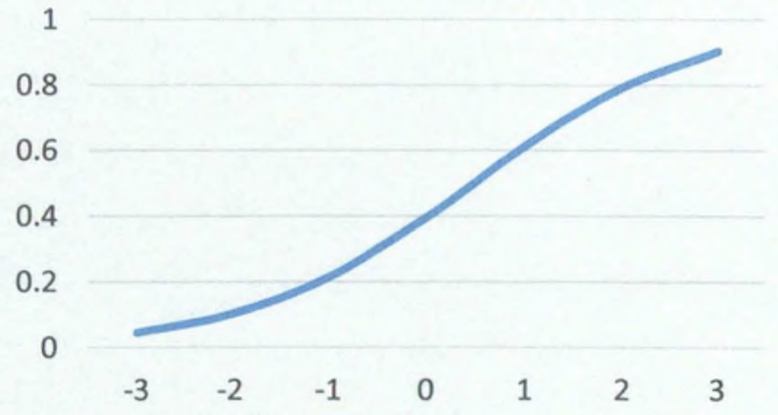


Fig. 21: Item Characteristic Curve - Item 21

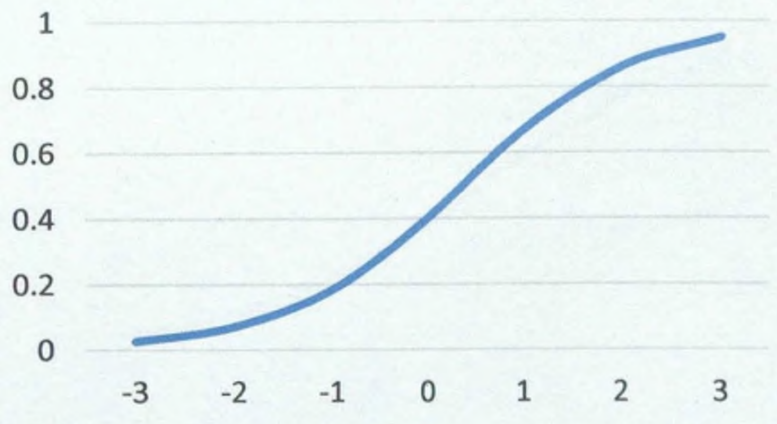


Fig. 22: Item Characteristic Curve - Item 22

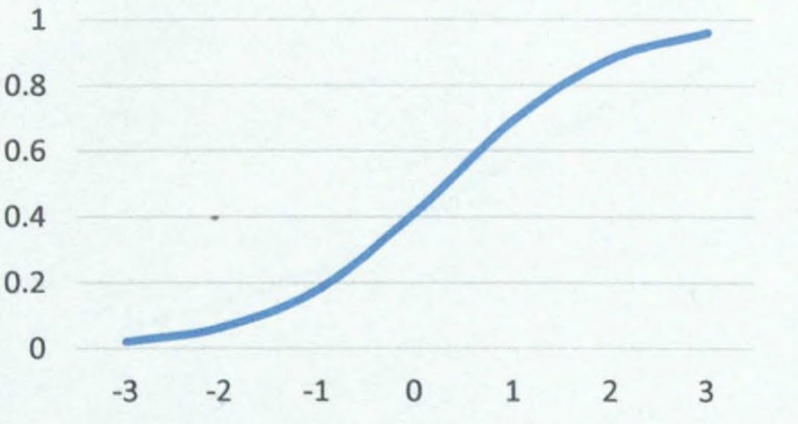


Fig. 23: Item Characteristic Curve - Item 23

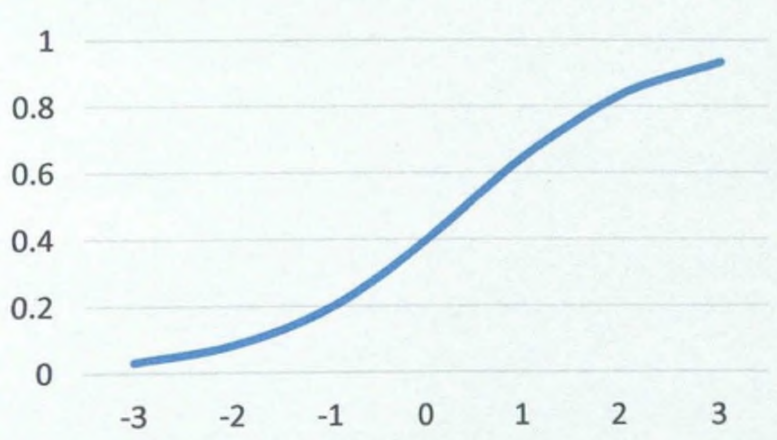


Fig. 24: Item Characteristic Curve - Item 24

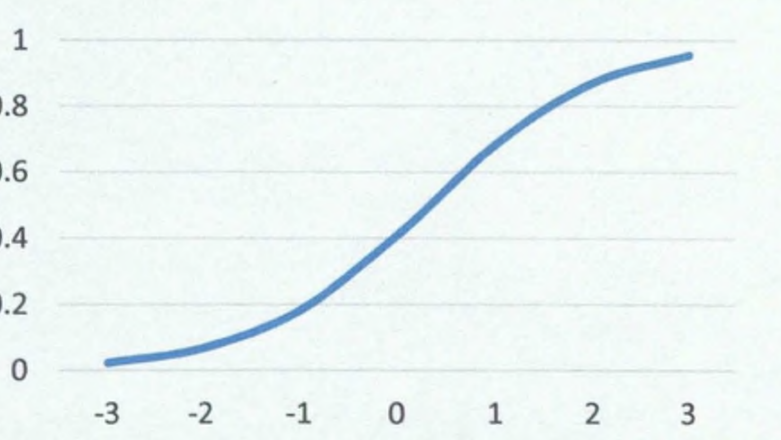


Fig. 25: Item Characteristic Curve - Item 25

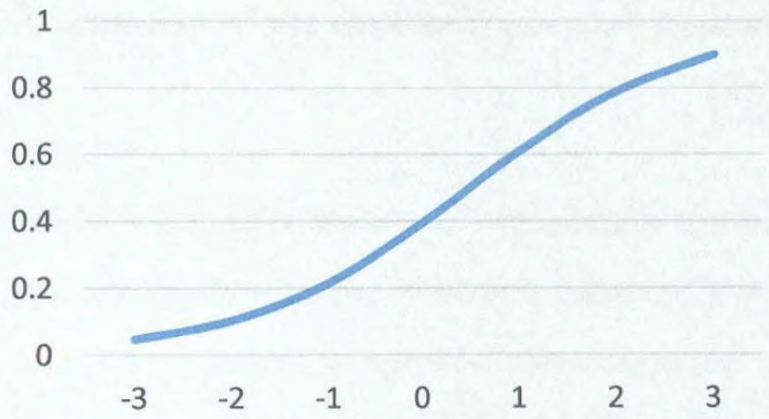


Fig. 26: Item Characteristic Curve - Item 26

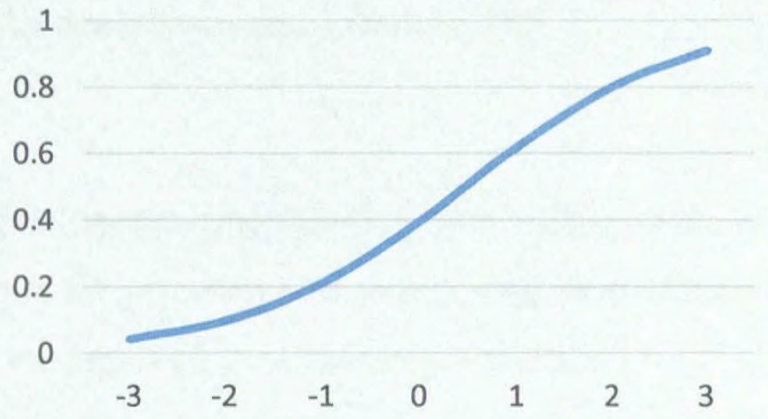


Fig. 27: Item Characteristic Curve - Item 27

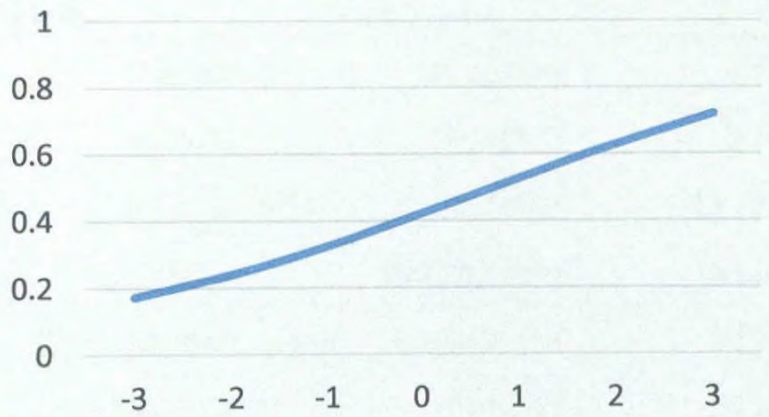


Fig. 28: Item Characteristic Curve - Item 28

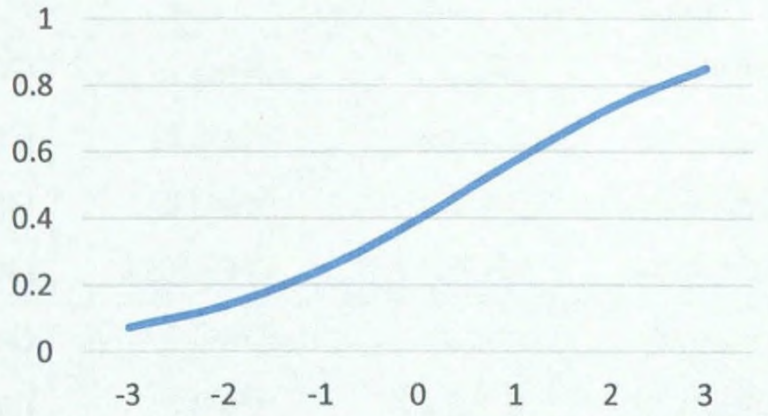


Fig. 29: Item Characteristic Curve - Item 29

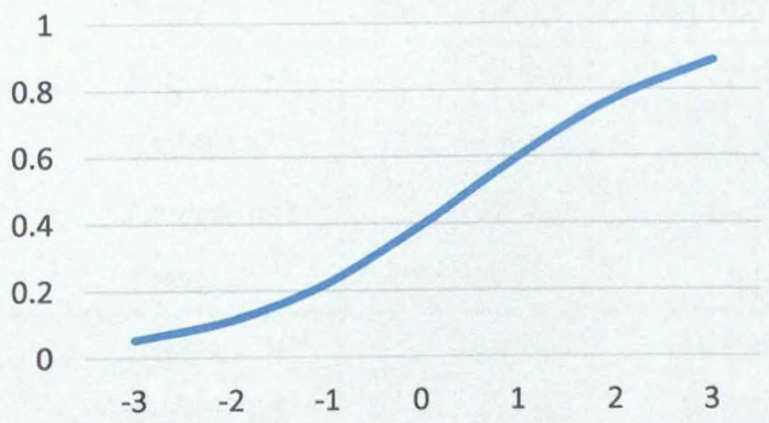
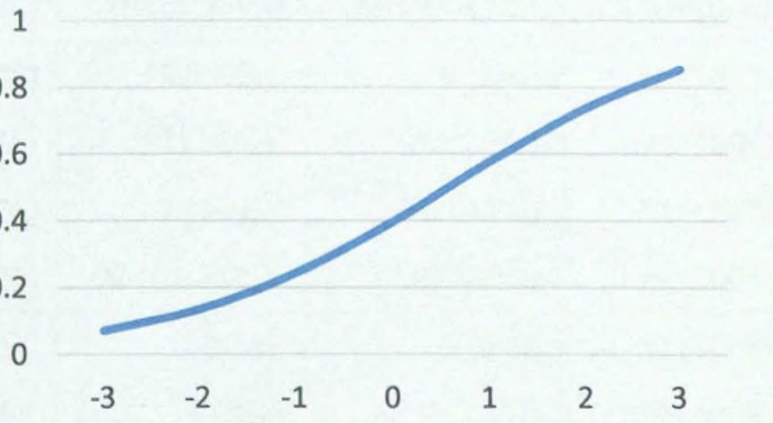


Fig. 30: Item Characteristic Curve - Item 30



