



Short Communication

Assessment of nutritional status among pre-school children aged between 3-5 years in Mahiyanganaya DS division, Sri Lanka

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Abstract

The nutritional status of the students at school should be adequate to produce well educated, skill full persons to drive the country in correct way for a bright future. Since pre-school community's' nutrition status has impact on nutritional status of school students, assessment as well as improvement of nutritional status among pre-school children is essential. Considering this fact, a nutritional survey was carried out among the pre-school children aged between 3-5 years in the Mahiyanganaya DS Division which is in the Badulla District of Uva Province, Sri Lanka. 150 Pre School children age of between 3-5 years were selected as samples from randomly selected school. According to the data collected with respect to BMI in the study area, 21.3% of children were in severe malnutrition (BMI < 14) and 42.7% (BMI: 14 – 16.5) were in moderate malnutrition and only 28.7% (BMI: 16.5–20) are in ideal condition and 7.3% (BMI>20) are in the category of over nutrition. Furthermore, prevalence of 70%, 45.3% and 56.7% were reported for anthropometric indicators of wasting, underweight and stunting respectively. Morbidity, low birth weight, inadequate dietary energy intake and socioeconomic background were the main causes of malnutrition in studied sample. Among the socioeconomic variable, monthly income and educational level of household had positive co-relation while family size had negative co-relation with BMI.

Keywords: Malnutrition, socioeconomic factors, stunting, underweight and wasting.

Introduction

Assessment of nutritional status is an essential component of any comprehensive health evaluation, which would be the key possible way in determination of food and nutrition adequacy and inadequacy in food intake among individuals or population groups as well. If not assessed, adequate nutrition of population or individuals cannot be ensured and they would be seen in an unhealthy condition. This abnormal nutritional situations (deviations from adequate nutrition), including under nutrition (inadequacy of food) and over nutrition (excess of food) are known as malnutrition. Malnutrition in a society arises due to several reasons; inadequate intakes of food for long periods of time, seasonal fluctuations in intakes of food, poor absorption and utilization of ingested food. In addition, deficiencies of specific nutrients result from choosing of wrong combinations or proportions of foods also leads to malnutrition.

Nutritional status of individual or representative sample of a population or a community can be assessed by number of methods, which utilize objective, quantifiable criteria inclusive anthropometric, biochemical or physiological (functional) characteristics. Amongst anthropometry measurements, refers to variances of physical measures and overall composition of body at different ages and nutritional degrees¹, is the most frequently

used method to assess the nutritional status of individuals or population groups. Considering anthropometric measurements WHO has categorized three ordinarily used forms of malnutrition; stunting, wasting and underweight with the respective indexes of height for age, weight for height and weight for age.

Stunting (growth retardation) often known as chronic protein energy malnutrition (PEM), is a nutritional status due to lack of calories and protein available to the body tissues. It results from long-lasting inadequate food intake and or steady and periodical health illness. Of all the anthropometric indexes, height for age index (stunting) is considered as the most reliable indicator for nutritional status assessment since their sensitivity for impermanent food inadequacy is limited.

On the other hand, wasting has been reported as subtle over seasons and duration of illness in meantime underweight affords seasonal retrieval since in some children also affect this weight for age index (overweight). Opposite to stunting wasting is short standing and severe protein energy malnutrition (acute malnutrition), that arises in a community when failed to obtain adequate nutrition before the nutritional deficit analysis and recent events of illness particularly diarrhea and severe food shortages.

Underweight status is a composite of the two preceding ones; either chronic, acute malnutrition or PEM. These nutritional statuses are defined as forms of malnutrition if Z scores for anthropometric indexes of weight for height, height for age and weight for age are of 2SD or more below the corresponding.

Assessment of nutritional status using anthropometric measurements is applied to all categories of people. Even though, in case of infants and children under five years of age, assessing growth by means of these physical measurements has been found the possible way in elucidation of their nutritional status. Growth of a child highly affected by disturbances in nutrition which results from inadequate food intake or severe and repeated infections or a combination of both.

Nutritional status of child is absolutely influenced by numerous causes; distal as well as proximal determinants including illness, diseases, cultural, psychological, social and political factors present in the physical environment where the child lives. These determinants are intently linked to the general standard of living and the population's competency to meet its principal requisites for nutritious food, safe water, good housing, acceptable levels of environmental sanitation, and ready and easy access to health care.

Evaluating the nutritional status of the child possesses the value in the direct and indirect measurement of quality of the life. Healthiest life is characterized by the good anthropometric growth measurements such as weight, height, mid upper arm circumference and dietary analysis in child because of the proper availability of nutritious food to the individual and to the community will provide the well-defined growth characters in child. If the early attainable in growth and development plays a major role of the marvelous achievement to be the educated, skillful, multi task full human beings and talented moral personality to the nation.

