

Malnutrition Assessment Among School Children at Kibwegere Primary School in Dar Es Salaam, Tanzania

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Abstract— Malnutrition remains a considerable problem among tribal children because of several factors, such as inadequate food, common infections, no access to health services, poor literacy, poor hygienic habits, and extreme cultural practices. It is a silent killer and is underappreciated among schoolchildren. The indicators used to define malnutrition were underweight, stunting, and wasting. The main objective of the study is to assess the nutritional status of children in and around Dar es Salaam, Tanzania. A cross-sectional study was carried out, and 69 school-going children were assessed. Data was taken using a structured interview schedule. The children aged 5 to 14 years are the study population, whereas the fathers of children were the respondents. The prevalence of underweight, stunting, and wasting was determined using anthropometric measurements. This is the first attempt to conduct such an assessment in this region. It was found that one-third (11.59%) of children were severely malnourished on the basis of weight for age (underweight). On the basis of height for age (stunted), more than half of the children (56.52%) were severely impaired.

Keywords— Underweight, stunting and wasting.

I. INTRODUCTION

Malnutrition is characterized by inadequate or excessive nutrient intake, an unbalanced intake of vital nutrients, or impaired nutrient use. Children are the future pillars of the nation. Children's health is crucial to the future of the nation. Healthy offspring would produce tomorrow's prosperous country. The most basic right for a child is balanced nourishment. This study will therefore focus on the malnutrition of local schoolchildren. A number of factors contribute to the prevalence of malnutrition, including poverty, failure to exclusively breastfeed, maternal factors like inadequate weight gain during pregnancy, diarrhea, acute respiratory infections, poor vitamin supplementation, large family sizes, poor sanitation, and a lack of education.

Children who are malnourished do not fully develop their physical and mental capacities. Low birth weight, diarrhea, pneumonia, malaria, measles, and HIV are the main causes of child fatalities. One out of every two of these casualties is mostly the result of malnutrition. According to UNICEF (2017), malnutrition increases a child's risk of dying from common diseases such as diarrhea, pneumonia, malaria, and

measles by over 50%. Insufficient nourishment stunts cognitive growth in those who survive. The risk of a child dying from recurrent illnesses is increased not just by persistent malnutrition but also by mild malnutrition.

Acute respiratory infection (ARI) or diarrhea, which can be treated in the early stages with easy home remedies when nourishment is provided, is responsible for about 40% of under-five mortality. Malnutrition is more likely to affect children who experience frequent cases of ARI or diarrhea (Mishra VK and Retherford RD, 2000). A number of variables, including political motivations, slow economic growth, the incidence of infectious diseases, and a lack of awareness, can be blamed for the chronic stage of child malnutrition.

A study on the burden of disease revealed that there is a category that comprises children with pre-transition disorders, including prenatal disorders, maternal diseases, and infectious diseases. More than two-thirds of the disease burden in India, or 68%, is attributable to nutritional deficiencies. Lack of protein, vitamins, calories, and minerals is caused by infection. With 50% of child deaths attributed to underlying undernutrition, malnutrition has long been linked to poor diet, poverty, and insufficient access to health care. It continues to be a major worldwide health issue.

The goal of this study was to estimate the proportion of school-age children who are underweight in Dar es Salaam and the coastal regions based on age groups from 5 to 14 years old seen at Kibwegere primary school. Because primary school pupils represent the country's future, a society's top priority is to assure their healthy growth and development. Only when a person has access to healthy nutrients and a secure environment can they grow and develop normally.

According to the World Health Organization, there are 178 million malnourished children worldwide. Malnutrition is a major factor in the mortality of more than half of children in developing nations, including Tanzania.

One of Tanzania's biggest problems with human development is still nutrition. Despite having an incidence of acute malnutrition that appears to be "low" and "acceptable," East Africa has one of the worst rates of undernourished

children. In Tanzania, over 100,000 children suffer from the most severe form of acute malnutrition, which affects an estimated 450,000 children. Tanzania has one of the highest rates of under nutrition in east and southern Africa, endangering not just individual lives but also the economic growth of the following generation through decreased educational success and lost productivity, income, and opportunities.