Annexure XXIX

Assessment of the distractors of each item of the draft Nutrition Literacy Test

Table 4.1.7. Distribution of the percentage of participants who selected each of the response options by item of the Nutrition Literacy Test and the percentage of participants who selected each of the response options, was compared in the highest 1/3 of the scores and lowest 1/3 of the scores, among high and low scoring participants.

Item		1	2	3	4	Total
1	Highest 1/3	31 (62%)*	1 (2%)	17 (34%)	1 (2%)	50 (100%)
	Middle 1/3	15 (30%)*	3 (6%)	13 (26%)	19 (38%)	50 (100%)
	Lowest 1/3	4 (8%)*	11 (22%)	8 (16%)	27 (54%)	50 (100%)
	Total	50 (33.34%)*	15 (10%)	38 (25.34%)	47 (31.34%)	150 (100%)
2	Highest 1/3	38 (76%)*	5 (10%)	5 (10%)	2 (4%)	50 (100%)
	Middle 1/3	21 (42%)*	5 (10%)	5 (10%)	19 (38%)	50 (100%)
	Lowest 1/3	6 (12%)*	6 (12%)	9 (18%)	29 (58%)	50 (100%)
	Total	65 (43.34%)*	16 (10.67%)	19 (12.67%)	50 (33.34%)	150 (100%)
