NATIONAL NUTRITION AND MICRONUTRIENT SURVEY

AMONG SCHOOL ADOLESCENTS AGED 10-18 YEARS

IN SRI LANKA - 2017

Dr. Renuka Jayatissa

Prof. D.N. Fernando

Dr. Amila Perera

Dr. Nawamali De Alwis

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Dr. Renuka Jayatissa

Principal Investigator
Head, Department of Nutrition
Medical Research Institute

MESSAGE FROM DEPUTY DIRECTOR GENERAL LABORATORY SERVICE

This National Nutrition and Micronutrient Survey among school adolescents aged 10-18 years in Sri Lanka has provided us with valuable information regarding the nutritional status, dietary habits and physical activity patterns.

This survey has assessed 2700 School children aged 10-18 years, representing all nine provinces of the country to yield information on their current nutritional status.

Findings of this survey can be used to assess the effectiveness of current interventions and new interventions to be introduced to improve the nutritional status of school children at national as well as school level.

The Department of Nutrition of Medical Research Institute has carried out many vital national surveys. I would like to take this opportunity to congratulate the survey team of Department of Nutrition at Medical Research Institute for this great piece of work.

I sincerely hope that findings of this survey will be used to set up nutrition targets of the country.

Dr. B.V.S.H. Benaragama

Deputy Director General – Laboratory Services
Ministry of Health, Nutrition and Indigenous Medicine

MESSAGE FROM DIRECTOR - MEDICAL RESEARCH INSTITUTE

Adolescence, being a period of gradual transition from childhood to adulthood is known to be critical for many psychological, physiological and social aspects of one's life. Therefore, meeting proper nutrition during this period is highly important to meet the required demands of an individual in order to become more productive. But, Sri Lanka as a developing country still faces the issues related to the nutritional status of adolescents in several areas of the country.

As another step towards addressing this issue, the Department of Nutrition of Medical Research Institute (MRI) has successfully completed the study on 'National Nutrition and Micronutrient Survey among School Adolescents Aged 10-18 Years in Sri Lanka.'

The study was directed at determining the nutritional status of the above-mentioned population and factors affecting their dietary habits and lifestyle.

I highly appreciate the team effort of the staff of MRI for their effort and devotion in successfully completing this survey.

It is my sincere expectation that this survey will provide the required background to monitor the overall nutrition of the school adolescents of Sri Lanka, and thereby assist the relevant stakeholders in taking necessary actions to address these issues and improve their nutritional status to maintain their health.

Dr. P. U. Gamlathge

Director
Medical Research institute

RESEARCH TEAM

Principal Investigator

Dr. Renuka Jayatissa	- Consultant Medical Nutritionist MRI

Advisor and Report Writing

Prof. Dulitha Fernando	- Emeritus Prof. of Community Medicine

Co-Investigators

Dr. Mizaya Cader	- Consultant Community Physician
Dr. Himali De Silva	- Registrar, Community Medicine
Dr. Amila Perera	- Medical Officer in Nutrition
Dr. Nawamali De Alwis	- Medical Officer in Nutrition

Field Coordinator

Mr. J.M. Ranbanda	- Nutrition Assistant

Laboratory Coordinator

Mr. S. Ranasinghe	- Senior Laboratory Technologist

Members of the Research Team

Mrs. A.B.G. Silva	- Chemist
Mrs. Y. Amaratunga	- Research Officer
Mr. S. Dissanayake	- Medical Laboratory Technician
Mr. T.V.N. Raweendra	- Team Coordinator and Measurer
Mr. W.A.P.I. Pieris	- Team Coordinator and Measurer
Mr. E.C. Paranagama	- Team Coordinator and Measurer
Mr. D.S. Dabare	- Team Coordinator and Measurer
Mr. W.B.S.M. Wijenayaka	- Team Coordinator and Measurer
Mr. D.I.K. Soorige	- Team Coordinator and Measurer
Mr. M.M.W. Jayasakera	- Team Coordinator and Measurer
Miss. H.I.K.N. Hevawitharana	- Development Assistants
Mrs. K.H.R. Shyamalee	- Development Assistants
Mr. S.P. Priyantha	- Saukya Karya Sahayaka
Mrs. Shyamalee	- Saukya Karya Sahayaka
Mrs. Indrani	- Saukya Karya Sahayaka

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EXECUTIVE SUMMARY

Adolescents undergo significant physical, social, cognitive and emotional changes in a relatively short period of time. Such changes affect eating practices and health. The rapid increase in growth and development requires increased intake of energy and nutrients, requiring a food intake to match this demand. Several psychosocial factors have been reported to influence the nutritional status among adolescents. Health can be greatly compromised if these needs conflict.

In Sri Lanka there is a paucity of recent information regarding nutritional and health status of above-mentioned groups. Such information will be necessary to identify problems related to adolescent health for advocacy and to contribute towards development of guidelines for strategic planning and health promotion efforts at the community level.

This study was undertaken to determine nutrition and micronutrient status among school adolescents aged 10-18 years in Sri Lanka and to describe their nutritional status, dietary habits and lifestyle practices.

A cross sectional study was carried out among a sample of school adolescents aged 10 to 18 years. The sample size was calculated as 2,700 children in the specified age group, thus requiring the inclusion of 300 children from each province. As the primary sampling unit, a random sample of 15 schools were identified from each province where the list of all schools was obtained from the Ministry of Education, using population proportionate to size technique. All primary schools were excluded.

From each selected school, one class from grade 6 to 12 was randomly selected. In each selected class, 20 children were randomly selected using the attendance register. An attempt was made to select equal numbers of girls and boys. In the case of a boy's school, girls were selected from the closest girl's school.

The data collection was carried out using a pre-tested interviewer administered questionnaire, taking relevant anthropometric measurements and collecting venous blood and casual urine samples for the biochemical assessments. All precautions were taken to ensure quality of the data.

The problem of thinness among this group at the national level was 26.9 percent, indicating it is a moderate public health problem. Percentage of severely thin children was 7.1 percent with 63.3 percent belonging to 'normal' nutritional status and percentages of overweight and obese children being 7.5 and 2.2 percent respectively. It was seen that the nutritional status of adolescents has shifted over time, with some reductions in the prevalence of thinness, and shifts from normal weight to overweight and obesity. Geographical variations showed that the highest percentage of both overweight and obese children were reported from the Western province with the NCP reporting a relatively high percentage of overweight children. Northern province reported the lowest percentage of overweight and obese children.

Prevalence of anaemia, iron deficiency and iron deficiency anaemia were 8.8, 22.1 and 3.8 percent respectively. A higher prevalence of anaemia was seen among the older children. Variations of iron deficiency were seen between the provinces ranging from a low value in the Sabaragamuwa province (16.1 percent) to high values in NCP (29.9 percent) and Northern (27.5 percent) province.

Prevalence of Vitamin A deficiency was low, being only 0.1 percent for the total sample. Among the total group, 13.2 percent were Vitamin D deficient and another 45.6 percent were found to have levels indicating Vitamin D insufficiency. There was no consistent pattern in the prevalence of Vitamin D deficiency between the children of different ages. Geographical variations were marked and highest prevalence was found in Central province.

Iodine insufficiency was observed in the Western and Uva provinces. Prevalence of zinc deficiency was 29.4 percent.

There was a marked geographical variation in the percentage of children who always consumed iron folate received from the school, ranging from a low value in the Southern province (48.8 percent) to high value of 88.5 percent in the Northern province.

In general, about a third of the study population has received vitamin A mega dose supplementation. This percentage ranged from 42.2 percent among 12-year-old children to 24.2 percent among the 10-year-old group. The receival of this supplement was higher among the post-adolescent group and among the males. Variations between the provinces were seen**,** ranging from 59.7 percent in the Eastern province to 12.9 percent in the North Western province.

Providing anti helminthic treatment is another activity undertaken for this group of children. It is seen that the percentage of children who received such treatment was marginally higher among the post-adolescent group and among the females. Wide variation is seen between the different provinces, the percentages ranging from a low value of 40.2 percent in the North Central province to a high value of 90.4 percent in the Eastern province.

About a half of the study group regularly take their breakfast before going to school. The most common source of food consumed as breakfast was 'home-made' food items. A high percentage (89.7 percent) of children regularly consumed food during the school interval, majority (81.9 percent) consuming food brought from home. A limited number of children consumed food given by the school. Only 11.3 percent of the study sample consumed meal bought from the school canteen.

Most frequently consumed foods (more than once a day) were rice/rice flour products, milk and coconut. Energy-dense foods including sweets, sugar sweetened beverages and fast foods were not consumed daily. A majority of adolescents do not show an adequate daily intake of fruits or vegetables. Fatty food consumption seems to be common among this group.

Of the study group, 8.2 percent of children participated in vigorous physical activities with another 51.6 percent participating in moderate activities. Variations in the time spent on the different activities were seen between provinces.

Mean time spent on tuition per week increased with increasing age and the mean time spent on watching "screens" (TV and hand phone) was comparatively higher compared to the time spent on tuition, gardening and dancing. Variations in the time spent on different activities were seen between provinces.

A substantial proportion of children who perceived as being underweight belonged to the 'thin' categories and 42.3 percent of this group had 'normal' values. Of those who had normal BMI values, a high percentage (57.3 percent) perceived that they had optimum weight. Among those who considered themselves as overweight or obese, a substantial proportion was in fact overweight or obese.

Methods adopted to reduce weight varied. The proportion of children in the post-adolescent group who took diet pills, powders etc. was higher than in the pre-adolescent group and most of them were in the age group of 17 years. There were more males who practiced this method of losing weight.

Proportion of children who skipped their meals to lose weight varied. More children practiced 'skipping dinner' rather than other meals.

Proportion of children who consumed alcohol products and/or practiced smoking were higher among the post-adolescents and among males.

Prevalence of selected morbidity experiences (diarrhea, cough, fever) during the preceding two weeks showed that the prevalence of diarrhea was lower compared to the illnesses with cough, or with fever. There was no clear pattern related neither to the age categories nor between males and females.

More children drink water brought from home compared to water available in school. Among the children who drank water from school, the percentage was higher in the post-adolescent group and among males. More of the children in the pre-adolescent group and females drink water brought from home.

A minority of children (4.2 percent) practiced hand washing with soap always before meals and 42.0 percent always wash hands with soap after using the toilet.

Over 80 percent of the children were exposed to educational activities related to benefits of healthy eating, safe food preparation and storing and hygienic practices. Differences were seen between the geographical areas ranging from 95.4 percent in the Western province and a value of 63.8 percent in the North Central province.

The findings indicate the need to plan policies and implement programmes that have the potential to simultaneously reduce the risk or burden of both under-nutrition and overweight or obesity. There is a need to educate parents to provide nutrient-rich breakfast and mid-morning snack to consume at school to control malnutrition. As use of snacks is a common practice during school interval, practices relevant to making healthy choices of food need to be encouraged at all public schools. Adequate supervision of school canteens and limiting the number of vendors or food stalls that sell cheap and unhealthy food in the vicinity of the school are activities that could contribute to encourage good food habits among school children.

Encouraging adequate physical activities has to be considered as a positive approach that should be practiced to enable children to attain a satisfactory nutritional status along with implementation of school-based obesity prevention initiatives that should be targeted towards this age group specifically, as overweight and obesity are more prevalent among younger adolescents.

CHAPTER 1

INTRODUCTION

Adolescents are tomorrow's adult population, and their health and well-being are crucial. Yet, interest in the health of adolescents is relatively recent, and a focus on nutrition is even more recent, with the exception of adolescent pregnancy. Adolescents constitute about 17% of the population of Sri Lanka. For a country like Sri Lanka that suffers no significant food shortages and provides extensive, free maternal and child health services, it is rather paradoxical that malnutrition affects nearly one-fifth of children under five and women.

Adolescents undergo dramatic physical, cognitive, social, and emotional changes in a relatively short period of time. Such changes affect eating practices and health. The rapid increase in growth and development results in increased demand for energy and nutrients. The consumption of food to match this demand is impacted by numerous psychosocial factors including newly acquired feelings of independence, peer acceptance, search for self-identity, need for sociability and enjoyment, busy lifestyle, concern for appearance, media, availability of food, and economic status. Health can be greatly compromised if these needs conflict.

According to a study carried out by the Medical Research Institute (MRI) in 2005, the overall prevalence of thinness, stunting and overweight among 10-15year old school children was 47.2, 28.5 and 2.2 percent respectively. The same study revealed a prevalence of anaemia and vitamin A deficiency to be 11.1 and 0.4 percent respectively.

In most developing countries, nutrition initiatives have been focusing on children and women, thus neglecting adolescents. Addressing the nutrition needs of adolescents could be an important step towards breaking the vicious cycle of intergenerational malnutrition, chronic diseases and poverty. Epidemiological evidence from both the developed and developing countries indicate that there is a link between foetal under-nutrition and increased risk of various chronic diseases during adulthood.

Rapid changes in diets and lifestyles resulting from industrialization, urbanization, economic development and market globalization have accelerated during the last decade. This has had a significant impact on the health and nutritional status of the population. The impact is particularly notable in developing countries and countries in transition like Sri Lanka. While such changes have resulted in improved standards of living and greater access to services, there have also been significant negative consequences due to inappropriate dietary patterns, decreased physical activities and increased tobacco use resulting in a corresponding increase in diet-related chronic diseases.

If adolescents are well nourished, they can make optimal use of their skills, talents and energies today, and be healthy and responsible citizens and parents of healthy babies tomorrow. To accomplish such a task and in order to break the intergenerational cycle of malnutrition, a special focus for overcoming adolescent malnutrition is needed.

In Sri Lanka, recent data on nutritional status of school adolescents is lacking. According to available literature, there is a paucity of recent information regarding nutritional and health status of above-mentioned age groups. In view of the wide array of factors affecting

nutritional status among school adolescents, conducting a study which identifies basic, underlying and immediate causes of malnutrition is essential. Such a study is likely to provide evidences that will provide appropriate actions that has to be taken to address the current status. The information base is further necessary for advocacy and to develop guidelines for strategic planning and health promotion efforts at community level.

General Objective

To determine nutrition and micronutrient status of school adolescents aged 10-18 years in Sri Lanka and to describe their dietary habits and lifestyle practices.

Specific objectives

- To determine the nutritional status of school adolescents aged 10-18 years.
- To determine the prevalence of anaemia and iron, vitamin A, vitamin D, iodine and zinc deficiencies among school adolescents aged 10-18 years at national and provincial levels.
- To obtain baseline information on adolescent's dietary habits and lifestyle behaviors.
- To identify determinants affecting adolescent dietary habits and lifestyle behaviors.

CHAPTER 2

METHOD

A cross sectional study was carried out among a sample of school going adolescents aged 10 to 18 years.

2.1 Sampling

2.1.1 Sample size

Sample size was calculated based on the estimated prevalence rate of iron deficiency (30%). The sample was estimated to have a 95% confidence interval and a 5% margin of error. A 10% non-response rate was also considered. The design effect of 1.5 was used to finalize and fix the overall sample size. The sample size calculated was 300 children of 10-18 years from each province, a total of 2,700 children.

The sample of 15 schools was included to obtain a sample size of 300 from each province. Considering the need of provincial representative data, an equal sample size (300 children) was drawn from each province. The distribution of schools and children from the provinces is indicated below:

Table 1: Sample size distribution

Province	No. of schools	No. of children
Each province	15	300
Total for 9 provinces	**135**	**2,700**

2.1.2 Sampling method

Selection of schools: The sampling frame was the list of schools in each province obtained from the Ministry of Education. Primary schools (children of 5-9 years) were excluded from the list. Eligible schools to be included were identified using the population proportion to sampling technique, enabling identification of a total of 135 schools to be included as clusters.

Selection of children: From each selected school, one class from grade 6 to 12 was randomly selected. In each selected class, 20 children were randomly selected using the attendance register. An attempt was made to select equal numbers of girls and boys. In the case of a boys' school, girls were selected from the closest girls' school. Letter from the Principle Investigator (PI) to the parents of the selected children were sent through teachers to obtain the informed consent. Children with the consent was included in the study.