II. REVIEW OF LITERATURE

The main objective of the study is to determine the nutritional status of Dar es Salaam-based schoolchildren between the ages of 5 and 14 in the Dar es Salaam region. In a study done by Juma et al. (2016), which included 63,237 children under the age of five who were admitted to the Bagamoyo District Hospital, it was determined that the overall proportions of stunting, underweight, and wasting were 8.37, 5.74, and 1.41%, respectively. The findings of this study support earlier research showing that starvation is still a concern in Tanzania. According to Ismail et al. (2020), the prevalence of stunting was 18%, that of thickness was 14%, and that of overweight and obesity was 5.23% among the participants. Abubaker et al. (2012) evaluated the prevalence and risk factors for children's low nutritional status and came to the conclusion that the study's sample of 423000 children (214 females) had a high rate of stunting (44.2%), underweight (19.1%), and anemia in nearly 70% of cases. A study conducted by Sunguya et al. (2006) at Tanzania's Muhimbili National Hospital in Dar es Salaam found that 1121 children were admitted with severe malnutrition over the course of a single year (2004–2005). Male children were more likely than female youngsters to have malnutrition.

III. RESEARCH METHODOLOGY

A total of 69 schoolchildren participated in the present study. A predesigned questionnaire was used to collect data on the sociodemographic profile (age, sex, religion, education, and income) of the participant's mother or guardian. Health or nutritional status of a tribal was assessed in three indicators from May 2023 to July 2023, such as the anthropometric indicator. For the present study, malnutrition was assessed through weight for age (underweight), height for age (stunting), and weight for height (wasting) standards according to Gomez and Water's classification. The Chi-Square (χ^2) test was used to find out if there were any significant differences between the dependent and independent variables. The methodology of qualitative research relies on questionnaires (both open-ended and closed-ended), interviews, and observation.

The methodology of quantitative research is focused on the statistical, mathematical, and numerical examination of data gathered through observation and surveys.

Methods used in the study

A questionnaire is a tool used to gather data by having a specified person respond to a series of spoken or written questions. In order to gather a significant amount of information from a specific sample throughout the course of

our research, we will ask questions of the students in a relatively rapid, easy, and effective manner. Observation is the process by which researchers get additional data on the research topic by using their sense organs, notably their eyes. The major goal of observation is to monitor the students' health and determine the severity of malnutrition. For a few days, sample students were under surveillance. Interview: The researcher interacted verbally with respondents during an interview or oral questionnaire to collect information from them. The purpose of the interview is to gather information from the respondents so that we can utilize it to determine how widespread malnutrition is among school-age children in the Dar es Salaam and Pwani regions.

Tools used

Pencils and paper are among the instruments utilized in the case study, along with note books, questionnaires, tape measures, and weight scales.

Populations in the study

Students from the Kibwegere primary school made up our study's population.

The sample for our study includes some parents and pupils in primary school that range in age from 5 to 14. Our study used 69 students as its sample size.

It was found that not all pupils' parents participated in our study.

The formula used to determine sample size is based on the standard formula prescribed by Yamane (1967).

$$n = \frac{N}{1 + N(e)^2}$$

Sample size, n

N: Number of people

e-Error margin

About 69 people participated in this study, divided as follows into student and parent groups:

140 respondents—girls and boys of all ages—from two schools participated in our study. All classes, from standard one to standard seven, were used for the sample.

Source of the data

Information was gathered at Kibwegere Primary School.

Following the Waterlow classification scheme, data analysis was carried out.

Waterlow's Classification

This is used mainly to distinguish between deficits of weight for height (wasting) and height for age (stunting), which are adopted by the WHO.

(Height-for-Age%) Stunting

Height for age=(Height of the child/Height for normal child at same age)×100

Stunting

Height/Age weight/Height	>m -2 SD	<m -2SD
>m - 2 SD	Normal	Wasted
<m -2SD	Stunted	Wasted and Stunted

Wasting

$$\text{Weight for age} = (\text{Weight of the child} / \text{Weight of a normal child at same height}) \times 100$$

Normal	>95
Mildly impaired	87.5–95
Moderately impaired	80–87.5
Severely impaired	<80

1) Operationalization of variables

Dependent Variable:

If one variable is influenced as a consequence of another, then it is termed a dependent variable. A brief description of dependent variables is explained as follows:

2) Underweight (weight for age)

Insufficient weight gain relative to age or losing weight implies various combinations of stunting and wasting. It is the first and most important indicator of malnutrition, which indicates acute malnutrition and can be identified in an early stage by growth monitoring. Weight-for-age is a numerical value computed by the weight in kilograms of the subject divided by the weight of a normal child of the same age. Underweight prevalence percentage of children under 5 years old who fall below minus two (moderate) and below minus three (severe) standard deviations from the median weight for the age of the reference population

Stunting (Height-for-age)

Insufficient height gain is relative to age, which implies deficits in height according to age. It indicates chronic malnutrition. Height-for-age is a numerical value computed by height in centimeters divided by height for a normal child of the same age. Stunting prevalence: percentage of children under 5 years old who fall below minus two (moderate) and below minus three (severe) standard deviations from the median height for the reference population.

