Nutritional Status of Preschool Children of Ethnic Community in Bangladesh

MD MONOARUL HAQUE
TASLIMA KHATUN
MANIKA RANI SARKER
MD ASIRUL HOQUE
Dept of Community Nutrition, Faculty of Public Health
Bangladesh University of Health Sciences (BUHS), Dhaka
Bangladesh

Abstract:

Objective: The comprehensive cross sectional study was an attempt to assess the nutritional status of pre- school Chakma ethnic children. Methods: A total sample of 374 Chakma ethnic preschool children from 3-5 years age belonging to different socioeconomic status were selected conveniently from Sadar Upazilla of Rangamati. Nutritional status was measured using Z score according WHO classification. Results: Moderate to severe underweight, stunted and wasted were 23.8%, 25.6% and 14.7% study subjects while rest of the children were healthy. The prevalence of mild malnutrition was more among girls than boys but opposite scenario in case of moderate and severe malnutrition except severe wasting. Children from housewife mother, no formal education and from lower middle income families suffered more from various grades of malnutrition. Significant association was seen between mother's occupation and child nutritional status (P=< 0.001). Child nutritional status was significantly associated with education of mother (p=<0.001). Significant association was also found in relation of monthly family income and all form of child nutritional status. Conclusion: This study demonstrated that malnutrition among preschool tribal children in Bangladesh is on a decreasing trend and further large scale study

including other ethnic communities may be suggested to get precise result.

Key words: Chakma ethnic pre-school children, Nutritional status, Z-score, Underweight, Wasting, Stunting.

Introduction

Child malnutrition is a wide spread public health problem having international consequences because good nutrition is an essential determinant for their well-being. The most neglected form of human deprivation is malnutrition; particularly among preschool children.[1]WHO cites malnutrition as the greatest single threats to the world's public health, it is still widely believed that malnutrition is restricted to the third world population.[2] Over population and poverty are pervasive in Bangladesh and causing population hazards like malnutrition among pre-school children who are naturally innocent, vulnerable, dependent often suffering from malnutrition.[3] The prevalence of malnutrition in Bangladesh remains among the highest in the world.[4] Persistent malnutrition contribute not only to widespread failure toward meeting the first MDG of having poverty and hunger, it also undermines efforts to reach MDG relating to maternal and child health. Malnutrition and hunger feed directly into ill health and poverty.[5]According to BDHS 2011 there has been some improvement in child nutritional status over the past four years.[6] The level of stunting has declined from 51 percent in 2004 and 43 percent in 2007 to 41 percent of children under five in 2011.The pattern and change in wasting has been small and inconsistent.[7] Bangladesh has a variety of tribal population reflecting its great ethnic diversity. They constitute about 1% of total population, though they are scattered all over the hilly and dense forest region of the country. So, as observed, their ethnic origin, culture, feeding practice, literacy rate and profession are

different from those of indigenous Bengali people. As these are very important determinants for nutrition, it is expected that there will be an obvious difference in the nutritional status of 3 to 5 years children of Chakma tribe from that of Bengali children.[8] Nutritional assessment by anthropometric measurement is an important technique for identifying individuals, groups or communities whose growth is not keeping up with the expected pattern.[9] Bairagi and Chowdhury showed that mother's education, family income, sex and birth order of the children are important determinant of malnutrition.[10] In Bangladesh this is further aggressive and critical because of unbalanced diet and poverty stress. Nutritional status is a sensitive indicator of community health and nutrition among preschool children, especially the prevalence of under nutrition that affects all dimensions of human development and leads to growth faltering in early life.[11] Therefore, the assessment of the nutritional status of a community is one of the first steps for the formulation of any public health strategy to combat malnutrition. The principal aim of such an assessment is to determine the type, magnitude and distribution of malnutrition in ethnic community and to identify the risk group and determine the contributory factors.[11]

Methods:

Study Area

A Cross-sectional community based study was carried out from July 2011 to June 2012 in at Rangamati Sadar Upazilla. Rangamati Sadar Upazilla consists of Rangamati town (Vedvedi, Collegegate, Rajbari, Newmarket, Banurupa, Kathaltoli, Fishery ghat, Reserve bazaar, Lanch ghat, Tabalchory, Asam basti, Chakra para) and Balukhaly Union. Rangamati is located in the Chittagong Division. The total area of the district is 6116.13 sq km. It's a combination of Hill – lake- Plain land in which 1291.5 sq. km is riverine and 4824.63 sq.

km. is under forest vegetation and the lake area is about 650 sq. km. Chakma with their different socio-economic status stay these area. The subjects were selected conveniently.