Due to these possibilities to from the good motivated community for the welfare of the world, the assessment of the nutritional status of the pre-school community is the essential vital need and to find the drawbacks and factors for the improvements in nutritional status. This study is rounded to assess the nutritional status of the children in age group of 3-5 at Mahiyangana division in Badulla District.

Methodology

A structured questionnaire was conducted among the sample of 150 pre-school children aged between 3-5 years selected from random schools in Mahiyangana D.S. division in Badulla district to elicit information on demographic details, anthropometric details, health history, dietary assessments and socio economic details. For anthropometric indicators measurements of height, weight were measured by using micropipes and solar digit weighing scales respectively. Z scores for stunting and wasting and body mass index (BMI) were calculated using the following equations.

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

$$Z \text{ score} = \frac{\text{Actual Data} - \text{Mean (Reference)}}{\text{Standard Deviation (Reference)}}$$

The anthropometric measurements collected using the questionnaire, were input in to Excel spread sheets. Regression analysis was used to find out the relationship between contributory factors and the nutrition status of school children by using SPSS-statistical software. EPINFO Statistical software used to analyze the anthropometric parameters for calculating 'Z scores'.

Results and discussion

Sample characteristics: The characteristics of studied sample of 150 pre-school children from randomly selected schools aged between 3-5 years in Mahiyangana D.S. division are shown in Table-1.

Table-1: Characteristics of studied sample.

Characteristics	Mean ± SD
Weight	14.83±2.2kg
Height	96.32 ±6.19Cm
Mid upper arm circumference	13.55±0.94Cm
Birth weight	2.83±4.05kg

Anthropometric measurements: Table-2 shows overall forms of malnutrition levels with respect to anthropometric indicators. It implies that 24.7% of children were in satisfactory nutritional status (Normal) and 75.3% of children were in any of malnutrition condition. Amongst the forms of malnutrition prevalence for wasting was higher (70%) than other anthropometric indicators and followed by stunting with 56.7%. The prevalence for underweight among the studied sample of 150 pre-school children aged between 3-5 years was 45.3%.

Table-2: Nutritional status of children for anthropometric indicators.

Nutritional status	Number of children	Percentage
Stunting	85	56.7
Wasting	105	70
Underweight	68	45.3
Normal	37	24.7
Total	150	-

Stunting, wasting and underweight were categorized as <-2 of HAZ, WHZ and WAZ respectively of the CDC/NCHS 2000 reference values.

Table-3 shows the breakdown of Z scores of normal, moderate and severe malnutrition levels for anthropometric indicators of stunting and wasting. It indicates that higher percentages of were children observed for moderate malnutrition levels of 40% and 58% respectively for stunting and wasting. Compare to wasting moderately stunted children was low as it is reflected from past nutritional history rather than recent inadequate food intake.

Table-3: Breakdown of Z scores for anthropometric indicators.

Degree of malnutrition	Percentage of children (%)	
	Stunting	Wasting
Severe	16.7	12
Moderate	40	58
Normal	30.7	30

Severe: Z score < -3SD, Moderate: Z score < -2SD, Normal: Z score -2SD- -3SD.

Table-4 shows the percentages of malnourished children for different malnutritional levels with respect to BMI and mid upper arm circumference. Majority of the studied sample (42.7%) was moderately malnourished based on BMI values and on the other hand higher percentage of sample (76.6%) was severely malnourished condition in terms of mid upper arm circumference.

Table-4: Nutritional status of sample based on BMI and Mid upper arm circumference (MUAC).

Level of malnutrition	MUAC		BMI	
	Degree	% age	Degree	% age
Severe	<23.5 Cm	76.6	<14.5	21.3
Moderate	23.5-25 Cm	13.3	14.5-16.5	42.7
Normal	>25 Cm	10.1	16.5-20	28.7

Socio-economic factors: Among the socio-economic factors, monthly income, educational level of household and family size had significant influence on nutritional status of children in the study area. The educational levels of mothers of sampled children is given in Table-5.

Accordingly, higher percentage (35.95) of mothers were non educated properly and mother’s educational level directly affect the nutritional status as mothers play major role in selecting and preparing meals for families. Because of illiteracy, they could not acquire any nutritional awareness from any kind of

publication such as medical magazine, nutrition book and other readable materials. Higher prevalence for malnutrition forms like wasting, stunting and underweight remaining in studied sample could be attributed to low educational levels of mothers.

Table-5: Educational levels of mothers in studied sample.

Education categories	Percentage of mothers
Primary (Grade 1-5)	35.95
Grade 6 -10	30.45
Up to O/Level	22.5
Up to A/Level	7.8
Tertiary (Degree/Diploma)	3.3

Table-6 shows income sources of studied sample. As shown in the table higher percentage (38.55%) of parents were involved in self-employment and their monthly income is below Rs. 20,000 which is not stable. With this fluctuating monthly income they face the problem of providing of nutritious food stuff to their families and without having enough profit, they would not be able to purchase the food items from the market to improve their household nutritional status.

