Assessment of Nutritional Status of Children Under Five years of age in rural Nepal

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ABSTRACT

Background

Nutritional status of children is one of the major predictors of child survival. However, malnutrition is a major public health problem in most of the developing countries and occurs prominently among under-five children. In context of Nepal, nearly 37% children are suffering from underweight, 41% from stunting and 11% are suffering from wasting. These children are at a substantially greater risk of severe acute malnutrition and death.

Objective

The objective of the study was to assess the nutritional status of children under five years of age and to find the factors associated with malnutrition.

Method

A cross-sectional study was conducted in Dolakha and Kavre districts of Nepal for assessing the nutritional status of under-five children and associated factors. A total of 243 under five children were included from two purposively selected village development committees (VDCs) i.e. one from each district. Statistical Package for the Social Sciences (SPSS) 22 Version and ENA Software Version 2011 were used for analyzing the data.

Result

Out of 243 children, according to WHO based on weight for height assessment, 17 (7.0%) were wasted, in height for age analysis, 97 (39.9%) were stunted and in weight for age assessment, 46 (18.9%) were underweight.

Conclusion

In the study population, there is high prevalence of malnutrition, especially stunting among under-five. Taking into account weight, height, age, and mid upper arm circumference (MUAC) measurements of malnourished children more than three-fifths of them were found below -2SD and nearly one-fourths below -3SD which needs intervention.

KEY WORDS

Associated factors, nutritional status, under-five years children

INTRODUCTION

Malnutrition is one of the most important public health problems of developing countries where resources are very limited. Nutrition is believed to be very essential for socio economic development of the country and is an essential component of millennium development goals. The common cause of malnutrition is lack of access to the nutritious food. Poor feeding practices, such as inadequate breastfeeding, offering the wrong foods, and not ensuring that the child gets enough nutritious food, contribute to malnutrition. Respiratory infections, frequent diarrhea, malaria also undermines a child's nutritional status. Over 10 million under-five children annually die from the diseases which are preventable and treatable almost all these deaths occur in poor countries.[1] Malnutrition is responsible for over 50% of these 10-11 million under-five deaths from preventable diseases.[2]

Malnutrition is a major public health problem in most of the developing countries and is more common among under-five year children.[3-5]

Globally in 2011, 165 million children under 5 years of age were stunted, 101 million children were underweight and 52 million children were wasted. Sub-Saharan Africa and South Asia are home to three fourths of the world's stunted children. In South Asia, 39 per cent of children under 5 years of age were stunted. The prevalence of underweight and wasting is alarmingly high in South Asia where 33% are underweight and 16% are wasted i.e approximately 1 in 3 children is underweight and 1 in 6 children is wasted. These children are at increased risk of severe acute malnutrition and death.[6]

In 2011 survey, among under-five children in Nepal nearly 29% children were suffering from underweight, 41% from stunting and 11% are suffering from wasting.[7] The annual report of Department of health services Nepal states a large number of cases from moderate to severe acute PEM and micronutrient deficiencies and malnutrition status is considered as a serious health problem for child survival and their growth and development.[8] The present study is being conducted to assess the prevalence of nutritional status and degree of malnutrition in children and to find the factors leading to malnutrition.

METHODS

A descriptive cross-sectional study was conducted in September 2014 in Dolakha and Kavre districts of Nepal. One village development committee (VDC) from each district was selected purposively by considering the accessibility of site and adequacy of resources. This was followed by the random selection of wards from each VDC. Population proportionate sampling was used to determine the sample size to be collected from each ward. Initially, a sample size of 221 households was estimated for the study.

However, after taking into account a 10% non-response rate, a total of 243 households were sampled in the end. In case of households with multiple children, one child was selected randomly from among the children.

A pre-tested questionnaire was used to collect data regarding demographics, anthropometric measurements (height, weight, mid upper arm circumference (MUAC), their feeding pattern (breast-feeding, bottle-feeding, weaning), immunization status, occupation of the parents, family size and type.