3	Highest 1/3	2 (4%)	0 (0%)	48 (96%)*	0 (0%)	50 (100%)
	Middle 1/3	3 (6%)	0 (0%)	37 (74%)*	10 (20%)	50 (100%)
	Lowest 1/3	17 (34%)	6 (12%)	7 (14%)*	20 (40%)	50 (100%)
	Total	22 (14.67%)	6 (4%)	92 (61.34%)*	30 (20%)	150 (100%)
4	Highest 1/3	2 (4%)	48 (96%)*	0(%)	0 (0%)	50 (100%)
	Middle 1/3	3 (6%)	36 (72%)*	3 (6%)	8 (16%)	50 (100%)
	Lowest 1/3	6 (12%)	16 (32%)*	6 (12%)	22 (44%)	50 (100%)
	Total	11 (7.33%)	100 (66.67%)*	9 (6.0%)	30 (20%)	150 (100%)
5	Highest 1/3	0 (0%)	50 (100%)*	0 (0%)	0 (0%)	50 (100%)
	Middle 1/3	2 (4%)	38 (76%)*	1 (2%)	9 (18%)	50 (100%)
	Lowest 1/3	5 (10%)	18 (36%)*	9 (18%)	18 (36%)	50 (100%)
	Total	7 (4.67%)	106 (70.67%)*	10 (6.67%)	27 (18%)	150 (100%)
6	Highest 1/3	33 (66%)*	5 (10%)	12 (24%)	0 (0%)	50 (100%)
	Middle 1/3	22 (44%)*	2 (4%)	13 (26%)	13 (26%)	50 (100%)
	Lowest 1/3	6 (12%)*	5 (10%)	21 (42%)	18 (36%)	50 (100%)
	Total	61 (40.67%)*	12 (8%)	46 (30.67%)	31 (20.67%)	150 (100%)

