

## ORIGINAL ARTICLE

### Nutritional Status of Children under 5 Years of age in Devdaha Municipality, Nepal- A Cross-Sectional Study

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#### ABSTRACT:

**Introduction:** Nutrition status of children under 5 years of age is a burning issue in world today. Malnutrition is major cause of childhood mortality and morbidity which can be prevented. **Aims and objectives:** To determine the prevalence of malnutrition in children under 5 years of age in Devdaha Municipality, Rupandehi, Nepal and to recommend appropriate remedial measures. **Methods and materials:** Prospective cross-sectional study was conducted on 198 children under the age of 5 years. Anthropometric measurements weight and Length/height was recorded and WHO anthro software was used to calculate data. **Result:** The prevalence of underweight, wasting and stunting was 27%, 17% and 29% respectively. In the study 18% of children had low weight for age and 8% had very low weight for age. 11% of children had low weight for height and 6% very low weight for height. Similarly 19 % had low height for age and 10% had very low height for age. The prevalence of stunting, wasting and underweight are more in children between 3-4years of age. **Conclusion:** Prevalence of underweight and stunting is high which reflects both acute and chronic malnutrition in this municipality. It is also seen that malnutrition is more prevalent in 3-4 years age which is starting age for schooling. So the measures like promotion of female education, correct method of feeding and food preparation, knowledge about hygiene and sanitation should be provided to people of Devdaha Municipality.

**Key words:** Anthropometry, malnutrition.

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## INTRODUCTION

Nutritional status is the best indicator of health of individual. For assessing the health and nutrition, growth is supposed to be the best indicator.<sup>1</sup> The physical, developmental and academic performance of children are affected by nutritional status. Among children in developing countries, malnutrition is an important factor contributing to illness and death.<sup>2</sup>

Approximately 70% of the world's undernourished children live in Asia, this region has the highest concentration of childhood under nutrition in the world.

Nutritional status of children under 5 years in Nepal is very poor. 29% of children underweight and 8% are severely underweight. Similarly percentage of under 5 years children who are wasted is 11% ; severely wasted is 3% . 41 % of them are stunted and 16 % are severely stunted.<sup>3</sup>

Malnutrition in early childhood has negative effect in motor, cognitive, social and emotional aspect of children and it further affects the health of children in long term.

Malnutrition kills 4 million children every year globally, one child every 8 seconds. Childhood malnutrition is the biggest cause of childhood mortality and morbidity which can be prevented if intervention is taken in early childhood.<sup>4</sup>

The WHO expert committee has recommended that the best indicator for the children to assess thinness is MI.<sup>5</sup> There are many studies conducted measuring BMI as growth indicator in adult and adolescence but studies in early childhood for assessing growth by using BMI has not been done.

Health and nutrition are two important aspects which are invariably interlinked with each other and can affect the various factors of demographic studies. In children, the three most commonly used anthropometric indices are weight-for-height, height-for-age, and weight-for-age. Deficit in height-for-age is called stunting and indicates chronic malnutrition. Deficit in weight-for-height is called wasting and indicates acute malnutrition. Deficit in weight-for-age is often referred to as underweight and reflects low weight-for-height, low height-for-age, or both.<sup>6</sup> Weight-for-

age is thus not a good indication of recent nutritional stress in the population.

As mentioned above malnutrition in early childhood affects the health of children and has long term consequences which cannot be prevented after certain period. Age under 5 years is crucial period of children’s mental and physical development. The study was conducted with for assessing the nutritional status of under 5 years old children of Devdaha municipality, Rupandehi District, Nepal. Simple anthropometric measurements are used to assess prevalence of underweight, stunting and wasting among children. The result of study can help the policy maker of country to plan necessary program to prevent malnutrition in this region of the country.

**AIMS AND OBJECTIVE**

1. To determine the prevalence of underweight, wasting and stunting in children under five Years of age of Devdaha municipality, Rupandehi District, Nepal.
2. To recommend appropriate remedial measures.

**MATERIALS AND METHODS**

This prospective cross sectional study was conducted in Devdaha Municipality of Rupandehi District, Nepal in 2016. The study included 98 under 5 years old children. Children were selected randomly from Bhaluhi (Devdaha 10), Charange (Devdaha 8), Kahireni and (Devdaha 7) which are densely populated area of Devdaha municipality. Out of Sample of 50 children were included from each area which

was selected randomly. 2 children were excluded due to chronic illness. Children were excluded if they suffered medical conditions.

**Sample size:** The optimal sample size of 92 study subjects was calculated on the basis of  $n = z^2 \times (1 - p) / d^2$  Where, n = required sample size, z = confidence level at 95% (standard value of 1.96), p = estimated prevalence of malnutrition in the study area (taken to be 60%) and d= relative margin of error at 10%.

**Weight:** The weight of the subjects was measured using spring balance to nearest 100 gm. There was no zero error. The readings were noted at eye level.