Data collection: An intensive 5 days training workshop was organized by the Principle Investigator to train the field coordinator, team leaders, data collectors, laboratory team at field and central level and data editors at central level. These training workshops focused on collection of field data, blood collection procedures and management of other aspects of the survey.

The field level data collection was carried out using a pre-tested interviewer administered questionnaire, taking relevant anthropometric measurements and collecting venous blood and casual urine samples for the biochemical assessments. All precautions were taken to ensure quality of data.

Ethical clearance was obtained from the Ethics Review Committee of the MRI, Ministry of Health. Data collection was carried out from July 2017 to November 2017.

The field level implementation was carried out by 4 survey teams. Each team included 5 members (one PHI as the team leader, two other interviewers and one nurse), under the supervision of the Nutrition Assistant of the MRI. Each team covered a school per day. Anthropometric measurements were carried out by the PHIs of MRI. Same team moved from one school to the other.

Detailed information of the structure of the survey team is as follows:

- One field coordinator – Nutrition Assistant of MRI
- One field laboratory coordinator - Medical Laboratory Technologist (MLT)
- Seven trained hired data collectors as interviewers
- Eight Public Health Inspectors (PHI) from MRI
- Five nurses/ PHNS for blood collection, recruited from the closest hospital
- Three support staff from MRI

2.1.3 Collection of blood samples

During the visit to the school, the field investigators arranged for selected children to be available for collection of venous blood samples at a given venue on a specific date after obtaining the written consent of the mother/ father or immediate caregiver. Consent for extended storage of blood samples for future testing of additional micronutrient levels was also obtained. Details of tests used for the assessment of micronutrient levels and reference ranges are given in Tables 2 and 3.

Venous blood samples were collected by trained nurses attached to each team, using disposable syringes and needles. In each province, a temporary field laboratory was set up at a central site such as a local hospital, school, health centre or other location which had essential facilities for the MLT to immediately centrifuge the samples brought in from the field and aliquot the serum into appropriate appendorff.

In order to obtain adequate amount of serum, at least 5 ml of venous blood was collected in two containers. First container was a metal free red top gel tube with a non-rubber stopper to separate serum for the biochemical assessments. Second container was an EDTA tube with green top to assess haemoglobin (Hb) levels. After collection of blood, the blood tube was placed in a cool box and allowed to clot. All samples were processed within <2 hours of collection. Haemoglobin was assessed on the same day in the field laboratory.

At the end of each day, a drop of whole blood was used to test for C-reactive protein and the remaining whole blood was centrifuged. The serum was aliquoted into at least four cryovials by pipetting, using a disposable pipette. Each aliquot of approximately 500µl was used for the analysis of ferritin, zinc, retinol and vitamin D. Sample number (ID) tag was applied on each of the cryovials. The serum was stored in a freezer (-20ºC or colder) as soon as possible. Aliquoted samples of the same cluster were kept in boxes with a label of the same cluster on the box. In this way, the laboratory could easily identify which

particular clusters are to be tested in a batch and thus minimizing the possibilities of increasing freeze/thaw cycles. A sample record/ handover form was filled up indicating ID number, cluster number, and type of analysis to be done. The samples were brought to the laboratory in the Department of Nutrition, (MRI) in Colombo, in dry cool boxes and stored in a -70^{0}C freezer. Serum samples were analyzed to estimate the blood parameters. Details of analytical methods is provided in Table 2.

Table 2: Details of analytical methods

Test	Testing methods	Quality assurance
Haemoglobin	Haemoglobin iso-thiocyanate method (HICN)	Samples giving high/ low values were measured in duplicate and internal control samples were run with each batch of samples
Ferritin	Immunoclaminosen method	
Zinc	ICP-MS	
Vitamin D	Immunoclaminosen method	
C-reactive protein	Latex agglutination method	Quality control samples were analyzed with each batch of samples
Serum Retinol	High Performance Liquid Chromatography (HPLC)	Internal Quality Control samples of 2 levels were run with each batch of Samples. Quarterly participate to External Quality Assurance programme run by the CDC
Urine Iodine	Sandell-Kolthoff reaction spectrophotometric method	

When the blood samples were inadequate (difficulties in collection, clotting of samples) testing was prioritised as follows. All available samples were subjected to estimation of haemoglobin, c-reactive protein and serum ferritin. Next in the order of priority was the estimation of vitamin D levels followed by the levels of vitamin A and zinc. Due to this reason, the numbers of the blood samples assessed for the different micronutrients varied.

2.2 Management of data

The filled-in questionnaires in tabs were first desk-edited at the field sites for completeness and checked for major errors by the Nutrition Assistant. Once this was complete, the data was transferred to Department of Nutrition, MRI in Colombo, where 3 development assistants received the data, maintained log registers and checked for completeness. Where there were inconsistencies or missing responses, they flagged the errors/ omissions and consulted the team leaders for clarification. A unique ID number was used for each child. Range and consistency checks as well as skip patterns were built in the data entry program to minimize entry of erroneous data. Analysis of data was undertaken using Statistical Package for Social Sciences (SPSS) version 21.

2.3 Data Analysis

2.3.1 Descriptive statistics

Distribution of categorical variables was computed and frequencies and percentages were reported along with the means and standard deviations of quantitative variables. Prevalence was provided with 95% confidence intervals (CI). Body Mass Index (BMI) was calculated using weight in kg and height in meters. WHO Anthroplus software was used to analyze the anthropometric data. BMI categories were defined as follows; BMI-for-age-sex <-3SD as severe thinness, BMI-for-age-sex between -3SD and -2SD as moderate thinness, BMI-for-age-sex <-2SD as thinness, BMI-for-age-sex between 1 SD and 2SD as overweight and BMI-for-age-sex >2SD as obesity. Table 3 provides the reference values used for blood and serum analysis.

Table 3: Reference values used in the analysis

Test	Reference range
Haemoglobin[1] (adjusted for altitude)	Severe deficiency (< 8 gm//dL) Moderate deficiency (8.0-10.9 gm/dL) Mild deficiency (11.0-11.9 gm/dL) Normal (>= 11.5 gm/dL) – 10-11 years of male and female Normal (>= 12 gm/dL) – 12-14 years of male and 12-18 years of female Normal (>= 13 gm/dL) – 15-18 years of male
Ferritin[2]	Low Ferritin (<15µg/dL) when CRP is normal and <30 µg/dL when CRP is high Normal (>=15µg/dL)
Zinc[3]	Deficient (<65 µg/dL) - in the morning Non-deficient (>=65 µg/dL) - in the morning
Retinol	Vitamin A deficiency (<20 micrgram/dL)
C-reactive protein[4]	Acute phase of infections (>= 6.0) No acute phase of infections (< 6.0)
Vitamin D Total 25-hydroxycholecalciferol	Deficiency (<12µg/dL) Insufficiency (12–20.0µg /dL) Normal (>= 20µg /dL)
Urine iodine	Insufficiency (<100µg/dL)

Sources:

[1]Gorstein J, Sullivan KM, Parvanta I, Begin F. Indicators and Methods for Cross-Sectional Surveys of Vitamin and Mineral Status of Populations. The Micronutrient Initiative (Ottawa) and the Centers for Disease Control and Prevention (Atlanta), May 2007.

[2]Iron deficiency anaemia: assessment, prevention and control. A guide for programme managers. Third Edition. Geneva, World Health Organization, 2007.

[3]ZiNCG. Assessment of the risk of zinc deficiency in populations and options for its control. Food Nutr Bull, 2004;25:S94-S203

[4]National Nutrition survey 2011, Government of Pakistan

CHAPTER 3

RESULTS

3.1 Description of the study population

Table 4 provides basic information on the study sample of 2570, which provided 95.2% participation rate. The ages of children varied from 10 years to 18 years with the highest percentage of children (21 percent) being in the 15 years age group with the lowest percentage (0.8 percent) in the 18 years age group. Categorization as pre-adolescents (10-14 years age group) and post-adolescents (15–18 years age group) showed a higher percentage of 54 percent among the pre-adolescents. The sample included 46.6 percent of males and 53.4 percent of females. Majority of the study population (77.5 percent) were from rural schools.

Table 4: Description of the study population

Basic characteristics	Number of children	Percentage
Age in years		
10	91	3.5
11	297	11.6
12	270	10.5
13	306	11.9
14	425	16.5
15	540	21.0
16	415	16.1
17	205	8.0
18	21	0.8
Age groups in years		
Pre-adolescent (10-14)	1389	54.0
Post-adolescent (15-18)	1181	46.0
Sex		
Male	1197	46.6
Female	1373	53.4
Location of school		
Estate	99	3.9
Rural	1991	77.5
Urban	480	18.7
Total	**2570**	**100.0**

3.2 Nutritional status

3.2.1 BMI categories and prevalence of stunting

Nutritional status as identified by BMI categories and using the indicator height-for-age are presented in Table 5. Using variations from the standard deviation on BMI as the criterion, the sample was classified as belonging to: severely thin, thin, normal, overweight and obese. Measure of height-for-age was used to categorize the children as being stunted or non-stunted. Among the total sample, 26.9 percent were thin, 7.5 percent were overweight, 2.2 percent were obese and 13.7 percent were stunted.

Table 5: Nutritional status of the study population by selected background characteristics (n=2570)

Background	BMI categories (%)					Height-for-age (%)	
	< -3SD Severe Thin	<-2SD Thin	-2SD to 1SD Normal	> 1SD to ≤ 2SD Over weight	>2SD Obese	< -2SD Stunting	≥ -2SD Not stunted
Age in years							
10	8.8	31.9	54.9	7.7	5.5	14.3	85.7
11	6.4	32.3	55.9	9.4	2.4	13.5	86.5
12	10.4	33.3	57.0	7.0	2.6	11.9	88.1
13	9.2	24.8	65.4	7.5	2.3	14.1	85.9
14	7.3	26.4	61.4	8.9	3.3	15.1	84.9
15	6.9	26.5	65.2	6.9	1.5	11.9	88.1
16	4.3	24.1	68.2	6.7	1.0	12.3	87.7
17	6.3	18.5	72.7	6.3	2.4	20.5	79.5
18	4.8	38.1	57.1	4.8	0.0	14.3	85.7
Age groups (years)							
10-14	8.2	29.0	59.8	8.3	2.9	13.8	86.2
15-18	5.8	24.5	67.8	6.7	1.4	13.5	86.5
Sex							
Male	9.8	34.2	56.1	7.1	2.6	11.6	88.4
Female	4.8	20.6	69.6	7.9	1.9	15.5	84.5
Province							
Western	6.7	24.0	59.7	11.7	4.6	12.0	88.0
Central	7.2	23.3	67.7	7.2	1.8	15.4	84.6
Southern	10.3	31.3	60.1	6.8	1.8	13.9	86.1
Northern	10.1	32.1	62.4	4.9	0.7	17.8	82.2
Eastern	6.1	28.0	63.1	6.5	2.4	17.7	82.3
NWP	4.8	24.3	65.1	7.7	2.9	11.0	89.0
NCP	6.5	28.6	59.4	10.1	1.8	5.8	94.2
Uva	5.7	23.7	67.6	5.7	3.0	14.0	86.0
Sabaragamuwa	6.7	27.0	64.3	7.7	1.0	15.0	85.0
Sri Lanka (95% CI)	**7.1** **6.1-8.1**	**26.9** **25.2-28.6**	**63.3** **61.3-65.1**	**7.5** **6.5-8.5**	**2.2** **1.6-2.8**	**13.7** **12.4-15.0**	**86.3** **85.0-87.6**

As shown in Table 5, a relatively high percentage of severely thin children as well as obese children were seen among the 10-year-old children. There is no clear trend in the percentage of thin children between the different age groups. Even though the highest percentage of severely thin children is reported among the 12-year-old group, a decline can be observed from 12 to 16 years.

Considering the sub groups, the percentage of severely thin, overweight, obese and stunted children were higher among the pre-adolescent group than the post-adolescents. Severely thin, thin and obese males are higher than females.

Among the total sample, 7.1 percent were severely thin, 20 percent were thin and percentages of overweight and obese children were 7.5 and 2.2 percent respectively.

Geographical variations showed that the highest percentage of severely thin children was reported from the Southern and Northern provinces while the highest percentage of obese children was reported from the Western province. Lowest prevalence of obesity was reported from the Northern Province. Prevalence of stunting varied from 5.8-17.8 percent in NCP and Northern Province respectively.

3.2.2 Anaemia and Iron status

Table 6 shows the prevalence of iron deficiency as indicated by serum ferritin values of less than 15 µg/dL when CRP is normal and values less than 30 µg/dL when CRP is high. Iron deficiency anaemia is indicated by low ferritin and anemia.

For the total sample, the prevalence of anaemia, iron deficiency and iron deficiency anaemia were 8.8, 22.1 and 3.8 percent respectively.

Though there was no clear pattern in the prevalence of iron deficiency (ID) related to children of different ages, there is a tendency to show a higher prevalence among the older children, with relatively lower values in the younger ages. It is also shown that the prevalence of ID was lower among the pre-adolescent group and among males.

Prevalence of ID values between the provinces ranged from a low value of 16.1 percent in the Sabaragamuwa province with high values in NCP (29.9 percent) and Northern (27.5 percent) province. Prevalence of anaemia varied from 4.3 percent in Southern and Uva provinces to 15.7 percent in the Northern province.

Iron deficiency anaemia (IDA) was most prevalent in the ages 15 and above with a marginal decrease among the 18-year-old children. This observation is shown by the higher prevalence among the 15 to 18-year-old children. Prevalence was higher among females. Variations were marked between the provinces, ranging from a low value in the Southern province (1.8 percent) to a high value of 7.3 percent in the Northern Province.

Table 6: Prevalence (%) of anaemia, iron deficiency (ID) and iron deficiency anaemia (IDA) of the study population by background characteristics

Background characteristics	No of children	Anaemia	No of children	ID	No of children	IDA
Age in years						
10	91	1.1	91	18.7	91	0.0
11	297	4.7	292	10.3	297	1.0
12	270	10.0	266	10.5	270	1.9
13	306	6.9	303	22.8	306	2.6
14	425	5.9	422	25.1	425	3.8
15	540	11.5	534	26.8	540	5.0
16	415	13.7	405	25.4	415	6.5
17	205	8.3	191	30.4	205	4.9
18	21	14.3	21	23.8	21	4.8
Age groups in years						
10-14	1389	6.3	1374	18.2	1389	2.3
15-18	1181	11.8	1151	26.8	1181	5.5
Sex						
Male	1197	6.5	1178	11.1	1197	0.7
Female	1373	10.9	1347	31.8	1373	6.5
Province						
Western	283	8.1	280	20.0	283	4.6
Central	279	7.2	276	22.1	279	4.3
Southern	281	4.3	277	18.8	281	1.8
Northern	287	15.7	287	27.5	287	7.3
Eastern	293	9.2	288	19.1	293	4.4
NWP	272	14.0	270	22.6	272	2.2
NCP	276	11.2	271	29.9	276	4.3
Uva	299	4.3	296	23.3	299	2.7
Sabaragamuwa	300	6.0	280	16.1	300	2.3
Sri Lanka (95% CI)	**2570**	**8.8 (7.7-9.9)**	**2525**	**22.1 (20.5-23.7)**	**2570**	**3.8 (3.5-4.1)**

3.2.3 Vitamin A status

As shown in Table 7, the prevalence of vitamin A deficiency was low, being only 0.1 percent for the total sample.

