

Prevalence of Malnutrition in a Rural Residential Sanskrit School in Baglung, Nepal

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ABSTRACT

Introduction: Under-nutrition is a condition in which there is inadequate consumption, poor absorption or excessive loss of nutrients. Nepal still faces high chronic as well as acute under-nutrition in children. The following study was conducted at a Sanskrit school in rural Baglung to find the prevalence of malnutrition among the children which could reflect the nutritional status of the community.

Methods: Out of 60 students admitted to the school, only 43 were present at the time when we collected our data. Weight was measured with a standard weighing scale and standing height with a measuring tape attached to the wall. Data were filled up in proforma, entered in Microsoft Excel 2013 and were analyzed and indicators calculated with SPSS version 20 using WHO Child Growth Reference data for 5-19 years and macros.

Results: Stunting (Z score < -2) was found in 53.5% of the study group and severe stunting (Z score < -3) was found in 25.6%. 12.5% of the 8 children under 10 years in our study had weight-for-age < -2 Z score which indicates underweight. No one was severely underweight. In our study, 2.3% had severe thinness (Z-score < -3), 14% had thinness (Z-score < -2). No one was overweight or obese.

Conclusions: The prevalence of malnutrition was high among the students of the rural Sanskrit school where the study was conducted.

Keywords: *anthropometry; Baglung; malnutrition; Nepal; prevalence.*

INTRODUCTION

Nepal faces high chronic as well as acute under-nutrition in children. Protein energy malnutrition is not only an important cause of childhood morbidity and mortality, but also leads to permanent impairment of physical and possibly mental growth of those who survive.¹ There can be a vicious cycle of malnutrition, poor health and cognitive and intellectual underdevelopment if one fails to provide adequate nutrition to children.

The National Demographic and Health Survey 2011² has shown that 41 percent of children less than 5 years of age are suffering from chronic under-nutrition

(stunting) while more than 10 percent are acutely under-nourished. Furthermore, national nutrition status estimates masks wide inequities. The mountain zone has the highest stunting rate of 56 percent, while the Terai has the lowest rate (37.4%).³

As medical professionals working at Baglung in Dhaulagiri zone, we wanted to find out the prevalence of malnutrition among local children. Using various anthropometric measures, we attempted to highlight

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the nutritional status of pupils at a local Sanskrit school.

METHODS

This is a cross-sectional study conducted at Muktinath Ved Vidyashram, a Sanskrit school in rural Baglung in a one-day health camp on January 23, 2016 that was organized for the health benefit of the students. Ethical approval and consent was taken.

Anthropometric data including height and weight were collected from the 43 students present. Weight was measured with a standard weighing scale and standing height with a measuring tape attached to the wall.

The data was filled up in proforma, entered in Microsoft Excel 2013 and were analyzed and indicators calculated with SPSS version 20 using WHO Child Growth Reference data for 5-19 years⁵ and macros.⁶ The data collected allowed the calculation of three indices: height-for-age, weight-for-age, and Body Mass Index.

Body mass index was calculated as:

$$\text{Body Mass Index} = \frac{\text{Weight in kg}}{(\text{height in metre})^2}$$

The Z-scores for the three indices were expressed in standard deviation units from WHO Growth reference data for 5-19 years as follows:

$$\text{Z-score} = \frac{\text{Measured value} - \text{Median of reference population}}{\text{Standard Deviation of the reference population}}$$

Stunting indicates low height-for-age, which is due to chronic malnutrition as a result of prolonged food deprivation and/or disease or illness. Wasting indicates low weight-for-height, which indicates acute malnutrition as a result of more recent food deficit or illness. Underweight indicates low weight-for-age which is a combined indicator to reflect both acute and chronic malnutrition.⁷

Then, classification of malnutrition was done as follows:

While classifying malnutrition, based on height-for-age,³ height-for-age Z-score < -2 SD indicates short for their age (stunted). Height-for-age Z-score < -3 SD indicates severely stunted. Similarly, weight-for-age Z-score of < -2 SD indicates underweight and < -3 SD indicates severely underweight.