Table-6: Source of income in studied sample.

Employment categories	Percentage of parents
Self-employment	38.55
Agriculture	30.25
Business	5.8
Foreign	13.36
Government	8.35
Others	3.69

Relationship between anthropometric indicators and socio-economic factors: The relationship between BMI and socioeconomic factors; monthly income, educational level of household and family size are shown in the Figure-1. It emphasizes that monthly income and educational level of house hold shown positive co-relation for BMI and in contrast family size shown negative co-relation for BMI. It’s because of sound knowledge in selection of food items at right quantities and the ability to purchase good kind of nutritious food in sufficient quantities.

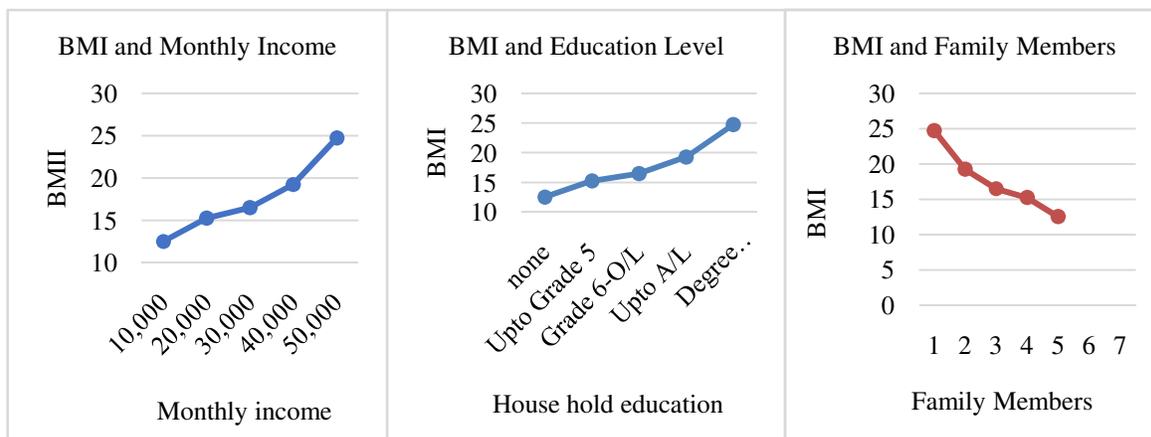


Figure-1: Relationship between BMI and Socio-economic factors.

Discussion: Prevailing forms of malnutrition such as stunting, wasting and underweight among pre-school children aged 3-5 years in Mahiyangana D.S. division could be due to interaction of inadequate food intake, inadequate dietary energy intake with wrong kind as well as proportion of choice of food, diseases, infections, internal parasites and socio-economic background of children. Results of higher prevalence for wasting and lower prevalence for stunting obtained in the study is supported by previous researches where nutritional status of children below 5 years in Weeraketiya D.S. division was examined².

Further Poor health condition, poor sanitary and unhygienic practices, limited facilities for safe drinking water, lavatory, and garbage disposal prevailed in the study area also found to be the reasons for malnutrition in studied sample. Most of the children were found with recurrent diarrhea and cold once in a month and this type of recent hours of illness leads to insufficient food intake ultimately acute malnutrition mainly wasting and underweight. Knowingly, diarrhea is one of the common morbidity that specially impact the nutritional status of children under 5 years of age³. These were the main reasons reported in the study area for the higher percentages of wasted and underweight children observed in studied sample.

Hence positive co-relation between BMI and educational level of household reported in this study is supported by linear association of malnutrition with maternal education in the study of nutritional status among children under the age of 5 years in Democratic Republic of Congo⁴. Likewise, another results drawn from this study that the negative co-relation between family size and BMI is supported with nutritional status of pre-school children from NBCS survey in Rwanda⁵.

Conclusion

Nutritional anthropometric indicators provide a reflection of the nutritional status of the community. Survey carried out in pre-school children in Mahiyangana D.S. division implies that all forms of malnutrition prevailed and the rates for anthropometric indicators remained high. Overall sample of 150, 2/3rd of sample

were found to be malnourished either severely or moderately with anthropometric indicators. Children aged between 3-5 years free from any of malnutritional forms remained very low percentages (about 1/3rd sample) in study area. From the survey it was recognized that socio-economic factors and poor health condition were the major causes for malnutrition in pre-school children in Mahiyangana D.S. division. Therefore, preventive strategies like provision of nutrient supplements, nutrition education programme and health safety programme are suggested to overcome malnutrition problem in pre-school children in study area.

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