**Length or Height:** For children less than 2 years of age, length was measured and for those more than 2 years of age, height was measured to nearest 0.1 cm.

**Statistical Analysis:** Data was entered in Microsoft Excel. The data was exported from Microsoft Excel to WHO Anthro.

**Ethics and Informed Consent:** Well informed consent was taken from the parent/caregiver before taking the anthropometric measurements of the child. Confidentiality was maintained. The project was approved by Institutional Ethics Committee.

**RESULTS**

198 children sampled in the study 112 (56.5%) were males and rest 86 (43.5%) were females.

**Table 1:** Percentage of Male and female children upto 5years of age

| Age (years)  | No. of children | Male | %    | Female | %    |
|--------------|-----------------|------|------|--------|------|
| ≤1           | 26              | 16   | 61.5 | 10     | 38.5 |
| 1-2          | 54              | 26   | 48.1 | 28     | 51.9 |
| 2-3          | 44              | 26   | 59   | 18     | 41   |
| 3-4          | 38              | 24   | 63.1 | 14     | 36.9 |
| 4-5          | 36              | 20   | 55.5 | 16     | 44.6 |
| <b>Total</b> | 198             | 112  | 56.5 | 86     | 43.5 |

**Table 2:** Percentage of children according to weight for age, weight for height and height for age

|                          | Z-score <-3 | %  | Z-score -2 to -3 | %  | Z-score -2 to +2 | %  |
|--------------------------|-------------|----|------------------|----|------------------|----|
| <b>Weight for age</b>    | 16          | 8  | 36               | 18 | 146              | 73 |
| <b>Weight for height</b> | 12          | 6  | 22               | 11 | 164              | 83 |
| <b>Height for age</b>    | 20          | 10 | 38               | 19 | 140              | 71 |

In the study 18% of children had low weight for age (Z score <2 S.D, underweight) and 8% had very low weight for age (Z score <-3 S.D, severely underweight). 11% of children had low wt for height (Z score <-2 S.D, wasting) and 6% very low weight for height (Z score <-2 S.D, severe wasting). Similarly 19 % had low height for age (Z score <-2 S.D, stunting) and 10% had very low height for age (Z score <-2 S.D, severe stunting).

**Table 3:** Percentage of children severe underweight, underweight and normal according to age

| Age | Z-score <-3<br>(severe underweight) | %    | Z-score -2 to -3<br>(underweight) | %    | Z-score -2 to +2<br>(Normal) | %    |
|-----|-------------------------------------|------|-----------------------------------|------|------------------------------|------|
| ≤1  | 0                                   | 0    | 4                                 | 15   | 22                           | 85   |
| 1-2 | 4                                   | 7.5  | 10                                | 18.5 | 40                           | 74   |
| 2-3 | 0                                   | 0    | 6                                 | 13.6 | 38                           | 86.4 |
| 3-4 | 6                                   | 15.8 | 10                                | 26.3 | 22                           | 57.9 |
| 4-5 | 6                                   | 16.6 | 6                                 | 16.6 | 24                           | 66.8 |

Table 3 shows the prevalence of underweight as measured by weight for age. Among children upto 1 years of age 15% were underweight.18.5% of children between 1-2 years were underweight and 7.7% were severely underweight.13.6 % of children between 2-3 years were underweight. 15.8% and 26.3% of children between 3-4 years of age were severely underweight and underweight respectively.16.6 % of children were severely underweight and 16.6% were underweight. So, from the study it is seen that under nutrition is more in children between 3-4 years of age.

**Table 4:** Percentage of children severe wasting, wasting and normal according to age

| Age | Z-score <-3<br>(severe wasting) | %    | Z-score -2 to -3<br>(wasting) | %    | Z-score -2 to +2<br>(Normal) | %    |
|-----|---------------------------------|------|-------------------------------|------|------------------------------|------|
| ≤1  | 4                               | 15.3 | 0                             | 0    | 22                           | 84.7 |
| 1-2 | 0                               | 0    | 10                            | 18.5 | 44                           | 81.5 |
| 2-3 | 0                               | 0    | 4                             | 9    | 40                           | 91   |
| 3-4 | 4                               | 10.5 | 6                             | 15.7 | 28                           | 73.8 |
| 4-5 | 4                               | 11   | 2                             | 5.5  | 30                           | 83.5 |

The table 4 shows the percentage of children who are wasted and severely wasted according to the age. 15.3% of children upto 1 year were severely wasted.18.5% of children between 1-2 years were wasted.9% of children 2-3 years were wasted. Among the children between 3-4 years 15.7 % were wasted and 10.5% were severely wasted. From the study we can conclude that wasting is more common in children between 3-4 years of age.