Table 7: Prevalence (%) of vitamin A deficiency of the study population by background characteristics

Background characteristics	No of children	<20 µg/dl Vitamin A deficiency %
Age in years		
10	91	0.0
11	297	0.0
12	270	0.4
13	306	0.0
14	425	0.2
15	540	0.0
16	415	0.2
17	205	0.0
18	21	0.0
Age groups in years		
10-14	1387	0.1
15-18	1180	0.1
Sex		
Male	1197	0.0
Female	1373	0.2
Province		
Western	283	0.0
Central	279	0.4
Southern	281	0.0
Northern	287	0.3
Eastern	293	0.0
NWP	272	0.0
NCP	276	0.0
Uva	299	0.3
Sabaragamuwa	300	0.0
Sri Lanka (95% CI)	**2570**	**0.1 (0.0-0.2)**

3.2.4 Vitamin D status

Vitamin D deficiency was identified to be present when the serum total 25-hydroxycholecalciferol levels were less than 12 µg/dL and vitamin D insufficiency was identified to be present when the serum levels were between 12 to 20 µg/dL (Table 8). Among the total group, 13.2 percent were vitamin D deficient while 45.6 percent were found to have levels indicating vitamin D insufficiency.

There was no consistent pattern in the prevalence of Vitamin D deficiency between the children of different ages even though the prevalence was relatively low among the younger children and the highest prevalence was reported among the 17-year-old children. This observation is also seen in that the prevalence among the 10-14 (pre-adolescents) was lower than among the post-adolescents. Female children had higher VDD than males.

Table 8: Prevalence (%) of vitamin D deficiency (<12 µg/dL) and vitamin D insufficiency (12 to <20 µg/dL) of the study population by background characteristics

Background characteristics	No of children	Vitamin D concentration (µg/dL)	
		Vitamin D deficiency (<12 µg/dL)	Vitamin D insufficiency (12 to < 20 µg/dL)
Age in years			
10	91	8.8	48.4
11	292	12.3	43.2
12	266	9.8	51.9
13	303	11.6	46.2
14	422	15.9	46.2
15	534	13.7	45.3
16	405	12.3	43.2
17	191	19.4	44.0
18	21	4.8	33.3
Age groups in years			
10-14	1374	12.5	46.8
15-18	1151	14.0	44.1
Sex			
Male	1178	6.7	40.2
Female	1347	18.9	50.3
Province			
Western	280	8.9	45.7
Central	276	32.2	44.6
Southern	277	13.0	45.8
Northern	287	8.7	44.9
Eastern	288	11.1	51.4
NWP	270	1.9	37.0
NCP	271	0.7	34.7
Uva	296	13.5	46.3
Sabaragamuwa	280	28.2	58.9
Sri Lanka (95% CI)	**2525**	**13.2 (11.9-14.5)**	**45.6 (43.7-47.5)**

Geographical variations were marked in that the prevalence of VDD ranged from a low value of 0.7 percent in the NCP to a high value of 32.2 percent in the Central province. Considering the prevalence of vitamin D insufficiency, the prevalence between the provinces ranged from a low value of 34.7 percent in the NCP to a high value of 58.9 percent in the Sabaragamuwa province.

3.2.5 Iodine status

As shown in Table 9, median urinary iodine concentration for the total sample was 137.9 µg/dL and ranged from 79 to 218.8 µg/dL. Prevalence of iodine insufficiency was observed in Western and Uva Provinces. All other provinces have achieved optimum level of median urinary iodine concentration.

Table 9: Median urinary iodine concentration in the study population by background characteristics

Background characteristics	No of Children	Urinary iodine concentration (µg/dl)	
		Median	25^{th} -75^{th} percentile
Age in years			
10	82	134.9	94.3 – 217.5
11	264	135.3	78.9 – 197.8
12	232	129.8	78.7 – 228.8
13	268	147.8	94.5 – 220.3
14	387	130.5	78.1 – 212.9
15	472	142.3	82.2 – 230.1
16	357	147.9	87.5 – 225.4
17	169	126.2	68.5 - 211.4
18	17	158.6	67.0 – 286.0
Age groups in years			
10-14	1233	134.9	80.6 – 212.9
15-18	1015	143.2	80.4 - 226.5
Sex			
Male	1027	141.4	78.6 -229.0
Female	1221	135.5	81.5 - 212.8
Province			
Western	228	94.2	58.9 – 172.3
Central	237	141.4	79.2 – 212.5
Southern	254	133.1	85.3 -195.4
Northern	240	161.6	103.3 – 266.4
Eastern	265	175.8	95.1 – 253.8
NWP	245	137.2	93.5 – 206.7
NCP	252	145.4	109.9 – 210.0
Uva	275	89.0	41.4 – 195.9
Sabaragamuwa	252	154.1	94.0 – 284.6
Sri Lanka*	**2532**	**137.9**	**79.0 – 218.8**

* Only 2532 out of 2570 children provided urinary samples.

3.2.6 Zinc status

As shown in Table 10, the prevalence of zinc deficiency was 29.4 percent for the total sample. Higher prevalence was found in children aged 18 years, among the post-adolescent group and among female children. Southern province reported the highest prevalence within the nine provinces.

Table 10: Prevalence (%) of zinc deficiency of the study population by background characteristics

Background characteristics	No of children	<65 µg/dl Zinc deficiency (%)
Age in years		
10	85	25.9
11	277	26.0
12	240	25.4
13	282	34.8
14	386	30.8
15	489	29.9
16	371	31.5
17	168	23.2
18	20	40.0
Age groups in years		
10-14	1270	29.3
15-18	1048	29.6
Sex		
Male	1085	28.3
Female	1233	30.4
Province		
Western	238	17.6
Central	270	26.7
Southern	269	46.1
Northern	268	38.1
Eastern	277	39.4
NWP	233	17.6
NCP	266	35.7
Uva	228	16.2
Sabaragamuwa	269	22.3
Sri Lanka (95% CI)	**2318**	**29.4 (27.6-31.3)**

* Only 2318 samples were analyzed for zinc due to inadequate serum.

3.3 Intake of micronutrient supplements

3.3.1 Iron folate supplements

Pattern of consumption of iron folate supplements by the study population is shown in Table 11.

Table 11: Percentage of children who received and had taken iron folate during last 12 months by background information

Basic characteristics	No. of children	Received (%)	Consumption (%)			
			Taken always	Taken sometimes	Not taken	Not received
Age in years						
10	91	65.9	54.9	9.9	1.1	34.1
11	297	67.7	60.3	6.1	1.3	32.3
12	270	82.6	71.5	9.6	1.5	17.4
13	306	75.8	65.0	8.8	2.0	24.2
14	425	73.9	64.7	8.2	0.9	26.1
15	540	79.8	70.9	7.8	1.1	20.2
16	415	85.3	70.4	12.0	2.9	14.7
17	205	74.6	62.9	8.3	3.4	25.4
18	21	71.4	61.9	4.8	4.8	28.6
Age groups (years)						
10 – 14	1389	74.2	64.5	8.3	1.4	25.8
15 - 18	1181	80.7	69.2	9.3	2.2	19.3
Sex						
Male	1197	76.0	69.8	4.9	1.3	24.0
Female	1373	78.2	63.9	12.1	2.1	21.8
Province						
Western	283	58.0	48.1	8.5	1.4	42.0
Central	279	79.9	65.9	12.2	1.8	20.1
Southern	281	48.8	42.3	6.0	0.4	51.2
Northern	287	94.8	88.5	5.2	1.0	5.2
Eastern	293	89.8	81.9	7.2	0.7	10.2
NWP	272	77.6	65.8	8.8	2.9	22.4
NCP	276	72.1	64.5	6.2	1.4	27.9
Uva	299	82.6	69.2	11.0	2.3	17.4
Sabaragamuwa	300	89.0	72.0	13.3	3.7	11.0
Sri Lanka (95% CI)	**2570**	**77.2 (75.5 – 78.8)**	**66.7 (64.9-68.5)**	**8.8 (7.7-9.9)**	**1.8 (1.3-2.3)**	**22.8 (21.2-24.4)**

The percentage of female children who received iron folate were higher than males and the reverse was seen among those who consumed iron folate. There was a marked geographical variation in the percentage of children who received iron folate, ranging from a low value in the Southern province (48.8 percent) to a high value of 94.8 percent in the Northern Province. Overall, 77.2 received iron folate in schools and 66.7 percent always consumed tablets.

Considering the children who consumed iron folate provided by school, there was no consistent pattern seen in relation with the age of the children. Among the pre-adolescent group, those who consumed iron, folate and vitamin C was lower compared to the post-adolescent group. Only 1.8 percent did not consume iron folate even after receiving and 22.8 percent had not received the supplement at all.

3.3.2 Vitamin A mega dose supplementation

In general, about a third of the study population had received vitamin A mega dose supplementation in the school. This percentage ranged from 42.2 percent among 12-year-old children to 24.2 percent among the 10-year-old group. The receival of this supplement was higher among the 15 to 18 years age group and among the males. Variations between the provinces were seen, ranging from 59.7 percent in the Eastern province to 12.9 percent in the North Western province (Table 12).

Table 12: Receival of vitamin A mega dose supplementation by background information

Basic characteristics	Number of children	% of children who received the vitamin A mega dose
Age in years		
10	91	24.2
11	297	25.9
12	270	42.2
13	306	31.4
14	425	28.2
15	540	34.6
16	415	33.0
17	205	26.3
18	21	33.3
Age groups in years		
10 – 14	1389	30.9
15 - 18	1181	32.6
Sex		
Male	1197	32.8
Female	1373	30.7
Province		
Western	283	30.4
Central	279	26.9
Southern	281	23.1
Northern	287	36.6
Eastern	293	59.7
NWP	272	12.9
NCP	276	22.1
Uva	299	46.2
Sabaragamuwa	300	24.7
Sri Lanka (95% CI)	**2570**	**31.7 (29.9-33.5)**

3.4 Anti helminthic treatment

Anti-helminthic treatment was provided in schools annually with iron folate supplementation. Table 13 indicates 68.1 percent of the study sample received de-worming tablets and 65.0 percent had taken them. Wide variations were seen between the different provinces. The percentage of children who received anti helminthic treatment ranges from a low value of 40.2 percent in the North Central province to a high value of 94.5 percent in the Eastern province.

Table 13: Percentage of children received and taken anti-helminthic treatment by background information

Basic characteristics	Number of children	% of children who received	% of children who taken
Age in years			
10	91	54.9	52.7
11	297	57.6	55.6
12	270	77.0	74.4
13	306	75.8	71.6
14	425	66.1	63.3
15	540	68.9	65.9
16	415	71.1	67.7
17	205	62.4	58.5
18	21	61.9	57.1
Age groups in years			
Pre-adolescent (10-14)	1389	67.8	64.9
Post-adolescent (15-18)	1181	68.4	65.1
Sex			
Male	1197	66.1	64.2
Female	1373	69.8	65.7
Province			
Western	283	54.1	50.5
Central	279	56.6	54.1
Southern	281	52.7	50.9
Northern	287	91.3	88.5
Eastern	293	94.5	90.4
NWP	272	61.4	54.8
NCP	276	40.2	40.2
Uva	299	71.6	68.2
Sabaragamuwa	300	86.7	83.7
Sri Lanka (95% CI)	**2570**	**68.1 (66.3-69.9)**	**65.0 (63.2-66.8)**

3.5 Food consumption

3.5.1 Pattern of consumption of breakfast

Selected aspects related to intake of breakfast other than a glass of milk during the previous month were studied. The information collected included pattern of consumption of breakfast (Table 14) and source of breakfast (Table 15). In general, about half of the study population regularly consumed breakfast and lowest percentage who did so (36.7) was observed in the Southern province. About one fifth (20.1 percent) had not taken breakfast during the last month.

Table 14: Pattern of intake of breakfast during the last month, by background information

Basic characteristics	Number of children	% of children who take their breakfast			
		Regularly	Sometimes	Rarely	Not taken
Age in years					
10	91	51.6	38.5	3.3	6.6
11	297	58.6	22.2	4.0	15.2
12	270	50.7	23.3	5.2	20.7
13	306	47.7	29.7	2.0	20.6
14	425	49.4	26.4	6.6	17.6
15	540	49.3	21.5	5.6	23.7
16	415	50.6	22.7	6.0	20.7
17	205	51.7	19.0	4.4	24.9
18	21	47.6	23.8	0.0	28.6
Age groups in years					
10 - 14	1387	51.4	26.4	4.5	17.6
15 - 18	1180	50.1	21.5	5.4	22.9
Sex					
Male	1197	53.8	22.7	4.4	19.0
Female	1373	48.2	25.4	5.4	21.0
Province					
Western	283	50.9	26.1	2.8	20.1
Central	279	50.9	22.2	6.1	20.8
Southern	281	36.7	25.6	2.8	34.9
Northern	287	64.1	16.7	1.7	17.4
Eastern	293	56.7	18.1	8.2	17.1
NWP	272	48.5	32.0	3.7	15.8
NCP	276	47.8	27.2	6.9	18.1
Uva	299	47.8	24.4	7.0	20.7
Sabaragamuwa	300	53.3	25.7	5.0	16.0
Sri Lanka (95% CI)	**2570**	**50.8 (48.9-58.2)**	**24.2 (22.5-25.9)**	**4.9 (4.1-5.7)**	**20.1 (18.6-21.7)**

The most common source of food consumed as breakfast was 'home-made' food with minor percentages of children consuming food from other sources (Table 15).

Table 15: Source of food consumed as breakfast, by background information

Basic characteristics	Number of children	Source of breakfast (%)				
		Homemade food	Commercial vehicle	Shop	School canteen	Given from the school
Age in years						
10	85	92.9	2.4	2.4	1.2	1.2
11	252	96.0	0.0	2.4	0.4	1.2
12	214	94.4	0.9	2.3	0.9	1.4
13	243	96.7	0.0	2.5	0.8	0.0
14	350	95.7	0.3	2.6	0.9	0.6
15	412	97.3	0.2	1.5	1.0	0.0
16	329	92.1	0.3	3.6	3.3	0.6
17	154	96.1	0.0	1.3	1.9	0.6
18	15	93.3	0.0	6.7	0.0	0.0
Age groups in years						
10 – 14	1144	95.5	0.4	2.4	0.8	0.8
15 - 18	910	95.2	0.2	2.3	2.0	0.3
Sex						
Male	969	95.0	0.6	2.4	1.4	0.5
Female	1085	95.7	0.1	2.4	1.2	0.6
Province		*				
Western	226	89.8	0.4	4.4	4.0	1.3
Central	221	96.8	0.0	1.4	0.0	1.8
Southern	183	97.3	0.5	1.1	1.1	0.0
Northern	237	93.7	0.8	5.5	0.0	0.0
Eastern	243	93.8	0.4	5.8	0.0	0.0
NWP	229	93.4	0.0	1.7	3.5	1.3
NCP	226	96.0	0.4	1.3	2.2	0.0
Uva	237	98.3	0.4	0.0	0.4	0.8
Sabaragamuwa	252	99.2	0.0	0.0	0.8	0.0
Sri Lanka (95% CI)	**2054**	**95.4 (94.5-96.3)**	**0.3 (0.1-0.5)**	**2.4 (1.7-3.1)**	**1.3 (0.8-1.8)**	**0.6 (0.3-0.9)**

3.5.2 Consumption of food during the school interval

Information on the pattern of consumption of food during the school interval within the previous month was collected and the findings are presented in Tables 16-17. As shown in Table 16, 89.7 percent of the children consumed food during the school interval, with no major differences between the children of different ages. With the exception in the Eastern province, more than 80 percent of the children consumed food during the school interval on a daily basis.