Weight-for-age is not calculated for children above 10 years. Weight-for-age reference data are not available beyond age 10 because this indicator does not distinguish between height and body mass in an age period where many children are experiencing the pubertal growth spurt and may appear as having excess

weight (by weight-for-age) when in fact they are just tall.⁸

Classifying malnutrition according to the BMI Z-score, > + 1SD (equivalent to BMI 25 kg/m² at 19 years) indicates overweight, > + 2SD (equivalent to BMI 30 kg/m² at 19 years) indicates obesity, < -2SD indicates thinness and < -3SD indicates severe thinness.

RESULTS

There were 60 male students admitted to the school at the time of the study. Out of 60 students admitted to the school, only 43 were present at the time when we collected our data and all 43 were taken as samples (Table 1, Figure 1).

Table 1. Descriptive statistics of the children enrolled in the study.

Particulars	Minimum	Maximum	Mean
Age (months)	96	228	156.28
Weight (kg)	19	60	34.19
Standing Height (cm)	112	169	140.14

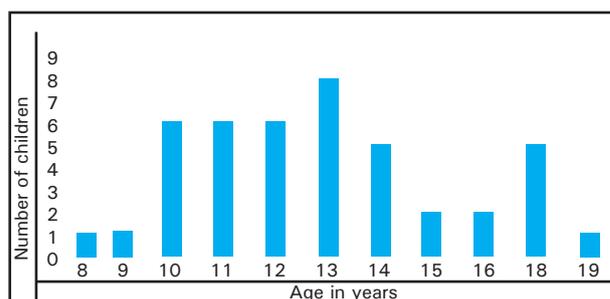


Figure 1. Age-wise distribution of study population.

Table 2. Height-for-age.

Age Groups (years)	N	Height/Age (%)		Mean z-score	SD z-score
		< -3 SD	< -2 SD		
8	1	0.0%	100.0%	-2.17	-
9	1	100.0%	100.0%	-3.42	-
10	6	0.0%	50.0%	-1.82	0.61
11	6	16.7%	50.0%	-1.80	1.23
12	6	0.0%	16.7%	-1.26	0.77

13	8	12.5%	25.0%	-1.34	1.53
14	5	100.0%	100.0%	-3.53	0.52
15	2	50.0%	50.0%	-2.56	1.99
16	2	50.0%	100.0%	-2.76	1.00
18	5	0.0%	60.0%	-1.84	0.77
19	1	100.0%	100.0%	-3.23	-
Grand Total	43	25.6%	53.5%	-2.01	1.21

Stunting (Z score < -2) was found in 53.5 % of the study group and severe stunting (Z score < -3) was found in 25.6% (Table 2).

Table 3. Weight-for-age.

Age Groups (years)	N	Weight/Age (%)			
		< -3 SD	< -2 SD	Mean z-score	SD z-score
8	1	0.0%	0.0%	-1.05	0.00
9	1	0.0%	100.0%	-2.92	-
10	6	0.0%	0.0%	-1.02	0.31
Grand Total	8	0.0%	12.5%	-1.26	0.72

12.5% of the 8 children under 10 years in our study had weight-for-age < -2 Z score which indicates underweight. No one was severely underweight (Table 3).

Table 4. BMI for age.

Age Groups (years)	N	BMI/Age (%)					Mean Z-score	SD Z-score
		< -3 SD	< -2 SD	> +1 SD	> +2 SD	> +3 SD		
8	1	0.0%	0.0%	16.7%	0.0%	0.0%	0.56	-
9	1	0.0%	0.0%	0.0%	0.0%	0.0%	-0.60	-
10	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.16	0.42
11	6	0.0%	0.0%	0.0%	0.0%	0.0%	-0.58	0.97
12	6	0.0%	16.7%	0.0%	0.0%	0.0%	-0.73	1.13
13	8	12.5%	37.5%	0.0%	0.0%	0.0%	-1.60	1.38
14	5	0.0%	50.0%	0.0%	0.0%	0.0%	-0.59	0.92
15	2	0.0%	0.0%	0.0%	0.0%	0.0%	-0.84	1.90
16	2	0.0%	0.0%	0.0%	0.0%	0.0%	-1.33	0.15
18	5	0.0%	0.0%	0.0%	0.0%	0.0%	-0.60	0.93
19	1	0.0%	100.0%	0.0%	0.0%	0.0%	-2.26	0.00
Grand Total	43	2.3%	14.0%	2.3%	0.0%	0.0%	-0.75	1.11

In our study, 2.3% had severe thinness (Z-score < -3), 14% had thinness (Z-score < -2). No one was overweight or obese (Table 4).