3) Wasting (weight-for-height)

Insufficient weight gain relative to height implies losing weight according to height. Weight-for-height is a numerical value computed by the weight in kilograms of the subject divided by the weight of a normal child at the same height. Wasting prevalence: percentage of children under 5 years old who fall below minus two (moderate) and below minus three (severe) standard deviations from the median weight for the height of the reference population.

Anthropometric index:

A scale that uses one or more of the measurements mentioned above along with the subject's age to evaluate current nutritional status. Indexes of particular interest include height for age, weight for height, weight for age and arm circumference for age.

Independent Variable:

An independent variable is a unique unit that is not affected by other variables. Some important dependent variables having direct bearing were identified in the present study. A brief description of these variables is explained as follows:

4) Age

The length of time that a person has lived or a thing has existed. Age was operationalized as the number of full years

completed by respondents at the time of the interview. Age is a factor that refers to the mental potential and emotional stability of a human being. The chronological age of their respondents was taken for the present study. The productive age group of 15 to 45 years of age was taken, and the age was divided into a 5-year class interval.

5) Sex 0–80

Sex refers to those that are biologically determined, while gender is used to describe the characteristics of women and men that are socially constructed. Gender in the human species is defined in the biological sciences as the division into male and female sexes serving biparental reproduction functions and evolutionary dynamics.

In this work, probability sampling techniques were used as the sample method.

iii) Simple random sampling, where each student has an equal chance of being selected from the sample inside their class. i) Multi-stage sampling, in which the Ubungo district was selected from the entire Dar es Salaam region while the Kibaha and Bagamoyo districts were chosen from the entire Pwani region. This is due to the high prevalence of childhood malnutrition in this area, according to various researchers.

ii) Stratified random sampling: in the school, pupils are chosen for the sample based on their classes, with just 10 numbers required for each class.

iii) Simple random sampling, where each student has an equal chance of being selected from the sample inside their class.

IV. RESULTS AND DISCUSSION

Malnutrition is the root cause of illness and death among tribal children, the most vulnerable group of the population to malnutrition. Infant malnutrition can trigger infections, morbidity, and fatality, along with poor mental and cognitive development. Most of the children whose fathers (73.08%) were laborers and 1.92 percent were involved in agriculture

A. Age-wise distribution of children

A person's mental capacity and emotional fortitude vary as they get older. It is seen as an important element of wellbeing and decision-making. Children's life styles vary depending on their age group, and this variation is also true for their life approaches. Following is a table illustrating the age distribution. Tables 4.1.1, 4.1.2, and Fig. 4.1

TABLE 4.1.1 Age wise distribution of the children based on gender

Age	M	F	Total
5 to 6	5	9	14
7 to 8	8	8	16
9 to 10	5	6	11
11 to 12	5	6	11
13 to 14	10	7	17
Total	33	36	69

TABLE 4.1.2 Age wise distribution of the children

Age	Frequency	Percentage
5 to 6	14	20.28
7 to 8	16	23.18
9 to 10	11	15.94
11 to 12	11	15.94
13 to 14	17	24.63