The purpose of the study was informed to the household member and verbal consent was sought before data collection. Ethical approval was taken from Kathmandu University School of Medical Sciences Institutional Review Committee. Only permanent residents from the selected districts were sampled in this study. Households without children and households with children who were ill at the time of data collection were excluded from the study.

The data analysis was performed with help of SPSS 22 version and ENA for SMART 2011. Correlation coefficient was calculated to test linear relationship between different variables under study. For measuring the deviation of weight-for-height, weight-for-age, length/height-for-age, BMI-for-age and arm circumference-for-age, ENA Software was used to calculate Z-score values which were then compared with WHO reference data 2006.

RESULTS

A total of 243 households were sampled having children aged under-five years. The background characteristics of the households are presented in Table 1. Age wise distribution showed that majority of the children (43.6%) were in 6 to 24 months age group, 39.5% in 25 to 48 months age group and 16.9% in the 49 to 60 months age group. Ethnicity distribution revealed that majority of the study population was Brahmin (34.2%), followed by Chhetri (25.1%) and Tamang (23.9%).

Majority (79.4%) of the household was follower of Hindu religion and 20.2% followed Buddhism. Agriculture (70.4%) was the most common occupation of the parents among professions like service, labour, business and driver.

According to the anthropometric measurements, there were negligible differences between the prevalence of acute malnutrition among boys and girls. However, prevalence of stunting and underweight among girls was seen slightly higher than in boys.

Regarding the weight-for-height index, the overall prevalence of wasting in children was 7%, which was wholly incorporated by moderate acute malnutrition. Severe wasting was null. Strong significant positive correlation was found between weight and height of children (r=0.81, p< 0.01).

Table 1. Socio-demographic characteristics.

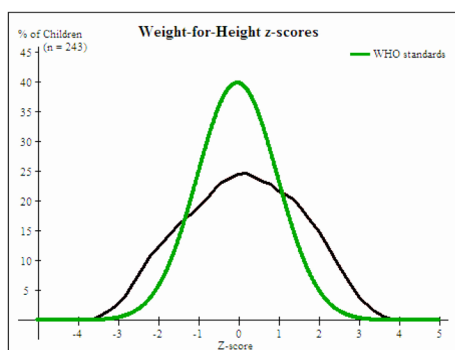| Variables		Number (%)
Age Group (months)		
	6 – 24	106 (43.6)
	25 – 48	96 (39.5)
	49 – 60	41 (16.9)
Ethnicity		
Brahmin		83 (34.2)
Chhetri		61 (25.1)
Tamang		58 (23.9)
Newar		30 (12.3)
Dalit		11 (4.5)
Religion		
Hindu		193 (79.4)
Buddhist		49 (20.2)
Christian		1 (0.4)
Occupation		
Agriculture		171 (70.4)
Service		36(14.8)
Labour		6 (2.4)
Business		16 (6.6)
Driver		14 (5.8)

Figure 1. Main survey results for Weight-for-height z-score (WHZ)

By assessing the height-for-age, 39.9% of stunting was revealed among which 25.5% was moderate and 14.4% was severe. Correlation between height and age of children was found to be significant (r=0.83, p < 0.01).

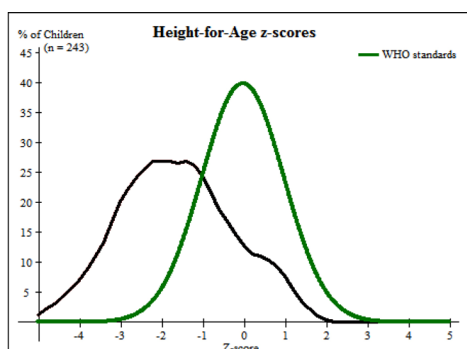**Figure 2. Main survey results for Height-for-age z-score (HAZ)**
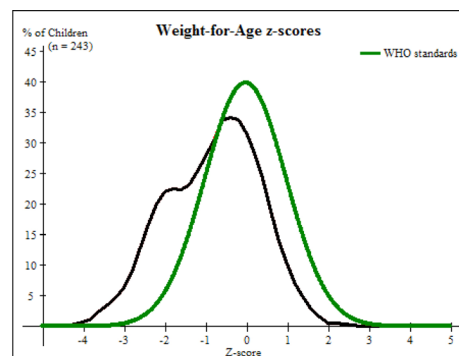