Table 16: Pattern of food intake during the school interval within the previous month by background information

Basic characteristics	Number of children	% of children who consume food during the school interval			
		Regularly	Sometimes	Rarely	Not consumed
Age in years					
10	91	84.6	14.3	0.0	1.1
11	297	91.2	6.4	1.0	1.3
12	270	89.6	7.4	2.2	0.7
13	306	89.9	8.5	0.7	1.0
14	425	89.9	7.5	0.7	1.9
15	540	90.0	5.2	0.9	3.9
16	415	89.9	6.3	0.2	3.6
17	205	88.8	5.9	1.0	4.4
18	21	81.0	9.5	0.0	9.5
Age groups in years					
10 – 14	1389	89.9	7.9	1.0	1.3
15 – 18	1181	89.6	5.8	0.7	4.0
Sex					
Male	1197	86.4	8.3	1.7	3.7
Female	1373	92.6	5.8	0.1	1.5
Province					
Western	283	92.6	7.1	0.4	0.0
Central	279	95.0	2.9	0.7	1.4
Southern	281	90.7	6.8	1.1	1.4
Northern	287	82.9	8.0	0.0	9.1
Eastern	293	75.4	18.4	2.7	3.4
NWP	272	94.9	4.4	0.0	0.7
NCP	276	93.5	4.0	0.7	1.8
Uva	299	88.3	6.0	1.7	4.0
Sabaragamuwa	300	94.7	4.3	0.3	0.7
Sri Lanka (95% CI)	**2570**	**89.7 (88.5-90.9)**	**6.9 (5.9-7.9)**	**0.9 (0.5-1.3)**	**2.5 (1.9-3.1)**

Table 17: Source of food consumed during the school interval during the last month by background information

Basic characteristics	Number of children	Source of food consumed during school interval (%)				
		Home-made food	Commercial vehicle	Shop	School canteen	Given from school
Age in years						
10	91	82.4	0.0	3.3	9.9	3.3
11	297	83.2	0.0	2.0	7.7	5.7
12	270	77.0	0.0	3.3	10.4	8.5
13	306	83.0	0.0	1.6	8.8	5.6
14	425	78.8	0.0	2.4	10.6	6.4
15	540	80.9	0.0	0.7	11.5	3.0
16	415	77.8	0.2	1.0	14.2	3.1
17	205	78.0	0.0	1.5	12.2	3.9
18	21	66.7	0.0	0.0	23.8	0.0
Age groups in years						
Pre-adolescent (10 - 14)	1389	80.6	0.0	2.4	9.5	6.3
Post-adolescent (15 - 18)	1181	79.1	0.1	0.9	12.8	3.1
Sex						
Male	1197	73.9	0.0	1.6	15.0	5.8
Female	1373	85.1	0.1	1.8	7.5	4.0
Province						
Western	203	79.9	0.0	6.0	12.4	1.8
Central	214	94.6	0.0	0.0	1.4	2.5
Southern	178	88.3	0.0	0.7	7.8	1.8
Northern	222	48.8	0.0	0.7	5.9	35.5
Eastern	228	49.1	0.3	6.1	41.0	0.0
NWP	214	85.3	0.0	0.4	13.6	0.0
NCP	217	91.7	0.0	0.7	5.8	0.0
Uva	233	88.3	0.0	0.3	5.7	1.7
Sabaragamuwa	250	94.0	0.0	0.3	5.0	0.0
Sri Lanka CI (95%)	**2505**	**81.9 (80.4-83.4)**	**0.0**	**1.8 (1.3-2.3)**	**11.3 (10.1-12.5)**	**5.0 (4.2-5.9)**

Table 17 indicates that a majority of children (81.9 percent) consumed home-made food while another 11.3 percent consumed food from the school canteen. Only 5.0 percent of children consumed food given from the school. It is interesting to note that the percentage of children who received food from school during the school interval was much higher in the Northern province whereas this percentage in other provinces was much less. None of the children from Eastern, NWP, NCP and Sabaragamuwa provinces had received meals during the school interval under the school meal programme.

Table 18: Percentage of schools which provided school meal by province

Basic characteristics	Number of schools	% of schools which provided school meal
Province		
Western	15	26.7
Central	15	46.7
Southern	15	46.7
Northern	15	100.0
Eastern	15	46.7
NWP	15	33.3
NCP	15	18.8
Uva	15	66.7
Sabaragamuwa	15	53.3
Sri Lanka CI (95%)	**135**	**48.1 (39.7-56.5)**

Out of the study sample, 48.1 percent of schools provided school meals. There was a major difference in the percentage of schools which provided school meals between provinces ranging from 18.8 percent in the North Central province to all schools studied in the Northern province.

In the study sample, 69.2 percent of schools provided breakfast and 30.8 percent provided lunch as school meal while 93.8 percent of the schools provided daily meal and 4.6 percent of schools provided meals occasionally (not shown in the table).

3.5.3 Food consumption pattern on the day prior to the interview and during the previous week

Frequency of consumption of food items belonging to different food groups during the previous week is presented in Table 19. Most frequently consumed foods (more than once a day) were rice/rice flour products, milk and coconut. Foods that were least consumed were cheese, shell fish, meat, processed meat and pizza.

Table 19: Consumption of food groups on the day prior to the interview and the frequency of consumption during last week (n=2570)

Type of food	Percentage of children					
	Last 24 hours	during the last week				
		More than once a day	Once a day	2- 3 times per week	Seldom	Never
Rice/rice flour products	99.2	92.9	5.2	1.5	0.3	0.1
Bread/cornflakes/wheat flour products	48.1	2.8	15.5	43.6	37.4	0.7
Dark yellow vegetables	34.9	0.1	1.6	58.9	38.3	1.1
Dark green leafy vegetables	37.7	0.1	3.4	64.7	30.4	1.4
Other vegetables	51.8	6.2	12.3	58.9	22.0	0.6
Potatoes	26.9	0.1	0.6	49.8	48.1	1.3
Other yams	6.3	0.0	0.3	17.2	78.0	4.6
Banana (ripened)	22.4	0.1	1.9	40.4	56.2	1.4
Papaw	5.2	0.0	0.2	18.1	77.9	3.9
Guava	9.6	0.0	0.7	18.2	77.3	3.7
Watermelon	2.8	0.0	0.2	9.2	82.5	8.1
Other fruits	18.3	0.0	0.6	27.3	70.6	1.5
Milk (liquid/powder)	59.4	17.8	35.1	9.9	23.1	13.9
Flavored milk (packets/bottles)	5.0	0.0	0.9	15.5	77.0	6.6
Yoghurt/ curd	7.6	0.0	0.9	21.9	72.9	4.4
Cheese	1.8	0.0	0.2	3.7	67.2	28.8
Butter/Ghee	2.5	0.0	0.2	5.3	68.3	26.1
Small fish	14.3	0.0	0.6	32.3	59.1	8.0
Large fish	21.9	0.0	0.7	31.8	60.8	6.7
Shell fish	2.1	0.0	0.0	4.8	74.6	20.5
Dry fish / sprats	33.5	0.2	3.5	55.8	35.4	5.1
Chicken	16.7	0.0	0.2	23.1	70.4	6.3
Meat types	5.1	0.0	0.1	8.2	32.3	59.3
Processed meat	2.4	0.1	0.0	3.1	59.7	37.1
Eggs	19.4	0.0	1.1	44.4	50.5	4.0
Dhal	55.0	0.3	4.2	69.8	25.1	0.6
Cow pea/chick pea/green gram	4.9	0.0	0.2	17.5	77.6	4.6
Coconut oil/Vegetable oil	74.6	7.4	33.0	44.4	14.9	0.4
Margarine	2.7	0.0	0.2	7.0	71.7	21.1
Peanuts/cashew nuts/sesame	8.7	0.0	0.4	20.4	76.3	2.9
Deep fried food	26.8	0.0	3.2	38.5	56.8	1.5
Biscuits	54.2	1.6	18.0	49.5	30.4	0.6
Cakes/chocolate/toffee	23.5	0.2	3.7	34.2	60.3	1.5
Sugary beverages (carbonated fizzy drinks)	5.8	0.0	0.4	14.6	78.3	6.6
Sugary beverages (fruit drinks)	2.1	0.0	0.2	5.8	73.6	20.5
Other sweets (doughnuts, Boondi, Dodol)	3.7	0.0	0.2	8.4	83.0	8.4
Pizza, burgers	0.6	0.0	0.0	1.2	49.6	49.2
Ice cream, Cool packets	21.7	0.0	4.1	33.8	60.3	1.8
Fortified food (Thriposha, Samaposha)	4.8	0.0	0.3	13.9	75.4	10.4

3.6 Physical activities

3.6.1 Physical activities undertaken during the previous week

Activities were categorized as vigorous (heavy lifting, digging, aerobics, or fast bicycling); moderate physical activities (carrying light loads, bicycling at a regular pace or tennis/badminton) and walking (at least 10 minutes at a time). Table 20 shows that 8.2 percent of the study population undertook vigorous physical activities and 51.6 percent pursued moderate physical activities. Nearly half the study population said that they undertook at least 10 minutes walking daily.

Table 20: Pattern of physical activities during last week by background characteristics (n=2570)

Background characteristics	Vigorous Physical activities	Moderate Physical activities	At least 10 minutes walking
Age in years			
10	4.4	47.3	51.6
11	9.1	40.7	46.5
12	8.5	40.4	45.9
13	6.9	44.1	54.6
14	7.5	41.4	53.2
15	10.2	52.2	55.4
16	6.7	56.6	53.0
17	8.3	63.9	56.1
18	19.0	57.1	57.1
Age groups in years			
10 – 14	7.7	58.0	50.5
15 - 18	8.8	44.1	54.7
Sex			
Male	11.3	62.3	48.9
Female	5.5	42.2	55.8
Province			
Western	5.7	45.2	45.9
Central	8.2	39.1	64.5
Southern	3.9	48.8	49.5
Northern	3.8	56.1	40.4
Eastern	11.3	58.4	43.3
NWP	8.5	59.9	53.7
NCP	18.5	47.8	50.7
Uva	9.0	59.9	69.9
Sabaragamuwa	5.3	48.7	54.7
Sri Lanka (CI 95%)	**8.2 (7.1-9.3)**	**51.6 (49.7-53.5)**	**52.6 (50.7-54.5)**

Table 21: Mean number of days and average time per day spent on different physical activities by background characteristics

Background characteristics	Vigorous Physical activities (n=211)		Moderate Physical activities (n=1326)		Walking (n=1351)	
	Mean (SD) days spent in last 7 days	Mean (SE) time spent per day (minutes)	Mean (SD) days spent in last 7 days	Mean (SE) time spent per day (minutes)	Mean (SD) days spent in last 7 days	Mean (SE) time spent per day (minutes)
Age in years						
10	4.0 (2.0)	26.3 (1.0)	5.3 (1.9)	50.7 (0.3)	5.1 (1.0)	31.9 (0.3)
11	4.3 (1.8)	30.6 (0.4)	4.6 (2.0)	60.7 (0.2)	4.9 (1.3)	32.5 (0.2)
12	4.2 (1.9)	38.3 (0.5)	4.5 (1.8)	54.9 (0.2)	4.7 (1.5)	34.9 (0.2)
13	4.6 (1.7)	44.1 (0.5)	4.3 (1.9)	57.1 (0.2)	4.7 (1.4)	29.7 (0.2)
14	3.7 (2.2)	47.6 (0.4)	4.3 (1.8)	59.4 (0.2)	4.9 (1.3)	33.6 (0.2)
15	3.7 (1.8)	32.1 (0.3)	4.1 (1.8)	51.7 (0.2)	5.1 (1.2)	34.2 (0.1)
16	3.4 (1.5)	54.5 (0.4)	4.1 (1.7)	46.5 (0.2)	5.0 (1.2)	33.0 (0.2)
17	3.9 (2.3)	51.0 (0.6)	4.0 (1.9)	55.6 (0.3)	5.1 (1.3)	27.2 (0.2)
18	6.5 (1.0)	71.3 (1.0)	4.6 (2.0)	58.3 (0.7)	5.8 (1.4)	25.8 (0.6)
Age groups in years						
10 - 14	4.2 (1.9)	39.8 (0.2)	4.5 (1.9)	57.8 (0.1)	4.8 (1.3)	32.5 (0.1)
15 - 18	3.8 (1.9)	42.7 (0.2)	4.1 (1.7)	50.5 (0.1)	5.1 (1.2)	32.4 (0.1)
Sex						
Male	4.1 (2.0)	47.5 (0.3)	4.5 (1.8)	59.1 (0.1)	5.0 (0.1)	32.1 (0.1)
Female	3.7 (1.6)	30.1 (0.2)	4.1 (1.9)	49.5 (0.1)	4.9 (0.9)	32.7 (0.9)
Province						
Western	2.9 (2.0)	32.6 (0.6)	3.6 (2.1)	81.2 (0.2)	4.5 (1.6)	28.4 (0.2)
Central	3.8 (1.5)	40.4 (0.5)	3.9 (1.8)	61.0 (0.2)	5.2 (1.3)	41.9 (0.2)
Southern	3.0 (1.1)	53.3 (0.7)	4.5 (1.9)	56.9 (0.2)	4.6 (1.4)	28.7 (0.2)
Northern	5.5 (1.5)	46.8 (0.7)	4.7 (1.5)	41.8 (0.2)	5.0 (0.5)	30.7 (0.2)
Eastern	4.5 (1.8)	36.1 (0.4)	5.0 (1.7)	52.2 (0.2)	5.3 (1.1)	29.0 (0.2)
NWP	3.9 (2.2)	58.1 (0.5)	4.1 (1.9)	44.3 (0.2)	4.8 (1.6)	27.7 (0.2)
NCP	4.3 (2.2)	42.6 (0.3)	4.5 (1.8)	46.6 (0.2)	4.8 (1.6)	33.4 (0.2)
Uva	3.6 (1.1)	22.6 (0.4)	4.2 (1.7)	47.9 (0.2)	5.0 (1.2)	33.5 (0.2)
Sabaragamuwa	3.4 (2.1)	52.5 (0.6)	4.3 (1.9)	71.0 (0.2)	5.1 (0.9)	34.6 (0.2)
Sri Lanka	**4.0 (1.9)**	**41.3 (0.2)**	**4.3 (1.8)**	**54.9 (0.1)**	**4.9 (1.3)**	**25.1 (0.1)**

Mean time spent in carrying out different types of physical activities are given in Table 21. It is seen that the mean time spent on vigorous physical activities was higher among the older children, even though there is no clear age-related pattern. However, the mean time spent in moderate physical activities was marginally lower in all age groups, with no clear age pattern. Male children spent more time in vigorous physical activities compared to the females. Variation between the provinces in the mean time spent on different types of physical activities ranged widely.

3.6.2 Time spent on different daily activities

Table 22 presents the percentage of children who participated in different daily activities. It is seen that the highest percentage of children (83.6 percent) spent time watching TV or hand phone (screen time) with a higher percentage of children (79.3 percent) attending tuition classes. Much lower percentages spent time on activities such as gardening (18.3 percent) and dancing (14.2 percent). This pattern varied widely between provinces.