Item		1	2	3	4	Total
7	Highest 1/3	42 (84%)*	7 (14%)	1 (2%)	0 (0%)	50 (100%)
	Middle 1/3	22 (44%)*	6 (12%)	8 (16%)	14 (28%)	50 (100%)
	Lowest 1/3	9 (18%)*	13 (26%)	10 (20%)	18 (36%)	50 (100%)
	Total	73 (48.67%)*	26 (17.34%)	19 (12.67%)	32 (21.34%)	150 (100%)
8	Highest 1/3	39 (78%)*	1 (2%)	10 (20%)	0 (0%)	50 (100%)
	Middle 1/3	27 (54%)*	2 (4%)	16 (32%)	5 (10%)	50 (100%)
	Lowest 1/3	15 (30%)*	16 (32%)	8 (16%)	11 (22%)	50 (100%)
	Total	81 (54%)*	19 (12.67%)	34 (22.67%)	16 (10.67%)	150 (100%)
9	Highest 1/3	13 (26%)	27 (54%)*	9 (18%)	1 (2%)	50 (100%)
	Middle 1/3	9 (18%)	14 (28%)*	14 (28%)	13 (26%)	50 (100%)
	Lowest 1/3	10 (20%)	8 (16%)*	11 (22%)	21 (42%)	50 (100%)
	Total	32 (21.34%)	49 (32.67%)*	34 (22.67%)	35 (23.34%)	150 (100%)
10	Highest 1/3	41 (82%)*	1 (2%)	7 (14%)	1 (2%)	50 (100%)
	Middle 1/3	33 (66%)*	4 (8%)	7 (14%)	6 (12%)	50 (100%)
	Lowest 1/3	28 (56%)*	2 (4%)	7 (14%)	13 (26%)	50 (100%)
	Total	102 (68%)*	7 (4.67%)	21 (14%)	20 (13.34%)	150 (100%)
11	Highest 1/3	0 (0%)	0 (0%)	50 (100%)*	0 (0%)	50 (100%)
	Middle 1/3	2 (4%)	0 (0%)	48 (96%)*	0 (0%)	50 (100%)
	Lowest 1/3	6 (12%)	3 (6%)	37 (74%)*	4 (8%)	50 (100%)
	Total	8 (5.34%)	3 (2%)	135 (90%)*	4 (2.67%)	150 (100%)
12	Highest 1/3	4 (8%)	42 (84%)*	4 (8%)	0 (0%)	50 (100%)
	Middle 1/3	28 (56%)	20 (40%)*	2 (4%)	0 (0%)	50 (100%)
	Lowest 1/3	32 (64%)	11 (22%)*	2 (4%)	5 (10%)	50 (100%)
	Total	64 (42.67%)	73 (48.67%)*	8 (5.34%)	5 (3.34%)	150 (100%)
13	Highest 1/3	8 (16%)	22 (44%)*	10 (20%)	10 (0%)	50 (100%)
	Middle 1/3	11 (22%)	22 (44%)*	16 (32%)	1 (2%)	50 (100%)
	Lowest 1/3	13 (26%)	11 (22%)*	17 (34%)	9 (18%)	50 (100%)
	Total	32 (21.34%)	55 (36.67%)*	43 (28.6%)	10 (6.67%)	150 (100%)
14	Highest 1/3	48 (96%)*	2(4%)	0 (0%)	0 (0%)	50 (100%)
	Middle 1/3	40 (80%)*	5 (10%)	1 (2%)	4 (8%)	50 (100%)
	Lowest 1/3	32 (64%)*	5(20%)	5 (10%)	8(16%)	50 (100%)
	Total	120 (80.0%)*	12 (8.0%)	6 (4%)	12 (8.0%)	150 (100%)