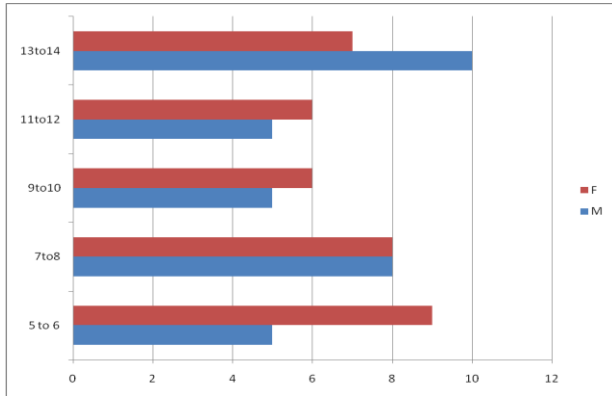


Fig. 4.1. Age distribution of the children

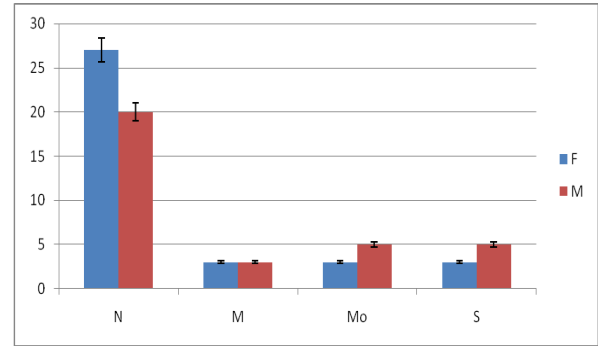


Fig. 4.2.

4.2. Nutritional status of the children by using Waterlows classification

TABLE 4.3 Nutritional status of the children

Nutritional status of the children (Stunted): Height-for-age*		
Nutritional status	Frequency	Percentage
Normal (>95%)	11	15.94
Mild impaired (87.7-95%)	08	11.59
Moderate impaired (80%-87.5%)	11	15.94
Severely impaired (<80%)	39	56.52

On the basis of height for age (stunted), more than half of the children (56.52%) were severe, and around 15.94% were normal in height, but around 15.94% were moderately impaired, followed by 11.59 percent who were mildly impaired.

The chi-square test was carried out for the statistical variations. The P value is less than 0.5; therefore, the result is significant, and the two variables are independent of each other. The results are presented in Table 4.3. Figure 4.3. IBM SPSS software was used for the statistical analysis. According to Abubaker et al. (2012), the study's sample of 423,000 kids (214 females) had a high rate of stunting (44.2%), underweight (19.1%), and anemia in over 70% of instances. The present study is in accordance with the work conducted by Abubaker et al. (2012).

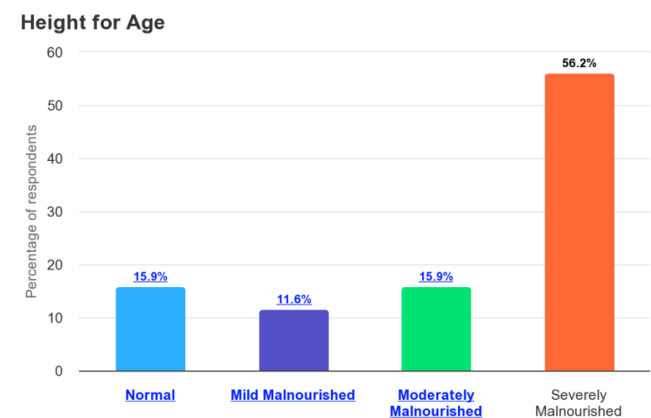


Fig. 4.3. Nutritional status of the children (stunted) (height for age) according to Waterlow's Classification

On the basis of weight for height (wasting), 81.15 percent were normal, 7.24 percent were GI and GII type, 2.89 percent were GIII type, and 1.44 percent were severe impaired G V type (Fig. 4.4). The results are presented in Table 4.4.

Occupation of children's father

Occupation	Frequency	Percentage
Private field	5	12.5
Manuallabor	2	5.0
Government employed	7	17.5
Self employed	15	37.5
Unemployed	4	10.0
Others	4	10.0
Gulf/abroad	3	7.5
Total	40	100

Annual family income of the respondents

Annual family income TSH	Frequency	Percentage(%)
<10,000	3	7.5
10,000-50,000	17	42.5
51,000-300,000	11	27.5
>300,000	9	22.5
Total	40	100

Above table illustrates that majority of the respondents father (37.5%) were self employed, 17.5 per cent were involved in government job, 12.5 percent were in private job 10% were jobless and only 7.5 per cent were in abroad.

The table shows that less than 7.5% % of children's father were earning 10,000 TSH per annum, and around half of the children parents were earning less than 50,000 TSH per annum and around one fifth of children father were earning more than 300,000 TSH per annum.

Nutritional status of the children (weight for age, Gomez classification)*

Nutritional status	Frequency	percentage
Normal(90-110)	47	68.11
Mild Malnutrition (Gr-I)(75-89)	06	8.69
Moderate Malnourished (Gr-II)(60-74)	08	11.59
Severe Malnourished (Gr-III)(≤60)	08	11.59

*Weight for age calculated according to Gomez Classification (WHO standard)

It was found that 6 (8.69%) children were mildly malnourished, followed by 8 (11.59%) who were moderately malnourished, 8 (11.59%) who were severely malnourished on the basis of weight for age (underweight), and 47 (68.11%) who were normal. The results are presented in Fig. 4.2.