Table 22: Percentage of children who participated in sedentary and other daily activities during the previous week by background characteristics (n=2570)

Background characteristics	No.	Tuition	Screen time	Dancing	Gardening
Age in years					
10	91	73.6	81.3	22.0	11.0
11	297	73.1	82.5	18.9	13.8
12	270	77.0	87.8	20.0	18.9
13	306	78.4	87.9	20.6	19.3
14	425	76.7	85.9	16.0	22.6
15	540	80.7	78.7	9.8	21.1
16	415	82.7	82.7	11.3	16.6
17	205	91.7	85.9	2.0	13.2
18	21	66.7	71.4	0.0	19.0
Age groups in years					
10 – 14	1389	76.2	85.7	18.8	18.5
15 - 18	1181	83.1	81.2	8.8	18.1
Sex					
Male	1197	78.6	85.9	4.2	19.3
Female	1373	80.0	81.6	22.9	17.5
Province					
Western	283	83.4	86.6	20.1	7.4
Central	279	71.7	87.5	14.0	25.4
Southern	281	87.2	85.8	16.0	10.3
Northern	287	70.7	74.6	7.7	6.6
Eastern	293	68.6	74.7	9.2	12.3
NWP	272	89.3	83.8	19.1	24.3
NCP	276	89.5	85.1	13.0	43.5
Uva	299	75.3	86.6	15.1	21.1
Sabaragamuwa	300	79.7	88.0	14.0	15.3
Sri Lanka (CI 95%)	**2570**	**79.3 (77.7-80.9)**	**83.6 (82.2-85.0)**	**14.2 (12.9-15.6)**	**18.3 (16.8-19.8)**

Table 23: Average number of hours per week spent on sedentary and other daily activities during the previous week by background characteristics

Background information	Median (minimum-maximum) hours spent during last week			
	Tuition (n=2038)	Screen time (n=2152)	Dancing (n=365)	Gardening (n=470)
Age in years				
10	6.0 (2.0-18.0)	10.0 (0.8-30.0)	1.0 (0.5-3.0)	1.0 (1.0-8.0)
11	6.0 (1.0-20.0)	12.0 (1.0-56.0)	1.3 (0.0-15.0)	2.0 (0.5-0.8)
12	5.0 (1.0-36.0)	10.0 (1.0-35.0)	1.5 (0.0-30.0)	2.0 (0.5-20.0)
13	6.0 (2.0-25.0)	10.0 (1.0-35.0)	1.5 (0.5-5.0)	2.0 (1.0-10.0)
14	6.0 (1.0-42.0)	14.0 (0.5-42.0)	1.5 (0.0-45.0)	2.0 (0.0-20.0)
15	8.0 (1.0-32.0)	7.0 (0.0-35.0)	1.5 (0.0-10.0)	2.0 (1.0-10.0)
16	8.0 (1.0-33.0)	7.0 (1.0-35.0)	1.0 (0.0-14.0)	2.0 (0.3-15.0)
17	8.3 (2.0-28.0)	10.0 (1.0-42.0)	1.3 (1.0-2.0)	4.0 (1.0-30.0)
18	9.0 (1.0-20.0)	7.0 (1.0-21.0)	30.9 (0.0-59.4)	3.5 (1.5-6.0)
Age groups				
10 - 14	6.0 (1.0-42.0)	10.5 (0.5-56.0)	1.5 (0.0-45.0)	2.0 (0.0-20.0)
15 - 18	8.0 (1.0-38.0)	7.0 (0.0-42.0)	1.5 (0.0-14.0)	2.0 (0.3-30.0)
Sex				
Male	6.0 (1.0-36.0)	10.0 (0.8-42.0)	1.5 (0.0-45.0)	2.0 (0.0-20.0)
Female	7.0 (1.0-42.0)	10.0 (0.0-56.0)	1.5 (0.0-30.0)	2.0 (0.0-30.0)
Province				
Western	7.5 (1.5-28.0)	12.0 (1.0-42.0)	1.5 (0.8-6.0)	2.0 (0.5-5.0)
Central	6.0 (1.0-42.0)	10.0 (0.5-42.0)	1.0 (0.5-4.0)	2.0 (0.5-8.0)
Southern	7.0 (1.0-26.0)	14.0 (0.2-35.0)	1.5 (0.5-10.0)	2.0 (1.0-5.0)
Northern	10.0 (1.0-28.0)	7.0 (1.0-56.0)	1.0 (0.0-15.0)	3.0 (1.0-21.0)
Eastern	6.0 (1.0-28.0)	10.0 (1.0-28.0)	1.0 (0.0-3.0)	2.8 (1.0-7.0)
NWP	8.0 (1.0-32.0)	7.0 (0.8-30.0)	1.8 (0.8-30.0)	2.0 (0.3-15.0)
NCP	8.0 (1.0-29.0)	7.0 (0.0-36.0)	1.5 (0.0-14.0)	2.0 (0.0-20.0)
Uva	6.0 (1.0-36.0)	10.0 (1.0-35.0)	1.5 (0.0-10.0)	2.0 (1.0-10.0)
Sabaragamuwa	6.0 (2.0-38.0)	14.0 (1.0-28.0)	1.3 (0.5-45.0)	2.0 (1.0-30.0)
Sri Lanka (range)	**7.0 (1.0-42.0)**	**10.0 (0.0-56.0)**	**1.5 (0.0-45.0)**	**2.0 (0.0-30.0)**

Generally, the mean time spent on tuition per week increased with increasing age. It is also seen that the mean time spent on watching "screens" (TV and hand phone) was comparatively higher compared to the time spent on tuition, gardening and dancing. Variations in the time spent on different activities were seen between provinces (Table 23).

3.6.3. Availability of sports facilities and access at school

An assessment of the availability of sports facilities for study subjects in schools was assessed and the findings are given in Table 24. Availability of a period for sports was highest in the Northern Province and lowest in the NCP. Availability of a sports teacher in the school was highest in Central province (92.8 percent) and lowest in the NCP (14.9 percent).

Table 24: Percentage of children with available sports facilities in schools by province

Background characteristics	Number of Children who responded	% of schools having sports facilities	
		Sports period	Sports teacher
Province			
Western	283	66.1	57.6
Central	279	51.3	92.8
Southern	281	72.6	85.8
Northern	287	79.8	86.1
Eastern	293	79.2	72.4
NWP	272	70.6	77.9
NCP	276	0.0	14.9
Uva	299	66.9	73.6
Sabaragamuwa	300	66.7	80.0
Sri Lanka (95% CI)	**2570**	**61.8 (59.9-63.7)**	**71.4 (69.7-73.2)**

Further information on the type of sports facilities available for children in schools was obtained and the data is presented in Table 25. Majority had access to facilities to play Volleyball (83.9 percent) and 57.5 percent had facilities to play cricket.

Table 25: Percentage of children having access to different sports facilities in schools by province

Background characteristics	No of children	% of children having access to							
		Foot ball	Volley ball	Net ball	Basket ball	Swimming	Cricket	Tennis	Other
Province									
Western	283	79.5	79.5	11.0	30.7	71.7	7.1	51.9	51.9
Central	279	22.9	72.4	73.8	2.5	2.5	78.9	0.0	57.3
Southern	281	27.0	100.0	80.1	13.5	10.3	78.6	12.8	38.8
Northern	287	44.3	79.1	65.2	20.9	0.0	72.1	7.0	58.9
Eastern	293	72.7	79.5	38.6	6.8	0.0	93.2	0.0	38.9
NWP	272	36.4	85.3	52.2	11.0	8.8	58.1	0.0	38.6
NCP	276	92.8	100.0	7.6	0.0	21.4	14.9	63.8	28.6
Uva	299	6.7	79.9	59.9	0.0	0.0	39.8	0.0	40.1
Sabaragamuwa	300	33.3	80.0	66.7	6.7	6.7	73.0	0.0	33.3
Sri Lanka	**2570**	**45.9**	**83.9**	**50.7**	**10.2**	**13.3**	**57.5**	**14.7**	**42.9**

Type of other sports available for study subjects were athletics (19.6%), badminton (17.0%), chess (21.6%), elle (5.1%), gymnastics (1.8%), khabadi (7.3%), karate (10.5%), rugby (3.4%), table tennis (3.1%), women's cricket (3.6%), wushu (1.6%).

3.7 Pattern of perception of body weight

Table 26 presents self-perception of body weight among the study participants. About one fourth perceived that they were underweight (23.4 percent) and overweight (23.3 percent) while 4.2 percent had no idea about their body weight.

Table 26: Self-perception of body weight by background characteristics

Background characteristics	Total number of children	% of children who perceive their body weight as				
		Under weight	Optimum weight	Over weight	Obese	No idea
Age in years						
10	91	30.8	47.3	14.3	0.0	7.7
11	297	22.6	53.9	18.2	1.0	4.4
12	270	23.0	45.9	24.8	0.0	6.3
13	306	20.6	49.0	24.8	0.0	5.6
14	425	21.2	45.9	27.8	0.5	4.7
15	540	27.2	46.3	23.1	0.9	2.4
16	415	21.9	50.8	23.4	0.5	3.4
17	205	22.4	50.2	23.4	0.0	3.9
18	21	33.3	61.9	4.8	0.0	0.0
Age groups in years						
10 - 14	1389	22.3	48.4	23.6	0.4	5.3
15 - 18	1181	24.6	48.9	22.9	0.6	3.0
Sex						
Male	1197	9.3	10.6	21.9	49.5	1.5
Female	1373	13.0	6.0	20.3	52.7	1.1
Province						
Western	283	25.4	45.2	25.8	1.4	2.1
Central	279	31.2	39.8	24.4	0.7	3.9
Southern	281	21.0	52.3	23.1	1.1	2.5
Northern	287	19.2	51.9	17.4	0.0	11.5
Eastern	293	20.5	54.6	20.8	0.0	4.1
NWP	272	23.9	49.6	24.3	0.0	2.2
NCP	276	24.6	43.8	25.4	0.4	5.8
Uva	299	22.1	49.8	24.4	0.7	3.0
Sabaragamuwa	300	23.0	49.7	24.3	0.0	3.0
Sri Lanka (95% CI)	**2570**	**23.4 (21.7-25.0)**	**48.6 (46.7-50.5)**	**23.3 (21.7-24.9)**	**0.5 (0.2-0.8)**	**4.2 (3.4-5.0)**

Table 27: BMI categories in relation to the self-perception of body weight (n=2570)

BMI category	Total number of children	% of children who perceive their body weight as,				
		Under weight	Optimum weight	Overweight	Obese	No idea
Underweight	692	50.5	42.3	3.3	0.0	3.9
Normal	1627	15.0	57.3	22.7	0.2	4.9
Overweight	194	3.1	11.3	81.4	2.6	1.5
Obese	57	3.5	5.3	84.2	7.0	0.0

Table 27 shows 50.5 percent of underweight children and 81.4 percent of overweight children perceive that they are underweight and overweight respectively.

Table 28: Methods by which the children want to change/ maintain their body weight by background characteristics

Background characteristics	Total number of children	% of children who wanted to			
		Lose weight	Gain weight	Maintain the same weight	No idea
Age in years					
10	91	7.7	8.8	26.4	57.1
11	297	9.8	8.4	19.9	62.0
12	270	10.7	10.7	19.3	59.3
13	306	10.1	3.9	28.1	57.8
14	425	12.9	8.9	19.5	58.6
15	540	10.4	9.6	18.9	61.1
16	415	12.8	8.0	20.7	58.6
17	205	13.2	5.4	22.0	59.5
18	21	9.5	9.5	19.0	61.9
Age groups in years					
10 – 14	1389	10.9	8.1	21.9	59.2
15 - 18	1181	11.7	8.3	20.1	59.9
Sex					
Male	1197	13.0	6.0	20.3	60.7
Female	1373	9.3	10.6	21.9	58.2
Province					
Western	283	14.1	8.8	14.5	62.5
Central	279	14.0	11.1	15.4	59.5
Southern	281	7.5	8.5	16.7	67.3
Northern	287	8.7	6.3	20.2	64.8
Eastern	293	10.2	8.9	31.1	49.8
NWP	272	12.9	8.1	29.4	49.6

NCP	276	12.0	8.3	34.4	45.3
Uva	299	11.4	6.7	12.0	69.9
Sabaragamuwa	300	10.7	7.0	16.7	65.7
Sri Lanka (95% CI)	**2570**	**11.2 (10.0-12.4)**	**8.2 (7.1-9.3)**	**21.1 (19.5-22.7)**	**59.5 (57.6-61.4)**

Table 28 provides information on the ways in which children wanted to 'change' their body weight. A high percentage of children had no idea about 'changing their body weight' with another 21.1 percent of them wanting to maintain the same weight while 8.2 percent wanted to gain weight. Majority of the children (59.5 percent) had no idea about changing or maintaining their body weight.

Table 29: BMI categories in relation to the methods by which children want to change their body weight

BMI category	Total number of children	% of children who wanted to			
		Lose weight	Gain weight	Maintain the same weight	No idea
Underweight	692	0.6	17.7	23.0	58.8
Normal	1627	9.8	5.3	22.7	62.1
Overweight	194	45.9	0.5	6.2	47.4
Obese	57	63.2	0.0	1.8	35.1

Table 29 presents the change of body weight wanted by the children. About half of underweight children (58.8 percent) had no idea whether they needed to change their body weight while 47.4 percent of overweight children and 35.1 percent of obese children had no idea about changing their body weight. Two third (63.2 percent) of obese children wanted to lose weight and 17.7 percent of underweight children wanted to gain weight.

Figure 1 and 2: Skipping meals by children to lose their weight during the preceding month by background characteristics

Figure 1

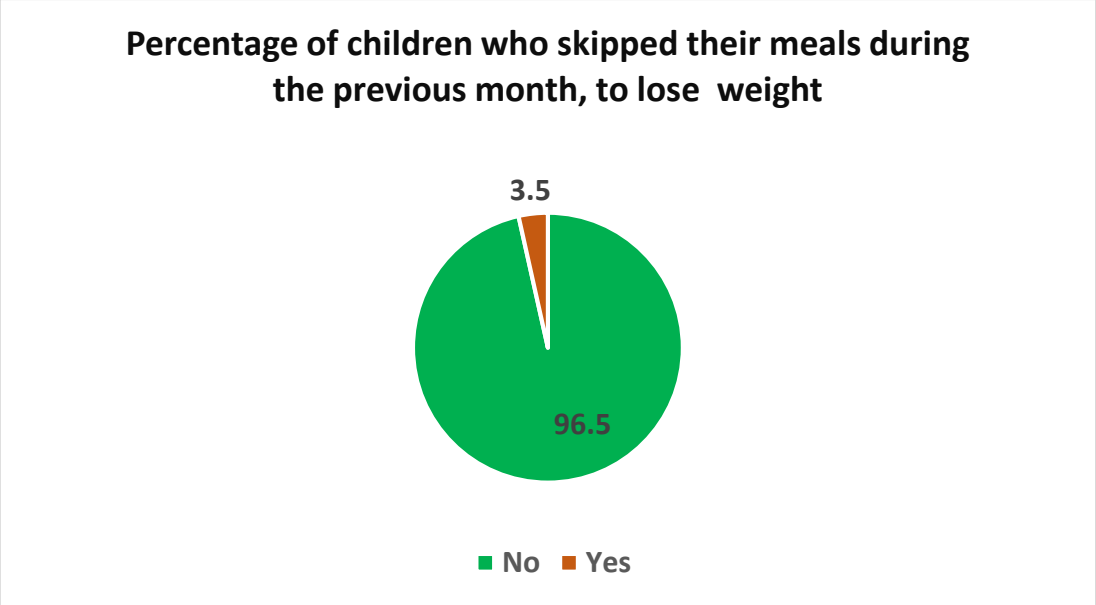

Figure 2

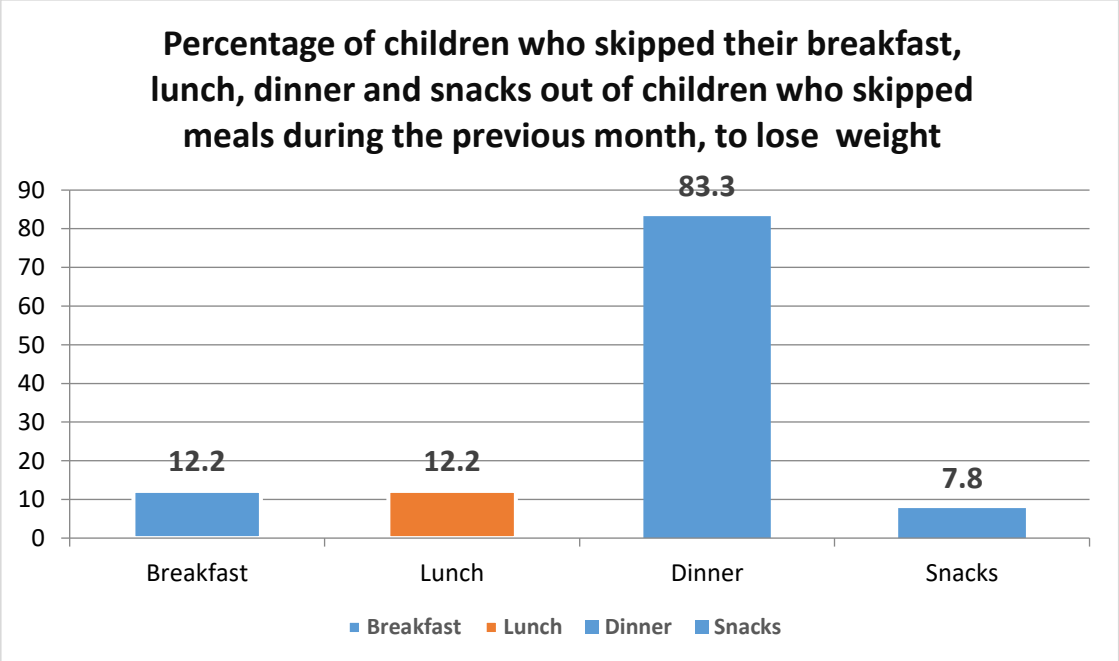

Figure 1 presents that 3.5 percent of children skipped their meals during last month to lose weight. Figure 2 shows that out of children who skipped meals to lose weight, 83.3 percent had skipped their dinner.