Item		1	2	3	4	Total
15	Highest 1/3	50 (100%)*	0 (0%)	0 (0%)	0 (0%)	50 (100%)
	Middle 1/3	48 (96%)*	0 (0%)	2 (0%)	0 (0%)	50 (100%)
	Lowest 1/3	33 (66%)*	3 (6%)	5 (10%)	9 (18%)	50 (100%)
	Total	131 (87.3%)*	3(2.0%)	7(4.7%)	9 (6%)	150 (100%)
16	Highest 1/3	5 (10%)	1 (2%)	44 (88%)*	0 (0%)	50 (100%)
	Middle 1/3	11 (22%)	3 (6%)	34 (68%)*	2 (4%)	50 (100%)
	Lowest 1/3	15 (30%)	6 (12%)	7 (14%)*	22 (44%)	50 (100%)
	Total	31 (20.67%)	10 (6.67%)	85 (56.67%)*	24 (16%)	150 (100%)
17	Highest 1/3	46 (92%)*	1 (2%)	0 (0%)	3 (6%)	50 (100%)
	Middle 1/3	27 (54%)*	4 (8%)	5 (10%)	14 (28%)	50 (100%)
	Lowest 1/3	8 (16%)*	10 (20%)	5 (10%)	27 (54%)	50 (100%)
	Total	81 (54%)*	15 (10%)	10 (6.67%)	44 (29.34%)	150 (100%)
18	Highest 1/3	50 (100%)*	0 (0%)	0 (0%)	0 (0%)	50 (100%)
	Middle 1/3	46 (92%)*	0 (0%)	1 (2%)	3 (6%)	50 (100%)
	Lowest 1/3	24 (48%)*	2 (4%)	6 (2%)	18 (46%)	50 (100%)
	Total	120 (80%)*	2 (1.3%)	7 (4.7%)	21 (14%)	150 (100%)
19	Highest 1/3	2 (4%)	0 (0%)	48 (96%)*	0 (0%)	50 (100%)
	Middle 1/3	10 (20%)	0 (0%)	34 (68%)*	6 (12%)	50 (100%)
	Lowest 1/3	13 (26%)	2 (4%)	17 (34%)*	18 (36%)	50 (100%)
	Total	25 (16.67%)	2 (1.34%)	99 (66%)*	24 (16%)	150 (100%)
20	Highest 1/3	5 (10%)	3 (6%)	41 (82%)*	1 (2%)	50 (100%)
	Middle 1/3	9 (18%)	6 (12%)	26 (52%)*	9 (18%)	50 (100%)
	Lowest 1/3	9 (18%)	7 (14%)	11 (22%)*	23 (46%)	50 (100%)
	Total	23 (15.34%)	16 (10.67%)	78 (52%)*	33 (22%)	150 (100%)
21	Highest 1/3	4 (8%)	44 (88%)*	0 (0%)	2 (4%)	50 (100%)
	Middle 1/3	4 (8%)	39 (78%)*	0 (0%)	7 (14%)	50 (100%)
	Lowest 1/3	10 (20%)	14 (28%)*	5 (10%)	21 (42%)	50 (100%)
	Total	18 (12%)	97 (64.67%)*	5 (3.34%)	30 (20%)	150 (100%)
22	Highest 1/3	2 (4%)	45 (90%)*	1 (2%)	2 (4%)	50 (100%)
	Middle 1/3	4 (8%)	42 (84%)*	1 (2%)	3 (6%)	50 (100%)
	Lowest 1/3	3 (6%)	17 (34%)*	2 (4%)	28 (56%)	50 (100%)
	Total	9 (6%)	104 (69.34%)*	4 (2.67%)	33 (22%)	150 (100%)

Item		1	2	3	4	Total
23	Highest 1/3	1 (2%)	1 (2%)	48 (96%)*	0 (0%)	50 (100%)
	Middle 1/3	4 (8%)	5 (10%)	33 (66%)*	8 (16%)	50 (100%)
	Lowest 1/3	11 (22%)	8 (16%)	8 (16%)*	23 (46%)	50 (100%)
	Total	16 (10.67%)	14 (9.34%)	89 (59.34%)*	31 (20.67%)	150 (100%)
24	Highest 1/3	48 (96%)*	1 (2%)	0 (0%)	1 (2%)	50 (100%)
	Middle 1/3	35 (70%)*	2 (4%)	2 (4%)	11 (22%)	50 (100%)
	Lowest 1/3	18 (36%)*	5 (10%)	1 (2%)	26 (52%)	50 (100%)
	Total	101 (67.34%)*	8 (5.34%)	3 (2%)	38 (25.34%)	150 (100%)
25	Highest 1/3	0 (0%)	6 (12%)	43 (86%)*	1 (2%)	50 (100%)
	Middle 1/3	5 (10%)	7 (14%)	26 (52%)*	12 (24%)	50 (100%)
	Lowest 1/3	4 (8%)	8 (16%)	8 (16%)*	30 (60%)	50 (100%)
	Total	9 (6%)	21 (14%)	77 (51.34%)*	43 (28.67%)	150 (100%)
26	Highest 1/3	1 (2%)	43 (86%)*	3 (6%)	3 (6%)	50 (100%)
	Middle 1/3	0 (0%)	23 (46%)*	14 (28%)	13 (26%)	50 (100%)
	Lowest 1/3	3 (6%)	14 (28%)*	8 (16%)	25 (50%)	50 (100%)
	Total	4 (2.67%)	80 (53.34%)*	25 (16.67%)	41 (27.34%)	150 (100%)
27	Highest 1/3	6 (12%)	29 (58%)*	11 (22%)	4 (8%)	50 (100%)
	Middle 1/3	7 (14%)	4 (8%)*	8 (16%)	31 (62%)	50 (100%)
	Lowest 1/3	3 (6%)	4 (8%)*	6 (12%)	37 (74%)	50 (100%)
	Total	16 (10.67%)	37 (24.67%)*	25 (16.67%)	72 (48%)	150 (100%)
28	Highest 1/3	37 (74%)*	1 (2%)	10 (20%)	2 (4%)	50 (100%)
	Middle 1/3	19 (38%)*	6 (12%)	9 (18%)	16 (32%)	50 (100%)
	Lowest 1/3	7 (14%)*	8 (16%)	4 (8%)	31 (62%)	50 (100%)
	Total	63 (42%)*	15 (10%)	23 (15.34%)	49 (32.67%)	150 (100%)
29	Highest 1/3	6 (12%)	1 (2%)	43 (86%)*	0 (0%)	50 (100%)
	Middle 1/3	15 (30%)	8 (16%)	13 (26%)*	14 (28%)	50 (100%)
	Lowest 1/3	12 (24%)	6 (12%)	8 (16%)*	24 (48%)	50 (100%)
	Total	33 (22%)	15 (10%)	64 (42.67%)*	38 (25.34%)	150 (100%)
30	Highest 1/3	4 (8%)	3 (6%)	43 (86%)*	0 (0%)	50 (100%)
	Middle 1/3	4 (8%)	9 (18%)	23 (46%)*	14 (28%)	50 (100%)
	Lowest 1/3	4 (8%)	16 (32%)	7 (14%)*	23 (46%)	50 (100%)
	Total	12 (8%)	28 (18.67%)	73 (48.67%)*	37 (24.67%)	150 (100%)