DISCUSSION

We found some other studies that had also attempted to find the prevalence of malnutrition among Nepalese children. One of the largest relevant studies was the National Demographic and Health Survey 2011 which showed the prevalence of stunting. We also found another similar study that was done in Kaski district

by Joshi et al.⁹ The percentage of stunting in our study population was 53% whereas the NDHS reported it to be 42%, 42.10%, 41.40%, 37.40% and 36% in rural areas, mountain areas, males, Western Region and Western Hills respectively. Similarly, Joshi et al⁹ found that the percentage of stunting was 13%.

In our study, the percentage of severe stunting was 25%, whereas in the NDHS, it was 17%, 16.70%, 16.70%, 14.90% and 12.60% in the rural, mountain, male, Western Region and Western Hills respectively.

In Nepal Multiple Indicator Cluster Survey 2014,¹⁰ the prevalence of underweight in children under 5 years was 30.1% and 8.6% for moderate-and-severe and severe underweight respectively. In our study, moderate underweight was 12.5%. Stunting was 37.8% and 15.8% for moderate-and-severe stunting and severe stunting respectively. In our study, stunting (moderate-and-severe) was 53.5% and severe stunting was 25.6%. Wasting was 11.3% and 3.2% respectively for moderate-and-severe wasting and severe wasting respectively.

However, these studies mostly included children under the age of five years whereas our study mostly included the adolescent age group. Our study showed high proportion of stunting among the adolescents. This suggests they were chronically malnourished.

The other studies also included variables such as mother's literacy, occupation, per-capita-income and so on but these could not be taken into account in the current study due to the fact that the children were all residing in a residential school and they were away from the parents. Inclusion of such variables could have been an asset in determining the role of those factors on the nutritional status of the children.

Other studies also commented on the prevalence of wasting and underweight as they included under-five children for whom references such as weight-for-height and weight-for-age are well established. However, as our study included participants of 8 to 19 years of age, these indices could not be commented on or compared with the other studies. 12.5% of the 8 children under 10 years in our study had weight-for-age < -2 Z score which indicates underweight. No one was severely underweight. This could be due to the fact that only children under-ten were considered for calculation of weight-for-age. In our study, 2.3% had severe thinness (Z-score < -3), 14% had thinness (Z-score < -2). No one was overweight or obese.

The school was an all male school with possibility

for under-nutrition as it runs in the sponsorship of donors and children from low economic background most often. This could be one of the reasons why the prevalence of malnutrition was so high. We decided to conduct the study on this group because of feasibility and convenience for collecting data from them which would help in getting an overview on the prevalence of malnutrition in the community.

Other variables including maternal data could also have been included which could further elucidate the relationship between maternal characteristics and child's malnutrition. However, this could not be done in the current study owing to the fact that children were in the residential school and parents were not available for interview.

CONCLUSIONS

This study found that the prevalence of malnutrition was high among the students of the rural Sanskrit school where the study was conducted. In our study, 12.5% of children under 10 years were underweight, 53.0% were stunted, 25.0% were severely stunted, 14% had thinness and 2.3% had severe thinness. These values suggest that they were more likely to be suffering from chronic malnutrition, prolonged food deprivation and/or disease or illness.

In the light of the findings from our study, it is recommended to spread awareness among parents and teachers in rural areas to provide proper nutritious food; as malnutrition is not only an important cause of childhood morbidity and mortality, but also leads to permanent impairment of physical and possibly mental growth of those who survive.

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Conflict of Interest: None.

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