3.8 Personal habits

Consumption of alcohol products and practice of smoking is presented in Table 30. Proportions who were involved in both these practices were higher among the post-adolescents and among males.

Table 30: Consumption of alcohol products, smoking and use of other substances during the past 30 days

Background information	Total number of children	% of children		
		consumed alcohol products	smoked	consumed products like babul, beedi or mawa
Age in years				
10	91	0.0	0.0	0.0
11	297	0.0	0.0	0.0
12	270	0.7	0.0	0.0
13	306	0.3	0.0	0.0
14	425	1.9	0.9	0.5
15	540	2.0	0.7	0.7
16	415	4.3	1.4	0.5
17	205	3.4	0.5	0.0
18	21	9.5	4.8	0.0
Age groups in years				
10 - 14	1389	0.8	0.3	0.1
15 - 18	1181	3.2	1.0	0.5
Sex				
Male	1197	3.4	1.3	0.7
Female	1373	0.6	0.0	0.0
Province				
Western	283	1.8	0.0	0.0
Central	279	2.5	0.0	1.4
Southern	281	0.4	0.4	0.4
Northern	287	0.3	0.3	0.0
Eastern	293	1.7	0.3	0.0
NWP	272	5.5	2.2	0.0
NCP	276	1.1	0.4	0.7
Uva	299	3.0	1.3	0.3
Sabaragamuwa	300	1.0	0.7	0.0
Sri Lanka (95% CI)	**2570**	**1.9 (1.4-2.4)**	**0.6 (0.3-0.9)**	**0.3 (0.1-0.5)**

3.9 Recent morbidity experiences

Prevalence of selected morbidity experiences, diarrhea, cough with or without fever, fever during the preceding two weeks was assessed and the findings are presented in Table 31. Prevalence of diarrhea was lower compared to the cough and fever. There were no clear patterns related neither to the age categories nor between males and females. Provincial prevalence varied among each illness.

Table 31: Prevalence of illnesses during the last 2 weeks in relation to background information

Basic characteristics	Number of children	Prevalence of diarrhea in last two weeks	Prevalence of cough with or without fever	Prevalence of fever
Age in years				
10	91	2.2	14.3	8.8
11	297	4.0	11.4	7.4
12	270	2.2	13.7	8.5
13	306	3.3	10.1	8.2
14	425	2.8	10.1	8.5
15	540	2.6	11.5	9.4
16	415	3.4	10.1	7.0
17	205	3.4	13.2	12.2
18	21	0.0	0.0	0.0
Age groups in years				
10 - 14	1389	3.0	11.4	8.2
15 - 18	1180	3.0	11.1	8.9
Sex				
Male	1197	3.2	11.6	7.9
Female	1373	2.8	10.9	9.1
Province				
Western	283	0.7	12.0	5.7
Central	279	3.2	9.7	5.7
Southern	281	2.8	14.2	8.9
Northern	287	3.8	7.3	11.5
Eastern	293	1.4	5.1	7.2
NWP	272	2.6	11.4	9.9
NCP	276	4.3	14.5	8.0
Uva	299	5.0	11.0	9.4
Sabaragamuwa	300	3.0	16.0	10.3
Sri Lanka (95% CI)	**2570**	**3.0 (2.3-3.7)**	**11.2 (10.0-12.4)**	**8.5 (7.4-9.6)**

3.10 Sources of drinking water used by children during school hours

Majority (82.0 percent) of the study sample were aware of the importance of drinking water. More children drink water brought from home compared to water available in the school (Table 32). More of the children in the post-adolescent group and males drink water available at the school. On the other hand, more of the children in the pre-adolescent group and females drink water brought from home.

Table 32: Awareness on importance of drinking water and sources of drinking water during school hours

Background characteristics	Total number of children	Aware on Importance of drinking water	% of children got drinking water from		
			School	Home	Both school and home
Age in years					
10	91	92.3	4.4	81.3	14.3
11	297	84.8	15.2	71.4	13.5
12	270	87.8	21.9	71.9	6.3
13	306	87.9	22.2	68.0	9.8
14	425	81.9	34.1	56.7	9.2
15	540	77.8	35.6	56.7	7.8
16	415	78.3	39.3	54.2	6.5
17	205	75.6	31.2	61.5	7.3
18	21	85.7	66.7	28.6	4.8
Age groups in years					
10 - 14	1389	85.7	23.1	66.9	10.0
15 - 18	1181	77.7	36.7	56.1	7.2
Sex					
Male	1197	79.2	44.9	47.0	8.1
Female	1373	84.5	15.8	74.9	9.2
Province					
Western	283	88.3	19.1	66.4	14.5
Central	279	83.5	22.9	70.3	6.8
Southern	281	85.8	24.6	65.1	10.3
Northern	287	92.0	50.5	42.2	7.3
Eastern	293	83.3	46.1	43.7	10.2
NWP	272	71.3	21.7	76.5	1.8
NCP	276	59.4	37.0	50.4	12.7
Uva	299	90.3	21.4	70.6	8.0
Sabaragamuwa	300	82.7	20.7	72.7	6.7
Sri Lanka (95% CI)	**2570**	**82.0 (80.5-83.5)**	**29.3 (27.5-31.1)**	**61.9 (60.0-63.8)**	**8.7 (7.6-9.8)**

3.11 Hand washing practices of study

Tables 33 and 34 present information on hand washing practices. Only 4.2 and 42.0 percent of the study population practiced washing hands always with soap before meals and after using the toilet respectively.

Table 33: Hand washing with soap before meals by children during the last month in relation to background characteristics

Background information	Total number of children	% of children who wash hands with soap before meals			
		No	Always	Rarely	Sometimes
Age in years					
10	91	18.7	4.4	2.2	74.7
11	297	30.0	5.4	0.7	64.0
12	270	30.4	5.6	2.6	61.5
13	306	35.6	2.3	2.0	60.1
14	425	39.1	4.2	3.1	53.6
15	540	37.2	4.1	3.5	55.2
16	415	35.9	3.4	1.4	59.3
17	205	23.9	4.9	1.5	69.8
18	21	28.6	4.8	0.0	66.7
Age groups in years					
10 - 14	1389	33.3	4.3	2.2	60.2
15 - 18	1181	34.3	4.0	2.4	59.4
Sex					
Male	1197	39.3	4.0	2.6	54.1
Female	1373	29.0	4.3	2.0	64.7
Province					
Western	283	32.9	4.6	0.4	62.2
Central	279	25.1	4.7	3.2	67.0
Southern	281	36.7	3.9	5.7	53.7
Northern	287	30.7	1.7	1.4	66.2
Eastern	293	33.4	4.4	3.1	59.0
NWP	272	31.6	5.9	1.8	60.7
NCP	276	40.9	10.1	1.1	47.8
Uva	299	36.1	1.7	3.7	58.5
Sabaragamuwa	300	36.3	1.0	0.0	62.7
Sri Lanka (95% CI)	**2570**	**33.8 (32.0-35.6)**	**4.2 (3.4-5.0)**	**2.3 (1.7-2.9)**	**59.8 (57.9-61.7)**

Table 34: Hand washing with soap after using the toilet by children during the last month in relation to background characteristics

Background information	Total number of children	% of children who wash hands with soap after using toilets			
		No	Always	Rarely	Sometimes
Age in years					
10	91	4.4	34.1	1.1	60.4
11	297	7.7	33.3	0.7	58.2
12	270	7.8	32.6	2.2	57.4
13	306	9.8	33.0	1.0	56.2
14	425	8.2	44.9	0.5	46.4
15	540	6.7	50.7	0.6	42.0
16	415	6.0	44.3	0.7	48.9
17	205	2.0	48.8	0.5	48.8
18	21	4.8	52.4	0.0	42.9
Age groups in years					
10 - 14	1389	8.1	36.7	1.0	54.1
15 - 18	1181	5.6	48.2	0.6	45.6
Sex					
Male	1197	4.5	45.6	0.3	49.6
Female	1373	9.8	37.8	1.4	51.0
Province					
Western	283	4.5	45.6	0.3	49.6
Central	279	9.8	37.8	1.4	51.0
Southern	281	9.3	33.5	2.1	55.2
Northern	287	12.5	38.3	0.3	48.8
Eastern	293	4.4	43.7	1.4	50.5
NWP	272	4.8	47.1	0.4	47.8
NCP	276	5.1	64.1	0.0	30.8
Uva	299	6.4	38.5	0.3	54.8
Sabaragamuwa	300	7.3	36.7	0.7	55.3
Sri Lanka (95% CI)	**2570**	**7.0 (6.0-8.0)**	**42.0 (40.1-43.9)**	**0.8 (0.5-1.1)**	**50.2 (48.3-52.1)**

3.12 Nutrition components taught in school

Above 80 percent of the children had been taught on benefits of healthy eating, safe food preparation and storage practices and benefits of physical activities. Considering the sub groups studied, main differences were seen between the geographical areas, such inputs being more frequent in schools in the Western province (around 95 percent) and less in the North Central province.

Table 35: Percentage of children who were taught on healthy eating, safe food preparation and benefit of physical activities in schools by background information

		% of children who were taught about the		
Basic characteristics	**Number of children**	**benefits of healthy eating**	**safe food preparation and storing**	**benefit of physical activities**
Age in years				
10	91	86.8	84.6	82.4
11	297	87.5	82.5	82.2
12	270	88.1	84.4	85.9
13	306	92.8	91.5	88.9
14	425	87.3	82.8	81.9
15	540	84.8	82.4	81.9
16	415	81.9	80.0	81.2
17	205	71.2	68.8	69.8
18	21	57.1	57.1	85.7
Age groups in years				
10 - 14	1389	88.7	85.1	86.2
15 - 18	1180	80.9	78.7	84.0
Sex				
Male	1197	84.0	79.4	86.2
Female	1373	86.2	84.6	84.0
Province				
Western	283	95.4	94.3	88.7
Central	279	87.1	82.1	82.8
Southern	281	87.9	84.0	85.4
Northern	287	86.4	82.2	78.7
Eastern	293	85.0	79.2	76.8
NWP	272	76.5	79.8	80.9
NCP	276	68.8	63.8	69.6
Uva	299	89.6	85.3	90.6
Sabaragamuwa	300	88.3	88.0	85.0
Sri Lanka (95% CI)	**2570**	**85.1 (83.7-86.5)**	**82.2 (80.7-83.7)**	**82.1 (80.6-83.6)**

CONCLUSIONS AND RECOMMENDATIONS

- According to the cut off values for public health significance specified by the World Health Organization (WHO), the following nutrition problems were identified among school children between 10-18 years of aged in Sri Lanka.
- There is a high prevalence of **thinness (underweight)** at national (26.9 percent) and provincial level (23.3-22.5 percent).
- There is a low prevalence of **overweight and obesity** at national level (9.7 percent) and in 7 out of 9 provinces (5.6-16.3 percent). Moderate prevalence in Western province (16.3 percent) and NCP (11.9 percent).
- There is a low prevalence of **stunting** at national level (13.7 percent) and all provinces (5.8-17.8 percent).
- There is a mild public health problem of **anaemia** at national (8.8 percent) and provincial levels (4.3-15.7 percent).
- There is a moderate public health problem of **iron deficiency** at national level (22.1 percent) and in 6 out of 9 provinces (16.1-29.9 percent). Prevalence of anaemia in Southern province was 18.8 percent, Eastern province 19.1 percent and Sabaragamuwa province 16.1 percent indicating a mild public health problem.
- **Iron deficiency anaemia** is no longer a public health problem at national level (3.8 percent). However, at the provincial level, IDA remains a mild public health problem in Northern province (7.3 percent) unlike in the other 8 provinces (1.8-4.6 percent).
- **Vitamin A deficiency** is no longer a public health problem at national level (0.1 percent) or provincial levels (0.0-0.4 percent).
- **Vitamin D deficiency** is an emerging public health problem at national (13.2 percent) and provincial levels (0.7-32.2 percent).
- There are **optimum iodine levels** at national level (137.9 µg/dL) and 7 out of 9 provinces (133.1-175.8 µg/dL). **Insufficient iodine** levels were present in Western (94.2 µg/dL) and Uva (89.0 µg/dL) provinces.
- **Zinc deficiency** is a public health concern at national (29.4 percent) and provincial levels (17.6-46.1 percent).

It is recommended to:

- Extend the school medical inspection to identify thin (underweight), overweight and obese children to include children aged 10-18 years in order to direct them to targeted interventions.
    - Based on an in-depth study enabling identification of factors linked to variations in nutritional status, and other relevant factors, consideration has to be given to identify appropriate interventions, especially those that could be carried out at school level.
    - Implement “Double-duty” actions that include interventions, programmes and policies that have the potential to simultaneously reduce the risk or burden of undernutrition, overweight and obesity.

- Improve iron folate and deworming supplementation programme to increase the coverage over 90 percent at school level while identifying the exit strategy for vitamin A mega dose supplementation.
- Conduct a study to determine the efficacy, safety and optimal dosage of vitamin D mega dose while promoting daily sun exposure 10-15 minutes near midday and thereon conduct an in-depth study on sun exposure for prevention of vitamin D deficiency with associated risk of skin cancer.
- Promote daily consumption of iron rich, vitamin A rich, zinc rich and vitamin D fortified food items.
- Promote activities through the school system to improve nutritional status. It is necessary to consider implementing programmes for all schools that include actions aimed at promoting healthy food practices. Such Actions need to include those aimed at enabling students to make healthy food choices.
    - Increase the awareness among parents, teachers and students on health and educational effects of thinness, overweight and obesity.
    - Set up cooking demonstration programmes for parents and students to popularize energy dense food for thin children and health meals for overweight and obese children.
    - Discourage skipping meals especially breakfast for thin children and skipping dinner to lose weight while promoting less snacks and early dinner.
    - Encourage to include protein rich food, vegetables and fruits in each meal while discouraging daily consumption of deep-fried food, biscuits, sugary food etc.
- Promoting physical activities among students through multiple approaches has to be considered as an input that will have a long-term impact on the health of the adolescent and in the adult, in the long term.
    - Encourage to utilize sports teacher in the school to initiate structured physical activity programmes to increase the activity level rather than competitive sports while increasing awareness of the advantages of reducing screen time and tuition time.
- Encourage hand washing with soap to control morbidities via dedicated sessions. Increase awareness about the importance of appropriate food consumption during illness to support growth during the adolescent period especially focusing on achieving optimum height.
- Enhance the self-empowerment on measuring own body weight and BMI values for early detection and appropriate correction of thin, overweight and obese children.
- Obtain more information on the current status of the educational activities aimed at promoting nutritional wellbeing among adolescents to make improvements required to upgrade the quality and effectiveness of such inputs.
    - Improve the practice of knowledge on healthy eating, safe food preparations and improve physical activities.
    - Variations in the nutritional status indicators, pattern of food consumption, micronutrient intake, physical activities, and availability of sports facilities

observed between provinces requires in depth studies to identify factors that may have led to such differences.

- Revisit the school meal programme; to enable provision of breakfast and/or a nutrient-rich, mid-morning snack at school to improve nutrition, health, and performance of students as use of snacks is frequent during the school interval when most of the study group consume food brought from home. Usefulness of provision of meals at school need to be assessed to make necessary modifications to the school meal programme to enable obtaining optimal benefits from the inputs.