*correct response to the item

Annexure XXX

Distribution of the reliability statistics of the nutrition literacy test

Reliability Statistics

KR -20 coefficient	N of Items
0.913	30

Item-Total Statistics	KR -20 coefficient if Item Deleted
1	0.910
2	0.909
3	0.907
4	0.909
5	0.909
6	0.911
7	0.909
8	0.913
9	0.913
10	0.914
11	0.911
12	0.910
13	0.915
14	0.913
15	0.910
16	0.909
17	0.908
18	0.909
19	0.909
20	0.911
21	0.909
22	0.909
23	0.908
24	0.909
25	0.909
26	0.911
27	0.910
28	0.911
29	0.909
30	0.909

Annexure XXXI

The measures of central tendency and dispersion in the nutrition literacy test score, is given below.

Table 1. Distribution of measures of central tendency and dispersion of the nutrition literacy test score, in the study population.

	Statistic
Mean(95% CI)	60.39 (59.06-61.73)
Median	63.98
Standard deviation	23.69
Skewness(SE)	-0.83(0.07)
Kurtosis(SE)	0.20(0.14)

Based on the above findings it could be seen that the nutrition literacy test score of the study population was not normally distributed and the values are right skewed, as shown by the Z score for the skewness calculated by skewness/ Std. Error of Skewness, in which acceptable range would be +1.96 to -1.96. In this case the value being -11.86.

Further visual inspection of the histogram and the Q-Q plot for the distribution of the score done. The histogram, the Q-Q plot and the box plot for the nutrition literacy test is shown Fig 1.

Fig 1: The Q-Q plot for the nutrition literacy test score

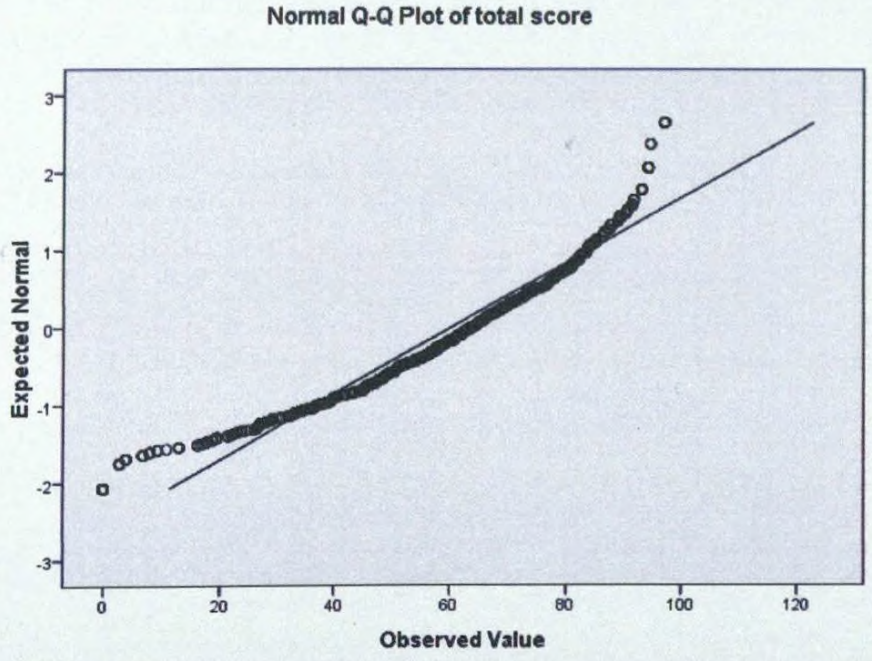
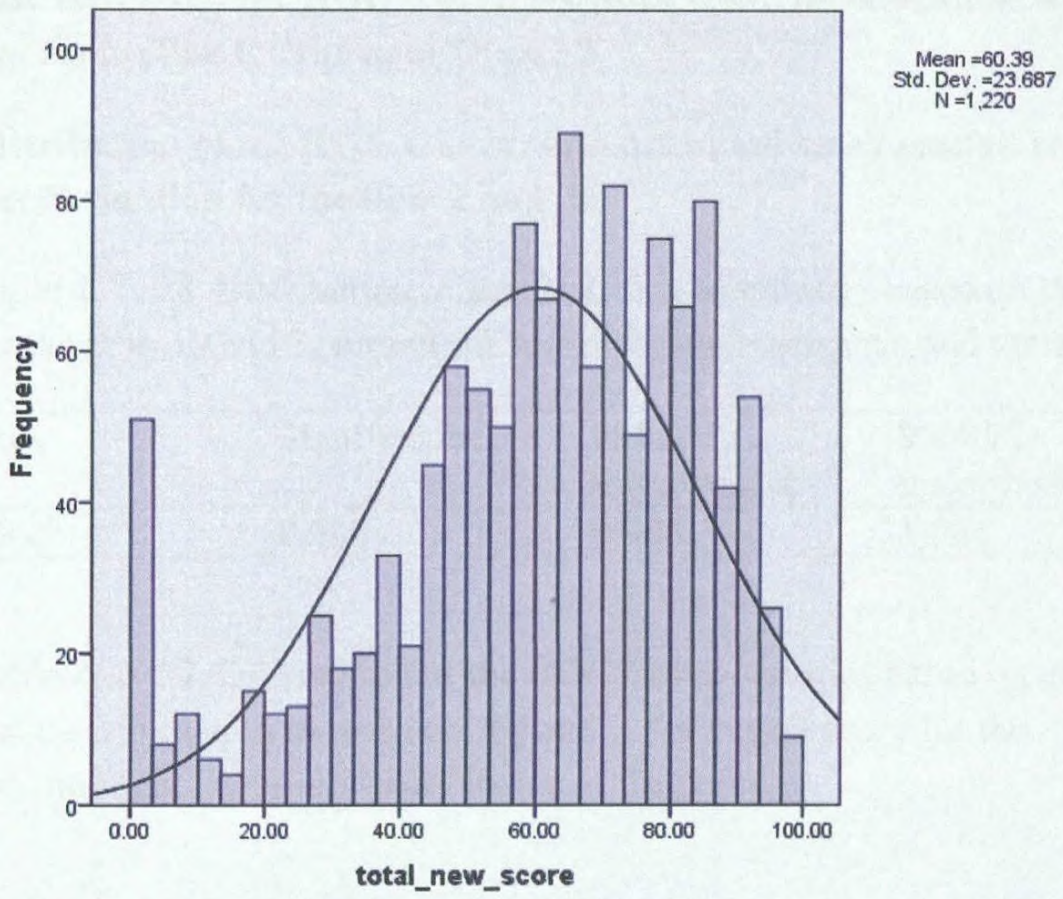