Figure 3. Main survey results for WAZ

The overall prevalence of underweight among under-five children was assessed to be 18.9%, among which 15.2% was incorporated by moderate underweight and 3.7% by severe underweight. Correlation between weight and age of children was found to be significant (r=0.90, p < 0.01).
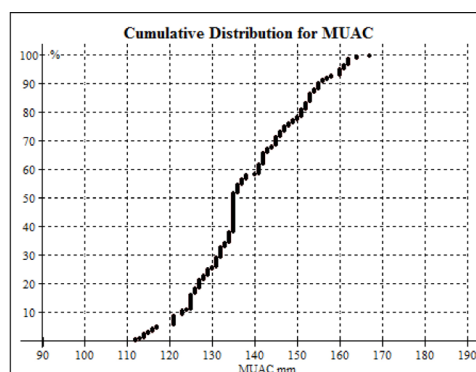

Figure 4. Main survey results for MUAC

According to the results of MUAC, 11.1% of the under-five children had global acute malnutrition. The moderate acute malnutrition accounted 8.6% and severe acute malnutrition accounted for 2.5%. Weak positive correlation was found between MUAC measurement and age of children. (r=0.26, p<0.01).

DISCUSSION

In order to assess the nutritional status of under five children, anthropometric indices were used and were compared to WHO's reference growth chart. Deviation of the anthropometric indices from the standard value is regarded as evidence of malnutrition. In this study, weight-for-height, height-for-age, weight-for-age are used as the main anthropometric indices and deficit from these indices are called wasting, stunting and underweight respectively. For each of these indices, Z-score below -2SD and -3SD are considered moderate and severely malnourished respectively.

One of the key findings of this study is that almost two fifths of the children (39.9%) in the study population are stunted, and is higher than the results of a survey conducted in children at Nepal Medical College Teaching Hospital.[9] This is almost close to the results of Nepal Demographic and

Health Survey (NDHS) 2011 (41%).[7] According to NDHS 2011, children in rural areas are more likely to be stunted than those in urban areas.[7]

One of the major demographic determinants for stunting is children's birth weight in this area. There is statistically inverse relationship between children's birth weight and stunting. The chance of stunting decreased as the birth weight increased and vice-versa. This finding is similar to a study conducted in North Ethiopia in 2014.[10] The inadequacy of nutrients starting from the uterus until three years after birth, might be the reason for the inverse relationship.[11]

The result for weight-for-height measurements in this study (7%) is low as compared to previously done studies in Nepal.[6,8,12] Prevalence for wasting was found similar in studies done in Azerbaijan and Iran.[13,14]

A total of 18.9% of the under-five children are underweight, among which girls (21.4%) are slightly more underweight than boys (16.8%). This is opposite as compared to the national figures in NDHS 2011.[7] Other study done in western Nepal which shows boys are more underweight than the girls.[15]

Anthropometric measurements like height, weight and MUAC show significant association with the nutritional status of under- five children at 0.01 level (2-tailed) which is comparable to the study done in other part of Nepal.[3]

Under-nutrition and weak immunological status can raise the chances of susceptibility and vulnerability to infections. In under-five children, main causes of malnutrition are inadequate dietary intake and frequent episodes of diarrheal and respiratory diseases. In addition to severe malnutrition, even mild to moderate malnutrition leads to various infections and risk to child health.[16] All anthropometric indices in this study reveal that moderate acute malnutrition has higher prevalence than severe acute malnutrition. However, figures for severe acute malnutrition are such that it cannot be ignored and appropriate measures should be taken for its decrement.

Limitations

This study has two limitations. Firstly, the study area was purposely selected hence the generalization of the study should be done with caution. Secondly, in a cross-sectional study, response and recall biases might not be completely eliminated. Besides, there might be presence of some confounders such as household hygiene and presence of food contaminants, which may have altered the results.