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ANNEX 1: QUESTIONNAIRE

සම්මුඛ සාකච්ඡාව පැවැත්වූ දිනය **Date of the Interview** | | | | | | | |

National Nutrition, Micronutrient and Thyroid status among school adolescents aged 10-18 years in Sri Lanka
වෛද්‍ය පර්යේෂණායතනය හා පෝෂණ සම්බන්ධීකරන අංශය මගින් සම්පාදනය කරනු ලබයි
Executed by the Department of Nutrition/MRI with Nutrition Coordination Division

මෙම සමීක්ෂණය අවු 10 – 18 දරුවන්ගේ පවත්නා සෞඛ්‍ය ජීවන රටාව හා පෝෂණ තත්ත්ව හා සම්බන්ධ තොරතුරු හඳුනා ගැනීමට පවත්වනු ලබයි. මෙම සමීක්ෂණයෙන් ලැබෙන ප්‍රතිඵල, සෞඛ්‍ය පෝෂණ හා දේශීය වෛද්‍ය අමාත්‍යාංශයටත් හා ආධාර ලබා දෙන ආයතන වලටත් දරුවන්ගේ පෝෂණ තත්ත්ව නගාසිටුවීම සඳහා ගතහැකි ක්‍රියාමාර්ග පිළිබඳ තීරණය කිරීමට උපකාර වනු ඇත. This survey is being conducted to know about current nutritional and life style behavior along with some related information about the children. As per result of the survey, Ministry of Health, Nutrition and Indigenous Medicine and donor agencies would like to take a decision about what sort of intervention would be necessary to help children to improve nutrition status.
සමීක්ෂණය ආරම්භ කිරීමට පෙර පහත කරුණු සහතික කරගත යුතුය. When starting the interview of the student, make sure:
සමීක්ෂණයේ අරමුණු පැහැදිලි කළේද? Have the objectives of the survey been explained? ☐
ඇසීමට බලාපොරොත්තු වන ප්‍රශ්න වර්ග ගැන විස්තර කළේද? Has the type of questions to be used been explained? ☐
ලබා ගන්නා දත්ත රහසිගතව තබා ගන්නා බවට සහභාගිවන්නන්ට දැනුම් දුන්නේද? Has the respondents been informed that the data will be kept confidential? ☐
සහභාගිවන්නන්ට අවශ්‍ය තොරතුරු ලබාදී ඔවුන්ගේ කැමැත්ත ලබා ගත්තේද? Has the informed consent been taken? ☐

1.0 ප්‍රදේශය හඳුනා ගැනීම Area Identification (නම සහ කේතය ලියන්න) (write original name and code)
A) දිස්ත්‍රික්කය District:
C) පාසලේ නම Name of the School:
D) පාසලට ඇතුලත් වූ දිනය Date of Admission to the School:
E) පසුගිය මාසය තුළ දරුවා පාසැල් නොපැමිණි දින ගණන Number of days that the child was absent in last month:

2.0 සහභාගිවන්නාගේ තොරතුරු Details of the participant:
සහභාගිවන්නාගේ නම Name of the participant:
ලිපිනය Address:
දුරකථන අංකය Telephone No: ☐☐☐☐☐☐☐☐☐☐

	සම්මුඛ සාකච්ඡාව පැවැත්වූ අය Interviewer	අධීක්ෂක Supervisor	ප්‍රමිති නිලධාරී Q.C.O
නම Name:			
අත්සන/දිනය Signature/Date:			

3.0. සම්මුඛ පරීක්ෂණයේ තත්වය (සම්මුඛ පරීක්ෂණය අවසානයේ පමණක් සම්පූර්ණ කළ යුතුය) Status of Interview (Fill only after completing the interview):

සම්පූර්ණ	**Complete**	**1** ---------
අසම්පූර්ණ	**Partially complete**	**2** ---------
ප්‍රතික්ශේපිත	**Refused**	**3** ---------

4.0 සාමාන්‍ය තොරතුරු GENERAL INFORMATION

4.1 ස්ත්‍රී පුරුෂභාවය Sex	1). පුරුෂ Male 2). ස්ත්‍රී Female ☐
4.2 උපන් දිනය Date of Birth	☐☐ ☐☐ ☐☐☐☐

5.0 ජලය හා සනීපාරක්ෂාව WATER AND SANITATION

5.1 පාසලේ ප්‍රධාන පානීය ජල ප්‍රභවය What is the major source of school drinking water?	1) නළ ජලය Piped water in School 2) නළ ළිඳ Tube well 3) ආරක්ෂිත ළිඳ Dug well –Protected 4) අනාරක්ෂිත ළිඳ Dug well – Unprotected 5) කරත්තයෙන්ගෙන යන කුඩා බව්සර්හෝ බැරල් Water traders (Bowser /cart with water tank) 6) මතුපිට ජලය (ගංගා/ඇළ/දොළ) Surface water (stream/river/canal) 7) වෙනත් (සඳහන්කරන්න) Other (specify)…… ☐
5.2 ජලය ආරක්ෂිත සහිත තත්වයට පත්කර ගැනීමට පාසලේදී කරන ප්‍රතිකර්ම මොනවද? What are the water treatments methods used in school?	1) උතුරුවීම Boil 2) පෙරීම Strain 3) ජල පෙරන යන්ත්‍ර භාවිතය Use Filters 4) උතුරුවා පෙරීම Boil and filter 5) ප්‍රතිකර්මයක් නොකරයි No treatment ☐
5.3 පාසලේදී ඔබ භාවිතා කරන වැසිකිළි පහසුකම කුමක්ද? What kind of toilet facility is used by you in school?	1) ජල මුද්‍රිත වැසිකිළිය Flush toilet 2) වල වැසිකිළිය Pit Latrine 3) වැසිකිලියක් නැත No toilet (bush /field) ☐

6.0 ආහාර වාර ගණන FOOD FREQUENCY

ආහාර වර්ගය Food Item	දිනපතා Daily 1.ඔව් Yes 2.නැත No	පසුගිය සතිය තුල වාරගණන (දින ගණන දක්වන්න) Frequency during past 7 days (indicate no. of days)	කිසිවිටෙක නැත Never

6.1 බත් / සහල්පිටි නිෂ්පාදන Rice/Rice flour products			
6.2 පාන්/ පාන්පිටි නිෂ්පාදන Bread/Wheat flour products			
6.3 බතල, මඤ්ඤොක්කා සහ අනෙකුත්අල වර්ග Sweet potato, Manioc, other yams			
6.4 දියර කිරි හෝ කිරිපිටි Milk (Liquid/ Powder)			
6.5 යෝගට් Yogurt			
6.6 චීස් Cheese			
6.7 බටර්/ගිතෙල් Butter/ Ghee(animal)			
6.8 ත්‍රිපෝෂ, සමපෝෂ වැනි සබලීකෘත ආහාර Fortified child foods(Thriposha, Cornflakes, Samaposha)			
6.9 මාළු Fish			
6.10 ඉස්සන්/ කකුළුවන්/ මුහුදුබෙල්ලන්වැනි සතුන්ගේමාංශ Shell fish (Prawns/ crabs/ shrimps/scallops etc.)			
6.11 කරවල, හාල්මැස්සන් Dry fish/ Sprats			
6.12 කුකුල්මස් Chicken			
6.13මස්වර්ග(හරක්මස්/ඌරුමස්/එළුමස්වෙනත්) Any Meat (beef/pork/mutton/other ect)			
6.14 සත්ව ඉන්ද්‍රිය Liver and other organ meat			
6.15 පිරි සැකසුම්කළ මස් (සොසේජස්වැනි) Processed meat (sausages ect)			
6.16 බිත්තර Eggs			
6.17 කව්පි, මුංඇට, කඩල cowpea, chick peas, green grams			
6.18 පරිප්පු Dhal			
6.19 රටකජු / කජු Peanuts/ Cashew nuts			
6.20 පොල්තෙල්/එළවලු තෙල් Coconut oil/ vegetable oil			
6.21 මාගරින්/එලගිතෙල් Margarine/ Vegetable ghee			
6.22 ගැඹුරු තෙලේ බැදි ආහාර (මුරුක්කු, වඩේ, රෝල්ස්වැනි)			

Deep fried foods (Potato chips, vadhei, rolls, murukku)			
6.23 තද කොළ පැහැති පලා Green leaves			
6.24 වට්ටක්කා, කැරට් Pumpkin, Carrot			
6. 25 අර්තාපල් Potato			
6.26 අනෙක්එළවලු (බෝංචි,බීට්රූට්, ගෝවා,වම්බටු,බණ්ඩක්කා) other vegetables (beans, beetroot, cabbage,bringjol, okra ect)			
6.27 කෙසෙල් Banana(ripened)			
6.28 ගස්ලබු Papaw			
6.29 පේර Guava			
6.30 කොමඩු Water melon			
6.31 අනෙක්පළතුරු (මිදි,ඇපල්) Other fruits (grapes, apple)			
6.32 ටොෆි වර්ග Toffee			
6.33 චොකොලට් Chocolate			
6.34 විස්කෝතු Biscuits			
6.35 අනෙකුත්කැවිලි Other sweets (Puhul dosi, thalaguli ect)			
6.36 අයිස්ක්‍රීම් Ice cream, cooled packets			
6.37 ටිපිටිප් Tip tip (excruited wheat flour products)			

7.0 සෞඛ්‍ය තත්වය සහ පරිපූරක ක්ෂුද්‍ර පෝෂක ලබාගැනීම **HEALTH STATUS AND INTAKE OF MICRONUTIENT SUPPLEMENTS**	
7.1. පසුගිය දෙසතිය තුළ ඔබට පාචනය වැලදුනිද? Have you had diarrhea in last two weeks?	1) ඔව් Yes 2) නැත No 9) නොදනී Don't Know ☐
7.2 පසුගිය සති දෙක තුළ ඔබට කැස්ස සමඟ අසනීප තත්වයක්පැවතිනිද? Have you had an illness with cough in the last two weeks?	1) ඔව් Yes 2) නැත No 9) නොදනී Don't Know ☐
7.3 පසුගිය සති දෙක තුළ ඔබට උණ සමඟ අසනීපතත්වයක්පැවතිනිද? Have you had fever in the last two weeks?	1) ඔව්Yes 2) නැත No 9) නොදනී Don't know ☐
7.4 ඔබ විටමින්දියර හෝ පෙති වශයෙන්භාවිතා කරනවාද Do you use any multivitamin syrup or capsule	1) ඔව් Yes 2) නැත No ☐

	9) නොදනී Don't know
7.5 එසේ භාවිතයට හේතු Reason for the use	1) වෛද්‍ය අනුමැතිය Prescribed by a doctor 2) සායනයේදී ලබාදීම Given at the clinic 3) ස්වකැමැත්තට Taking on own 4) වෙනත් (සඳහන්කරන්න) Other (specify)…….
7.6 යකඩ, ෆෝලික්අම්ල, විටමින්C පරිපූරක පෙති (පෙති 3) පාසලින්ලබාදීම Iron folic acid supplementation (3 tablets) in the school	1) ලැබුණි Received 2) නොලැබුණි Not Received 3) එම පරිපූරක ලබාදීම ගැන නොදනී Don't Know of that supplementation පිළිතුර 2/3 නම් 7.9 ට යන්න. If the answers are 2/3 go to question 7.9.
7.7 ඔබට එය ලබා දුන්වාර ගණන වන්නේ How often did you receive Iron folic acid supplementation?	1) දිනපතා මාස 6ක්පෙති 3 බැගින් Three tablets daily for 6 months 2) මසකට වරක්මාස 6ක්පෙති 3 බැගින් Three tablets once in a month for 6months 3) මසකට වරක්මාස 6ක්පෙති 12 බැගින් Twelve tablets once in a month for 6 months 4) සතියකට වරක්මාස 6ක්පෙති 3 බැගින් Once in a week for 6 months 5) අක්‍රමවත්ලෙස මාස 6ක් Irregularly for 6 months
7.8 එසේ ලබා දුන්පරිපූරක පෙති ඔබ භාවිතා කලේ කෙසේද? How often did you take Iron folic acid supplementation?	1) දිනපතා මාස 6ක්පෙති 3 බැගින් Three tablets daily for 6 months 2) මසකට වරක්මාස 6ක්පෙති 3 බැගින් Three tablets once in a month for 6months 3) මසකට වරක්මාස 6ක්පෙති 12 බැගින් Twelve tablets once in a month for 6 months 4) සතියකට වරක්මාස 6ක්පෙති 3 බැගින්Once in a week for 6 months 5) අක්‍රමවත්ලෙස මාස 6ක් Irregularly for 6 months
7.9 පසුගිය මාස 6 තුල ඔබට පාසලින්පණු ප්‍රතිකාර ලබුනිද? Did you receive worm treatment during last 6 months?	1) ඔව් Yes 2) නැත No 9) නොදනී Don't Know පිළිතුර 2/3 නම් 7.12ට යන්න. If the answers are 2/3 go to question 7.12.
7.10) එය ලබා දුන්වාර ගණන How often did you receive it?	1) මාස 6 කට වරක් Once in 6 months 2) අවුරුද්දකට වරක් Yearly

7.11) එසේ පාසලින් ලබාදුන්පණු ප්‍රතිකාර ඔබ ලබාගත්තේ කෙසේද? How often did you take warm treatment given from school?	1) කිසිවිටෙක නැත Never 2) සමහර වෙලාවට Sometimes 3) නිතරම Always ☐
7.12) ඔබට පසු ගිය වසර තුල පාසලින්විටමින් A පරිපූරක ලබුනිද? Did you receive Vitamin A supplementation from school this year?	1) ඔව් Yes 2) නැත No 9) නොදනී Don't Know ☐
7.13) ඔබ පසුගිය දින 30 තුළ බියර්, අරක්කු, කසිප්පු හෝ වෙනත්ඕනෑම මත්පැන්ඕනෑම මත්පැන්නිෂ්පාදන භාවිතා කර තිබෙනවාද? Have you used any alcohol product such as beer, arrack, Kassippu or any other alcohol during the last 30 days?	1) ඔව් Yes 2) නැත No ☐
7.14) ඔබ පසුගිය දින 30 තුළ දුම්පානය කර තිබෙනවාද? Have you smoked during the last 30 days?	1) ඔව් Yes 2) නැත No ☐

8.0 ශාරීරික ක්‍රියාකාරකම් PHYSICAL ACTIVITIES	
8.1) පසුගිය සතිය තුල ඔබ දින කීයක්අධි බරඉසිලීම, වේගයෙන්බයිසිකල් පැදීම, ශ්වායු ව්‍යායාම වැනි වැඩි සක්‍රියාතවයකින් යුතු ශාරීරික ක්‍රියාකාරකම්වල යෙදුනේද? During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?	සතියකට දින…… days per week නැත No ☐ පිළිතුර නැත නම් **8.3** ට යන්න. If the answer is No go to question 8.3.
8.2) ඔබ එවැනි දිනයක්තුල වැඩි සක්‍රියාතවයකින් යුතු ශාරීරික ක්‍රියාකාරකම්වල යෙදුනු කාලය වන්නේ? How much time did you usually spend doing vigorous physical activities on one of those days?	දිනකට පැය…….. hours per day දිනකට විනාඩි…… minutes per day නොදනී Don't Know ☐
8.3) පසුගිය සතිය තුල ඔබ දින කීයක්සාමාන්‍ය බර ඉසිලීම, සාමාන්ය වේගයෙන්බයිසිකල්පැදී ,ටෙනිස්ක්‍රීඩාව වැනි මධයස්ථ ශාරීරික ක්‍රියාකාරකම්වල යෙදුනේද? During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis?	සතියකටදින…… days per week නැත No ☐ පිළිතුර නැත නම් **8.5**ට යන්න. If the answer is No go to question 8.5.
8.4) ඔබ එවැනි දිනයක්තුලමධයස්ථ ශාරීරික ක්‍රියාකාරකම්වල යෙදුනු කාලය වන්නේ? How much time did you usually spend doing **moderate** physical activities on one of those days?	දිනකටපැය…….. hours per day දිනකටවිනාඩි……. minutes per day නොදනී Don't Know ☐