Fig 2: Histogram for the distribution of nutrition literacy test score



Based on this it could be seen that the distribution of the nutrition literacy test score was non normal in the study population, further findings for Shapiro-Wilk's test is shown in the table 4.2.23.

Table 2. Shapiro-Wilk's test for the normality of nutrition literacy test score

	Statistic	df	Sig.
Nutrition literacy test score	.932	1220	.000

Based on the above findings it could be seen that p value<0.05, hence the distribution of the score was non normal.

Annexure XXXII

Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 18 and 3

Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 2 and 25

Table 4. 1. 28. Distribution of the ROC Curve statistics based on education level, and response for the item 18 and 3, for cut off score, for the inadequate and marginal nutrition literacy group.

Area	Significance	95% CI lower bound	95% CI upper bound
0.995	0.000	0.986	1.004

Table 4. 1. 29. Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 18 and 3, for cut off score for the inadequate and marginal nutrition literacy group -coordinates of the curve

Coordinates of the Curve

Test Result Variable(s):score_tot

Positive if Greater Than or Equal To[a]	Sensitivity	1 - Specificity
1.5	1	1
2.68	1	0.947
3.43	1	0.895
7.43	1	0.789
11.36	1	0.684
13.36	1	0.579
16.29	1	0.474
18.97	1	0.421
21.11	1	0.368
22.75	1	0.316
24.25	1	0.263
27	1	0.211
30.93	1	0.158
33.61	0.969	0.158
35.22	0.969	0.053
39.54	0.969	0
45.18	0.954	0
48.72	0.923	0
51.33	0.908	0
52.83	0.877	0
53.47	0.846	0
56.65	0.831	0
60.01	0.815	0
60.76	0.8	0
62.19	0.769	0
63.51	0.754	0
64.65	0.723	0
66.37	0.708	0
67.87	0.677	0
69.22	0.646	0
70.76	0.631	0
72.08	0.6	0
72.47	0.585	0
72.76	0.569	0
73.51	0.538	0
74.37	0.508	0
75.05	0.492	0
75.73	0.477	0
76.48	0.446	0
77.05	0.431	0
77.23	0.415	0
77.87	0.385	0
79.8	0.354	0
82.3	0.338	0
83.73	0.323	0
85.73	0.308	0
87.62	0.262	0
88.48	0.246	0
89.73	0.215	0
90.87	0.154	0
91.73	0.108	0
92.59	0.092	0
93.73	0.062	0
95.16	0.031	0
98.02	0.015	0
101.02	0	0

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Table 4. 1. 31. Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 2 and 25, for cut off score, for the adequate and marginal nutrition literacy group.

Area	Significance	95% CI lower bound	95% CI upper bound
0.996	0.000	.986	1.006

Table 4. 1. 32. Distribution of the ROC Curve statistics based on education level, item difficulty and discrimination for the item 2 and 25, for cut off score for the adequate and marginal nutrition literacy group -coordinates of the curve