**Table 5:** Percentage of children severe stunting, wasting, normal and tall according to age

| Age | Z-score <-3<br>(severe stunting) | %    | Z-score -2 to -3<br>(stunting) | %    | Z-score -2 to +2<br>(normal) | %    | Z score >2<br>(Tall) | %   |
|-----|----------------------------------|------|--------------------------------|------|------------------------------|------|----------------------|-----|
| ≤1  | 0                                | 0    | 2                              | 7.7  | 22                           | 84.6 | 2                    | 7.7 |
| 1-2 | 10                               | 18.5 | 12                             | 22.2 | 28                           | 51.9 | 4                    | 7.4 |
| 2-3 | 2                                | 4.5  | 4                              | 9    | 34                           | 77.5 | 4                    | 9   |
| 3-4 | 6                                | 15.7 | 10                             | 26.3 | 22                           | 58   | 0                    | 0   |
| 4-5 | 2                                | 5.5  | 10                             | 28   | 22                           | 61   | 2                    | 5.5 |

Height for age parameter was used to measure stunting.7.7% of children upto 1 year were stunted and 7.7% were above normal height for age. Among children between1-2 years 18.5% were severely stunted, 22.2 % were stunted and 7.4 % had above normal height for age. Similarly, among 2-3 years of age 4.5% were severely stunted, 9 %were stunted and 9% had above normal height for age.15.7% of children between 3-4 years had severe stunting, 26.3% had stunting. 5.5% of children between 4-5 years were severely stunted, 10% were stunted and 5.5% had above normal height for age. From the study children between 3-4 years have maximum number of stunting.

## DISCUSSION

Protein-energy malnutrition affects more than a third of the world's children. Nearly 80% of affected children live in Asia, 15% in Africa, and only about 5% in Latin America. Most countries in Asia have high prevalence of underweight, stunting and wasting. South-eastern Asia ranks second in the descending order of prevalence of underweight and third for wasting and stunting.

### Under nutritionist an indicator of both acute and chronic malnutrition

In the present study the prevalence of underweight children is 27%. Globally 16% of children are undernourished out of which 33% are of South Asia region.<sup>7</sup> According to NHDS 2011 prevalence of underweight children in Nepal is 37% which is higher than children of present study.<sup>3</sup> In another study carried by Ruwali D et al<sup>2</sup> in Chitwan district of Nepal prevalence of underweight was 22.7%. Similarly in the study done by Sapkota VP et al<sup>8</sup> in Dhankuta prevalence of under-weight was 27%.<sup>8</sup> Another studies conducted by Thapa M et al<sup>1</sup> in Humla and Mugu prevalence of underweight were 28.3% and 31.7% respectively. So prevalence of underweight is almost similar in all regions of Nepal which is slightly lower than the NDHS 2011 data.

Wasting is an indicator of acute malnutrition. So, it can be easily altered by a recent illness or disease. Therefore, it may even indicate the state of morbidity in the child population. The prevalence of wasting was 17% in our study. According to UNICEF 2013 data 52 million under 5 years children are wasted out of which 16% are of South Asia.<sup>7</sup> According to NHDS 2011 prevalence of wasting in Nepal was 14%.<sup>3</sup> In the study done by Ruwali D et al<sup>2</sup> prevalence of wasting was 25.7%. According to study conducted by Sapkota VP et al<sup>8</sup> prevalence of wasting was 11%. Similarly in the study done by Thapa M et al<sup>1</sup> prevalence of wasting was 10.05% and 11% in Mugu and Humla respectively. So the prevalence of wasting in the present study population is higher than the studies conducted in Dhankuta, Mugu and Humla; lower than children of Chitwan.

Stunting is an indicator of chronic malnutrition. The poor socioeconomic conditions and increased risk of frequent and early exposure to adverse conditions such as illness and/or inappropriate feeding practices has lead to the increase in the prevalence of stunting.

The study shows that the prevalence of stunting in children in Devdaha municipality is 29%. According to UNICEF 2013 data 26% children are stunted, out of which South Asia consists of 39%.<sup>7</sup> Prevalence of stunting in Nepal is 57% according to NHDS 2011 which is very high. In the

study conducted by Ruwali D et al<sup>2</sup> prevalence of stunting was 37.3%. Study of Sapkota V P et al<sup>8</sup> showed that prevalence of stunting was 37%. Thapa M et al<sup>1</sup> showed under 5 years old children of Mugu district had 29.4% prevalence and that of Humla was 22.4% . All studies conducted in different part of Nepal showed that prevalence of stunting is lower than that of NDHS 2011 data.<sup>3</sup>

## CONCLUSION

The status of malnutrition of Devdaha Municipality is more or less similar to status of country as given by NHDS 2011 data. Prevalence of stunting is higher followed by underweight then wasting. Hence, most of the children upto 5 years are suffering from both acute and chronic nutritional failure. So the programmes to improve the nutritional status for children since birth should be conducted. This can include exclusive breast feeding, proper weaning, correct feeding techniques and proper method of food preparation. Along with this mother including family members and school teachers are to be educated about hygiene and sanitation, nutritional value of different food in our diet so that children can get required nutrition at home as well as in school. Most important mother should be educated and nutritional status of female should be given priority especially during pregnancy and lactation period.

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