8.5) පසුගිය සතිය තුල ඔබ දින කීයක්විනාඩි 1 0ක් වත් ඇවිද්දේද? During the last 7 days, on how many days did you walk for at least 10 minutes at a time?	සතියකට දින…… days per week නැත No ☐ පිළිතුර නැත නම් **8.7**ට යන්න. If the answer is No go to question 8.5.
8.6) ඔබ එවැනි දිනයක්තුල ඇවිද්ද කාලය වන්නේ? How much time did you usually spend walking on one of those days?	දිනකටපැය……. hours per day දිනකටවිනාඩි……. minutes per day නොදනී Don't Know ☐
8.7) පසුගිය සතිය තුල ඔබ දින කීයක්වාඩිවී සිටියේද? During the last 7 days, how much time did you spend sitting on a week day?	දිනකටපැය……. hours per day දිනකටවිනාඩි……. minutes per day නොදනී Don't Know ☐
8.8)ඔබගේ පාසලේ ක්‍රීඩා පහසුකම් තිබේද? Does your school have a sporting facilities?	1)ඔව්Yes 2) නැත No ☐ පිළිතුරනැහැනම්**8.10**ටයන්න. If the answer is No go to question 8.10.
8.9 එම පහසුකම්කවරේද යන්න සඳහන්කරන්න. (සියලුම වරණයන් විමසන්න (mark more than one)	1)පාපන්දු පිටියක් Football ground 2)අත් පන්දු අංගනය Volley ball court 3)ටෙනිස් පිටියක් Lawn Tennis court 4)පැසි පන්දු අංගනය Basketball court 5)පිහිනුම් තටාකය Swimming pool 6)වෙනත් සඳහන් කරන්න Others Specify…… ☐
8.10 පසුගිය වසර තුල ඔබට ශාරීරික යෝග්‍යතාවය පිළිබඳ අධ්‍යාපනයක් ලැබුණි ද During this school year, were you taught in any of your classes the benefits of physical activity?	1)ඔව් Yes 2)නැත No 9)නොදනී I do not know ☐
8.11 ඔබගේ පාසලේ ඔබට ක්‍රීඩා කටයුතු සඳහා සතියකට අනිවාර්ය කාලයක් වෙන් කර තිබේද In your school, is there a specific time period in a week when you have to go for compulsory sports activities?	1) 1)ඔව් Yes 2) 2)නැත No 3) 9)නොදනී I do not know ☐

9.0 ආහාර හා පරිභෝජනය FOOD AND DIET	
9.1 පසුගිය මාසය තුල නිවසේ ආහාර හිඟකමින්ඔබ කොපමණ වාරයක්පමණ නිරාහාරව සිටියේද During the past 30 days, how often did you	1) කිසිවිටෙක නැතNever 2) කලාතුරකින් Rarely 3) සමහර වෙලාවට Sometimes 4) බොහෝ වෙලාවට Most of the time ☐

go hungry because there was not enough food in your home?	5) නිතරම Always
9.2 පසුගිය මාසය තුල ඔබ උදේ ආහාරය ලබාගත්තේ? During the past 30 days, how often did you eat breakfast?	1) කිසිවිටෙක නැත Never 2) කලාතුරකින් Rarely 3) සමහර වෙලාවට Sometimes 4)බොහෝ වෙලාවට Most of the time 5) නිතරම Always ☐
9.3 පසුගිය මාසය තුල ඔබ පාසලේදී උදේ ආහාරය ලබාගත්තේද? During the past 30 days, how often did you eat breakfast at school?	1) කිසිවිටෙක නැත Never 2) කලාතුරකින් Rarely 3) සමහර වෙලාවට Sometimes 4) බොහෝ වෙලාවට Most of the time 5) නිතරම Always ☐
9.4 ඔබ උදේ ආහාරය නොගන්නේ නම්එයට ප්‍රධාන හේතුව කුමක්ද? What is the **main** reason you do not eat breakfast?	1) උදේ ආහාරය ගැනීමට ප්‍රමාණවත්කාලයක්නොමැතිවීම I do not have time for breakfast 2) උදැසනම ආහාර ගැනීම කළ නොහැකිවීම I cannot eat early in the morning 3) නිවසේ නිතරම ආහාර නොමැතිවීම There is not always food in my home 4) වෙනත්හේතු Some other reasons ☐
9.5 ඔබ සාමාන්‍යයෙන්උදේ ආහාරය ගන්නේ කොහේද? Where do you usually have breakfast?	1) නිවසේදී/ නෙවසිකගාරයේදී Home/ Hostel/ Boarding etc. 2) පාසලේදී School 3) වෙනත් Any other ☐
9.6 ඔබ සාමාන්‍යයෙන් පාසලට කෙටි කෑම වේලක්ගෙන යනවාද? Do you usually take snacks to school?	1) ඔව් Yes 2) නැත No 3) සමහර වෙලාවට Sometimes ☐
9.7 එසේනම්, එය කුමන ආකාරයේ කෙටි කෑම වර්ගයක්ද If Yes, what type of snack do you often take to school?	1) නිවසේදී පිළියෙළ කරන ලද Home Made food 2) අවන්හලකින්මිලට ගත් Restaurant/Street side food 3) පාසැල්ආපන ශාලාවෙන් School Canteen food 4) විස්කෝතු Biscuits 5) වෙනත් Any other ☐
9.8 ඔබ ප්‍රියකරන්නේ කුමන ආහාරද? Which foods do you prefer?	1) නිවසේදී පිළියෙළ කළ ආහාර Home made food 2) වෙනත් Other ☐
9.9 සාමාන්‍යයෙන්සතියක්තුල ඔබ කොපමණ දවසක්පළතුරු ආහාරයට ගන්නවාද? In a typical week, on how many days do you eat fruit?	1) දිනපතා Daily 2) සතියකට 1-3 වරක් 1-3 times per week 3) සතියකට 4-6 වරක් 4 - 6 times week 4) කලාතුරකින් Rarely 5) කිසිවිටෙක නැත Never ☐
9.10 ඔබ පළතුරු ආහාරයට ගන්නේ කෙලෙසද? In which form, do you often intake fruits?	1) ගෙඩි වශයෙන් Whole fruit 2) පළතුරු යුෂ Fruit Juice 3) අච්චාරු Achcharu 4) වෙනත් (සඳහන්කරන්න (Other (specify)……. ☐

9.11 සාමාන්‍යයෙන්සතියක්තුල කොපමණ දිනක්ඔබ එළවලු ආහාරයට ගන්නවාද? In a typical week, on how many days do you eat vegetables?	1) දිනපතා Daily 2) සතියකට 1-3 වරක් 1-3 times per week 3) සතියකට 4-6 වරක් 4 - 6 times 4) කලාතුරකින් Rarely 5) කිසිවිටෙක නැත Never ☐

9.12 සාමාන්‍යයෙන්සතියක්තුල කොපමණ දිනක්ඔබ මස්, මාළු, බිත්තර ආහාරයට ගන්නවාද? In a typical week, on how many days do you eat non-veg food such as Egg, Meat, Fish etc.?	1) දිනපතාDaily 2) සතියකට 1-3 වරක් 1-3 times per week 3) සතියකට 4-6 වරක් 4 - 6 times week 4)කලාතුරකින්Rarely 5)කිසිවිටෙකනැතNever ☐
9.13 කුමන මාංශ ආහාර ඔබ ආහාරයට ප්‍රියකරන්නේද? Which non-veg foods do you prefer to eat?	1) කුකුල්මස්Chicken 2) මාළුFish 3) එළුමස්Mutton 4) හරක්මස්Beef 5) ඌරුමස්Pork 6) බිත්තරEgg ☐
9.14කෙතරම්බහුලව ඔබ මාංශමය ආහාර ගන්නේද? How often do you eat non-veg?	1)දිනපතාDaily 2)සතියකට 1-3 වරක්1-3 times per week 3)සතියකට 4-6 වරක්4 - 6 times week 4)කලාතුරකින්Rarely 5)කිසිවිටෙකනැතNever ☐
10.15මින්කුමනමාංශමයආහාර ඔබනිවසේ/නේවාසිකාගාරයේනිතරමපිළියෙළකරන්නේද? Which Non-Veg Food is often prepared at Home (or Hostel etc.)?	1)කුකුල්මස්Chicken 2)මාළුFish 3)එළුමස්Mutton 4)හරක්මස්Beef 5)ඌරුමස්Pork ☐ 6)බිත්තරEgg
9.16පාසලින්දිවාආහාරයසපයනුලබයිදDoes the school provide mid day meal?	1)ඔව්Yes 2)නැතNo ☐
9.17එසේනම්, කෙතරම්වාරගණනක්ද?If Yes, how often do they Provide food?	1)දිනපතා Daily 2)ඉඳහිටOnce in a while ☐
9.18ඔබඑසේසපයනආහාරප්‍රියකරයිද?Do you like the food provided?	1) ඔව්Yes 2) නැතNo ☐
9.19 කෙතරම්වාරගණනක්ඔබනිවසේදීතෙලෙන්බදිනලදආහාරලබාගන්නේද?How often do you eat food that is fried at home?	1) දිනපතාDaily 2)සතියකට 1-3 වරක්1-3 times per week 3)සතියකට 4-6 වරක්4 - 6 times week 4)කලාතුරකින්Rarely 5)කිසිවිටෙකනැතNever ☐
9.20කෙතරම්වාර ගණනක්ඔබනිවසෙන්පිටතදීතෙලෙන්බදිනලදආහාරලබාගන්නේද?How often do you eat fried food away from home?	1) දිනපතාDaily 2)සතියකට 1-3 වරක්1-3 times per week 3)සතියකට 4-6 වරක්4 - 6 times week ☐ 4)කලාතුරකින්Rarely

	5)කිසිවිටෙකනැතNever
9.21ඔබපාසලේදීහෝඉන්පිටතදීසිසිල්බීමපානයකරයිද? Do you drink soft drinks at school or outside school?	1)ඔව්Yes 2)නැතNo ☐
9.22සාමාන්‍යයෙන්සතියක්තුලඔබසිසිල්බීමපානයකරනවාරගණනවන්නේ?In a typical week, how often do you drink soft drinks?	1)දිනපතාDaily 2)සතියකට 1-3 වරක්1-3 times per week 3)සතියකට 4-6 වරක්4 - 6 times week 4)කලාතුරකින්Rarely 5)කිසිවිටෙකනැතNever ☐
9.23ඔබපාසලේදීකේක්,චොකලට්,සීනිකෑමආහාරයටගන්නවාදDo you eat cakes, Chocolates, sweets etc. during school?	1)ඔව්Yes 2)නැතNo ☐
9.24සාමාන්‍යයෙන්සතියක්තුලඔබපාසලේදීකේක්,චොකලට්,සීනිකෑමආහාරයටගන්නේIn a typical week, how often do you eat Cakes, Chocolates, sweets etc.?	1)දිනපතාDaily 2)සතියකට 1-3 වරක්1-3 times per week 3)සතියකට 4-6 වරක්4 - 6 times week 4)කලාතුරකින්Rarely 5)කිසිවිටෙකනැතNever ☐

9.25 ඔබගේ ශරීරයේබරඔබ දකින්නේ කෙසේද? How do you describe your weight?	1)ඉතා අඩු බර Very underweight 2) අඩු බර Slightly underweight 3) ප්‍රශස්ත බර About the right weight 4) වැඩි බර Slightly overweight 5) ඉතා වැඩි බර Very overweight
9.26 ඔබගේ ශරීරයේබරසඳහා ඔබ කිරීමට උත්සාහ කරන්නේ කෙසේද? Which of the following are you trying to do about your weight?	1)බර අඩු කරගැනීම Lose weight 2)බර වැඩි කර ගැනීම Gain weight 3)පවතින බරෙහිම රැඳී සිටීම Stay the same weight 4)බර සම්බන්ධයෙන් කිසිවක් කිරීමට උත්සාහ නොකරමි I am not trying to do anything about my weight
9.27 පසුගිය මාසය තුල ඔබ වෛද්‍ය අනුමැතියක් නොමැතිව බර අඩුකර ගැනීමට හෝ බර වැඩි නොවීමට පෙති,කරල්,කුඩු භාවිතා කළේද? During the past 30 days, did you take any diet pills, powders, or liquids without a doctor's advice to lose weight or to keep from gaining weight?	1)ඔව් Yes 2)නැත No
9.28පසුගිය මාසය තුල ඔබ බර අඩු කර ගැනීමට හෝ බර වැඩි නොවීමට පැය 24 ක් පුරා නිරාහාරව සිටියේද?During the past 30 days, did you go without eating for 24 hours to lose weight or to keep from gaining weight?	1) ඔව් Yes 2) නැත No
9.29පසුගිය වසර තුල පාසලේදී ඔබට සෞඛ්‍ය සම්පන්න ආහාර පරිභෝජනය ගැන අධ්‍යාපනයක් ලබා දුනිද?During this school year, were you taught in any of your classes the benefits of healthy eating?	1) ඔව් Yes 2) නැත No 9)නොදනී I do not know
9.30පසුගිය වසර තුල පාසලේදී සුරක්ෂිත ආහාර පිළියෙළ කිරීම සහ ගබඩා කිරීම පිළිබඳ අධ්‍යාපනයක් ලබා දුනිද?During this school year, were you taught in any of your classes how to safely prepare or store food?	1) ඔව් Yes 2) නැත No 9) නොදනී I do not know

9.31පසුගිය සතිය තුල ඔබ දින කීයක් KFC, Mc Donald වැනි ක්ෂණික කෑම අවන්හල්වලින් ආහාර ගත්තේද?During the past 7 days, on how many days did you eat at a fast food restaurant, such as McDonalds or KFC etc.	1) දින 0 days 2) දින 1 day 3) දින 2 days 4) දින 3 days 5) දින 4 days 6) දින 5 days 7) දින 6 days 8) දින 7 days
9.32පසුගිය මාසය තුල ඔබ ඔබ දිනකට කී වාරයක් දත් මැදීම හෝ පිරිසිදු කිරීම කළේද?During the past 30 days, how many times per day did you usually clean or brush your teeth?	1) පසුගිය මාසය තුලම නැත I did not clean or brush my teeth during the past 30 days 2) දිනකට වරක් 1 time per day 3) දිනකට දෙවරක් 2 times per day 4) දිනකට තුන් වරක් 3 times per day

9.33පසුගිය මාසය තුල කෑමට පෙර අත් සේදීම කරේ During the past 30 days, how often did you wash your hands before eating?	1) කිසිවිටෙකනැතNever 2) කලාතුරකින්Rarely 3) සමහරවෙලාවටSometimes 4)බොහෝවෙලාවටMost of the time 5) නිතරමAlways ☐
9.34පසුගිය මාසය තුල වැසිකිළි කැසිකිලි භාවිතයෙන් පසු අත් සේදීම කරේ During the past 30 days, how often did you wash your hands after using the toilet or latrine?	1) කිසිවිටෙකනැතNever 2) කලාතුරකින්Rarely 3) සමහරවෙලාවටSometimes 4)බොහෝවෙලාවටMost of the time 5) නිතරමAlways ☐
9.35පාසලේදී කෑමට පෙර අත් සේදීමට පහසුකම් පවතීද Is there a place for you to wash your hands before eating at school?	1. ඔව් Yes 2. නැත No ☐
9.36පසුගිය මාසය තුල ඔබ සබන් යොදා අත් සේදීම කරේ During the past 30 days, how often did you use soap when washing your hands at school?	1) කිසිවිටෙකනැතNever 2) කලාතුරකින්Rarely 3) සමහරවෙලාවටSometimes 4)බොහෝවෙලාවටMost of the time 5) නිතරමAlways ☐
9.37පසුගිය පාසැල් වසර තුලදී අත් සේදීමේ වැදගත්කම ගැන අධ්‍යාපනයක් ලබුනිද During this school year, were you taught in any of yours classes the importance of hand washing?	1. ඔව් Yes 2. නැත No 9.නොදනී I do not know ☐