CONCLUSION

In conclusion, the result of this study has revealed the existence of high prevalence of malnutrition, especially stunting among under-five children in this study area. Statistically inverse relationship between child's birth weight and stunting is also seen. Taking into account weight, height, age, and MUAC measurements of malnourished children more than three-fifths of them were found below -2SD (Z score) and nearly one-fourths below -3SD (Z score) which needs intervention.

ACKNOWLEDGEMENT

REFERENCES

1. United Nations Children's Fund. The state of the world's children 2009. Special edition: celebrating 20 years of the convention on the rights of the child. New York: United Nations Children's Fund, 2009. 92 p.

2. Collins S, Dent N, Binns P, Bahwere P, Sadler K, Hallam A. Management of severe acute malnutrition in children. *Lancet.* 2006; 368(9551):1992–2000.

3. Bhandari TR, Chhetri M. Nutritional Status of Under Five Year Children and Factors Associated in Kapilvastu District, Nepal. *J Nutrition Health Food Sci* 2013;1(1): 6.

4. Masood-us-Syed SS, Muhammd S , Butt ZK. Nutritional Assessment of Children under the Age of Sixty Months in District Sialkot, Pakistan. J Pak Med Stud. 2011;1(1). www.jpmsonline.com

5. Olack B, Burke H, Cosmas L et al. Nutritional Status of Under- five Children Living in an Informal Urban Settlement of Nairobi, Kenya. *J Health Popul Nutr* 2011 August;29 (4):357-63.

6. Improving Child Nutrition- UNICEF http://www.Unicef.org/gambia/Improving_ Child_Nutrition_the_achievable_imperative_for_global_progress.pdf

7. Population Division Ministry of Health and Population. Nepal Demographic and Health Survey 2011 Preliminary Report. New ERA, ICF Macro;2011.

8. Department of Health Services Government of Nepal Ministry of Health and PopulationTeku, Kathmandu. Annual Report. 2070;71:256. www.dohs.np

9. Rijal P, Sharma A, Shrestha S, Upadhyay S. Nutritional assessment of children at Nepal Medical College Teaching Hospital. *Heal Renaiss*. 2011;9(3):184-8 healthrenaissance.org.np

10. Brhane G., Regassa N. Nutritional status of children under five years of age in Shire Indaselassie, North Ethiopia: Examining the prevalence and risk factors. *Kontakt* 2014;16(3):e161–e170; http://dx.doi.org/10.1016/j.kontakt.2014.06.003

11. The World Bank. Repositioning Nutrition as Central to Development. World. 2006. 272 p. http://books.google.com/books?hl=en&lr=&id=PRPc32wCLjMC&oi=fnd&pg=PR3&dq=Repositioning+Nutrition+as+Central+to+Development&ots=V98pCwPyvB&sig=FnCjr2PrRAcIPG71Gx5jnWOc6AI

12. Ruwali D. Nutritional Status of Children Under Five Years of Age and Factors Associated in Padampur VDC, Chitwan. *Heal Prospect*. 2011; 10:14–8.

13. Reza FEH, Sima O, Najaf A, Fariba B. Geographical Distribution of Nutrition Deficiency Among Children Under Five Years Old in The West Azerbaijan Province, Iran. *The Journal of Urmia University of Medical Sciences.* 2013;24(3); 201-9.

14. Veghari G. The Relationship of Ethnicity, Socio-economic Factors and Malnutrition in Primary School Children in North of Iran: A Cross-sectional Study. *JRHS* 2013;13(1):58-62.

15. Shrestha B. Nutritional Status of Under-Five Children in Western Nepal. *J Nepal Paediatr Soc* 2014;34(2):119-124. doi: http://dx.doi.org/10.3126/jnps.v34i2.10566

16. Urban J. Success Factor in Community Based Nutrition Oriented Programme and Project. Atlas of South Asian Children and Women, UNICEF, ROSA UNICEF, Asia. 1997.