TABLE 4.4. Nutritional status of the children (Wasted): Weight-for-height*

Nutritional status of the children (Wasted): Weight-for-height*		
Normal (>81%)	56	81.15
Mild Impaired Group I (71%-80%)	05	7.24
Group II Impaired (61%-70%)	05	7.24
Group III Impaired (51%-60%)	02	2.89
Severely Impaired G IV(<50%)	01	1.4

*Height for age and weight for height according to Waterlow's classification

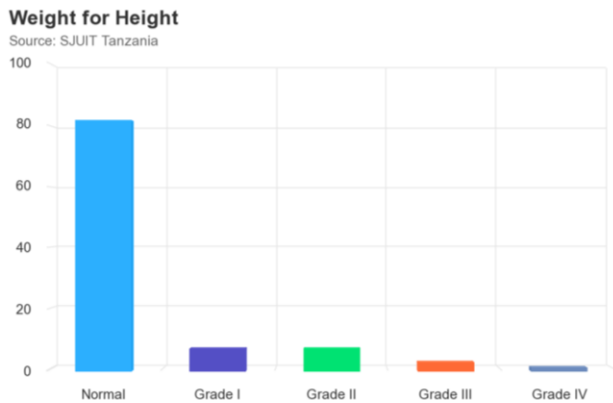


Fig. 4.4. Nutritional status of the children (wasted) (weight for height) according to Waterlow's Classification

According to research by Juma et al. (2016), the total proportions of stunting, underweight, and wasting were 8.37, 5.74, and 1.41%, respectively, in 63,237 children under the age of five who were hospitalized at the Bagamoyo District Hospital. The results of this study confirm those of past studies that indicate famine is still a problem in Tanzania. The results are not supportive of the findings of Juma et al. (2016). The difference may be because responses from hospitalized children were used in Juma et al.'s (2016) study, but the current study included school-aged participants.

4.5. Relation between nutritional status and age of children

TABLE 4.5. Relation between nutritional status and age of children

Age (months)	Weight for age				Total
	Normal	1 st degree	2 nd degree	3 rd degree	
5 to 6	14(100)	0	0	0	14(100.00)
7 to 8	16(100)	0	0	0	16(100.00)
9 to 10	11(100)	0	0	0	11(100.00)
11 to 12	2(18.1)	4(36.3)	3(27.27)	2(18.1)	11(100.00)
13 to 14	4(23.52)	2(11.76)	5(29.41)	06(35.29)	17(100.00)
TOTAL		47(68.11)		6(8.69)	8(11.59)

χ^2 cal = 8.00, P value = 0.238 (significant)

*Figures in the parenthesis denote percentage

The above table shows that 68 percent were normal, 11.59% were from the 2nd and 3rd degree, malnourished, who were from the 11–14 year age group, and 8.69 percent were from the 1st degree, malnourished among the 11–14 year age group. Table 4.5: IBM SPSS software was used for statistical analysis. The chi-square results showed there was a statistically significant difference between the two variables and therefore rejected the null hypothesis.

The result shows that 37.5% of respondents' fathers were self-employed, 17.5% were employed by the government, 12.5% were employed by the private sector, 10% were

unemployed, and 7.5% were living abroad. The result also reveals that less than 7.5% of fathers of children earn less than 10,000 TSH annually, that about 50% of parents make less than 50,000 TSH annually, and that about a fifth of fathers make more than 300,000

V. CONCLUSION

Many diseases affect children. But malnutrition is the root cause of the mortality of the children. Therefore, the prevalence of malnutrition study was carried out in a school in Dar es Salaam. A cross-sectional study was conducted to assess the nutritional status of tribal children under 14 years old in Dar es Salaam, Tanzania. The main objective of the study was to assess the nutritional status of children and to assess factors that influence the risk of malnutrition. This is the first attempt to study this research in this region. A total of 69 respondents were taken. The age of the children between 5 and 14 years old was selected with the help of a multistage sampling technique. The study concludes that the majority of respondents were from the age group of 20–29 years, and the majority of children (81%) were normal based on weight for height. About 42.5% of malnourished kids had fathers earning less than 50,000 TSH annually. Based on the results, it can be concluded that the father's income and that of his children are therefore related. Boys are equally malnourished as girls in terms of both gender and nutritional status.

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