Coordinates of the Curve

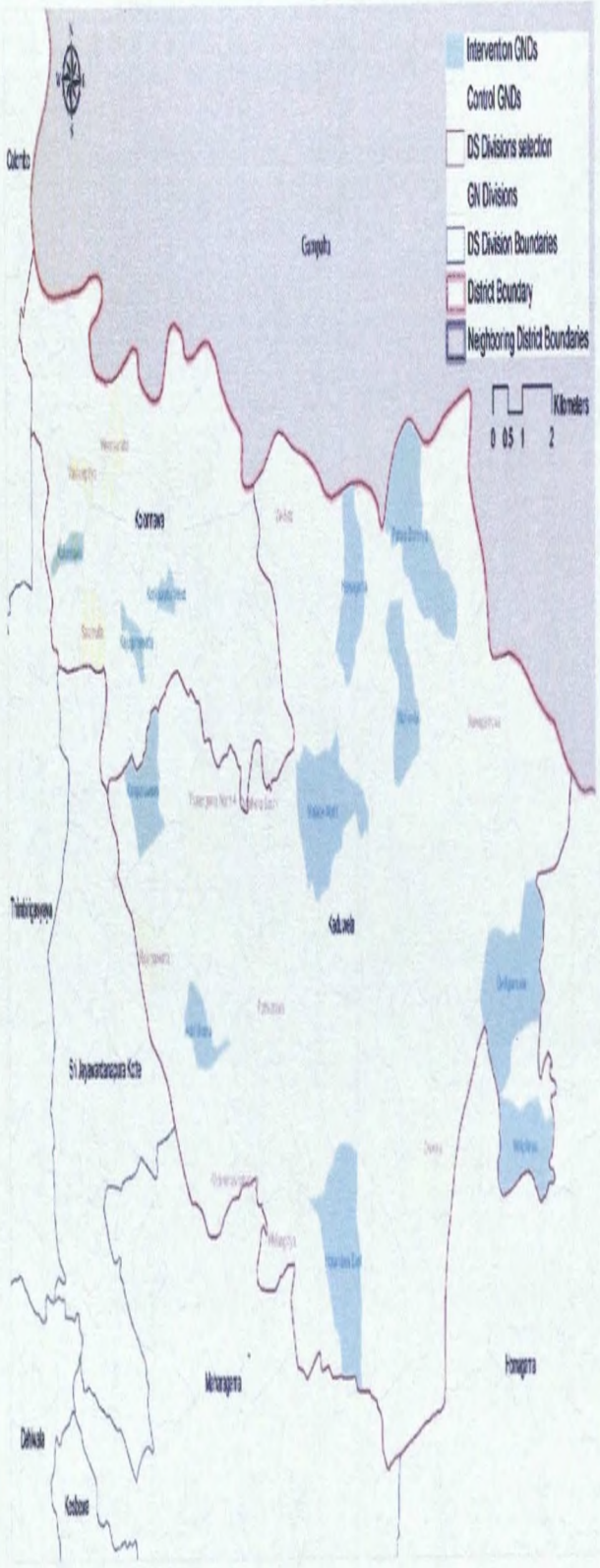
Test Result Variable(s):score_tot

Positive if Greater Than or Equal Toa	Sensitivity	1 - Specificity	Positive if Greater Than or Equal Toa	Sensitivity	1 - Specificity
1.5	1	1	43.11	1	0.262
2.68	1	0.976	43.97	1	0.238
3.43	1	0.929	45.11	1	0.19
7.93	1	0.881	47.97	1	0.167
12.93	1	0.833	50.65	1	0.143
14.43	1	0.81	52.47	1	0.119
16.29	1	0.762	56.26	1	0.095
18.97	1	0.738	61.01	1	0.071
21.11	1	0.714	66.15	1	0.024
22.5	1	0.69	72.37	0.909	0.024
23.25	1	0.667	76.48	0.818	0.024
24.25	1	0.643	77.05	0.818	0
25.11	1	0.619	79.16	0.773	0
27.11	1	0.571	82.3	0.727	0
30.25	1	0.548	83.73	0.682	0
32	1	0.524	85.73	0.636	0
32.68	1	0.5	87.62	0.545	0
33.47	1	0.452	89.05	0.5	0
35.08	1	0.429	90.87	0.409	0
36.4	1	0.405	92.3	0.273	0
37.54	1	0.357	93.73	0.182	0
39.54	1	0.333	95.16	0.091	0
41.65	1	0.31	98.02	0.045	0
42.79	1	0.286	101.02	0	0

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Annxure XXXIII

GN Divisions for the intervention (Map)



Annexure XXXIII.a

Table 1:Distribution of items of standard living index.

Socio-demographic characteristics	Number (1220)	Percentage
Housing Characteristics		
Source of drinking water		
Pipe borne (piped into home/ premises)	764	62.6
Common tap	248	20.3
private well	171	14.0
common well	13	1.1
Other	21	1.7
Type of toilet		
Water seal/Pour flush	972	79.7
Pit latrine	116	9.5
Common	126	10.3
None	0	0
other	4	.3
Type of roofing		
tiles	299	24.5
Asbestos/sheets	756	62.0
Cadjan/plastic/ other	165	13.5
Availability of electricity		
Yes	1183	97.0
No	37	3.0
Availability of radio		
Yes	1108	90.8
No	112	9.2
Availability of television		
Yes	1191	97.6
No	29	2.4
Availability of telephone		
Yes	882	72.3
No	338	27.7
Availability of refrigerator		
Yes	828	67.9
No	392	32.1
Availability of bicycle		
Yes	217	17.8
No	1003	82.2
Availability of motor bicycle		
Yes	415	34.0
No	805	66.0

Availability of a car			
	Yes	65	5.3
	No	1155	94.7
Availability of other vehicles			
	Yes	307	25.2
	No	913	74.9

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