Sampling

According to study of 1-5 years of tribal children of the tea workers in Sylhet division and prevalence of malnutrition is 42%.[8] Sample size was estimated by using Z^2pq/d^2 formula where p was 0.42. This assumption and a confidence interval (CI) of 95% were taken into account for sample size determination. Using the statistical formula for comparative studies, a sample size of 374 households was used and multi-stage sampling was done in the selection of households.[12]

Data Collection

A structured questionnaire was used in the study to collect information on socio demographic and socio-economic characteristics of the households. The socio-economic classification in this study was made according to 2006 Gross National Income (GNI) per capita and calculated by World Bank (WB)[13] (The groups were: low-income $75.41 or less (BDT ≤ 5360), lower middle-income $75.5 - $299.58 (BDT 5361-21270), upper middle-income $299.68 - $926.25 (BDT 21271-65761) and high-income $926.33 or more (BDT ≥ 65762

Anthropometric

A form in the structured questionnaire was used to record information on anthropometric measurements (weight, Length/ht). The procedures followed in taking anthropometric measurements and Z score are as described by United Nations and using WHO Anthro software.[14,15] The length was measured with a appropriate length scale with minimal cloths. . Three measurements were taken three times and if the difference among reading was less than 1 cm, the mean measurement was taken and recorded to the nearest 0.1 cm. The body weight was

measured using a platform beam scale. The subjects stand still over the center of the platform with body weight evenly distributed between both feet with light indoor clothing. Weight was recorded to the nearest 0.1 kg.

Z-score {Weight-for-Age (WAZ), Height-for-Age (HAZ), and Weight-for-Height (WHZ)} were classified by WHO.[16]

Table 1: Classification of nutritional status using Z-score

Cut off values	Terms of status
Weight for Age Z-Score	
< -3.00 WAZ	Severe underweight
-3.00 to -2.01 WAZ	Moderate underweight
-2.00 to -1.01 WAZ	Mild underweight
± 1.00 WAZ	Normal
Height for Age Z-Score	
< -3.00 HAZ	Severe stunting
-3.00 to -2.01 HAZ	Moderate stunting
-2.00 to -1.01 HAZ	Mild stunting
± 1.00 HAZ	Normal
Weight for height Z-Score	
± 1.00 HAZ	Normal
< -3.00 WHZ	Severe wasting
-3.00 to -2.01 WHZ	Moderate wasting
-2.00 to -1.01 WHZ	Mild wasting
± 1.00 WHZ	Normal
+2.01 to +3.00 WHZ	Over-weight
≥3.00 WHZ	Obesity

Source: Reference WHO child growth standards, 2006

Data analysis

The data were entered and analyzed using Statistical Package for Social Scientists (SPSS) version 16. To ensure that all the information had been correctly entered. Frequencies for non-continuous data and the mean values for continuous data were obtained before carrying out statistical analysis and used in checking for outliers. Mean and standard deviation, frequency and chi-square were performed where is appropriate.

Ethical Consideration

All ethical issues, which were related to the research involved with human subjects, were followed according to the guideline of Bangladesh Diabetic Somiti (BADAS) ethical review committee.

Results:

A total of 374 preschool Chakma tribe children aged of (M±SD) 3.92±0.87were studied. In terms of religion, 92.2% were Buddhist and 7.8% were Hindu. About 54.3% mothers were non schooling, 22.2% were primary level, 19.3% were secondary level and 3.7% were educated at ≤ graduation level. Higher education was hardly seen among mother. Table showed that 39.6% mothers were farmer; housewives were 37.4% and business, service were 8.0%, 6.7% respectively. The families of the respondents were arbitrarily classified into low income (up to taka 5360), lower middle income (5360-21270 taka) and upper middle income (21271-65761 taka). About 81% of the family came from lower middle income families. The rest 13% were upper middle income group family **(Table 2).** The prevalence of malnutrition in tribal preschool children according to Z-score classification and influenced by sex of the subject is presented in **Figure 1**. It was seen mild underweight, mild stunting, mild wasting was more prevalent among girls (78.3%, 79.4%, and 87.2%) than boys (70.1%, 64.4%, and 81.4%) but in case of moderate underweight, stunting, wasting boys were more sufferer (23.7%, 28.9%, and 14.4%) than girls (16.7%, 16.1%, and 9.4%). Figure showed that severe underweight, stunting were more among boys than girls but severe wasting were more among girls than boys. Among study subjects moderate to severe underweight (<-2Z) were 23.8% and 76.2% study subjects had normal weight for their age. **Table 3** showed that moderate to severe stunted children were only 25.6% and 74.4% children were normal. In case of wasting, table revealed

that moderate to severe wasting were 14.7% whereas normal child was 85.3%. **The table 4** showed stunting (92.7%), wasting (91.07%) and thinness (70%) were seen among children whose mother were housewife. Significant association was found in relation of mother's occupation and child nutritional status of HAZ, WHZ & MUACZ (P=0.005, 0.018 & 0.001). **The table 5** showed the association of mother education and children nutritional status. Stunting (85.4%), wasting (82%) and thinness (92.6%) of children were highest among caregivers who were illiterate. There also found a significant association between mothers education and child nutritional status HAZ and MUACZ (P=0.043 & p=0.001). **The table 6** showed wasting (69.64%), stunting (66.66%), underweight (71.9%) and thinness (74.07%) of children were highest among lower middle income group (21271-65761 tk). Significant association was found in relation of monthly family income and all form of child nutritional status.

Table 2: Socioeconomic characteristics of the caregivers (n=374)

Characteristics	Number (%)
Age of children (M±SD)	3.92±0.87
Religion	
Hindu	29(7.8)
Buddhist	345(92.2)
Education of mother	
No schooling	203(54.3)
Primary	83(22.2)
Secondary	73(19.3)
Secondary-Higher Secondary	0(0)
Up to Graduation	15(4.0)
Occupation of mother	
Housewife	140(37.4)
Agriculture	148(39.6)
Business	30(8.0)
Service	25(6.7)
Others	31(8.2)
Monthly family income(BDT)	
Lower income (< 5360)	22(6.0)
Lower middle income (5360-21270)	303(81.0)
Upper middle income (21271-65761)	49(13.1)

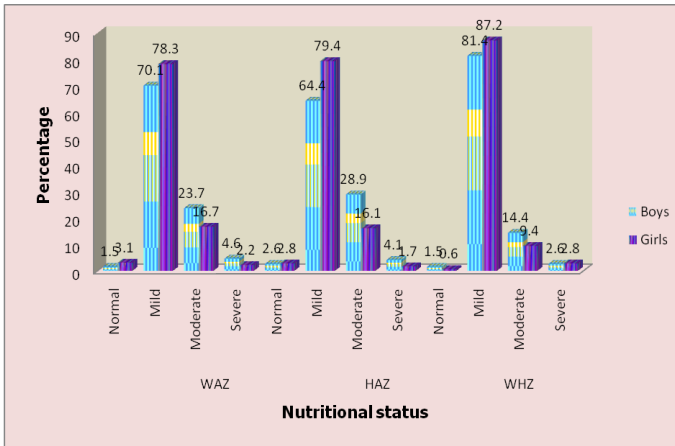Results were expressed as number and percentage

Figure 1: Relationship between gender and nutritional status of the study subjects

Table 3: Nutritional status (normal & moderate to severe) of study subjects (n=374)

Anthropometric indicators	Normal (±2SD)%	Moderate to Severe (<-2SD) %
Underweight (WAZ)	76.2%	23.8%
Stunting (HAZ)	74.4%	25.6%
Wasting (WHZ)	85.3%	14.7%

Results were expressed as percentage

Table 4: Relationship between occupation of mother and nutritional status of the study subjects

Occupation of mother	Anthropometric indicators		
	HAZ	WHZ	MUACZ
	N (%)	N (%)	N (%)
Housewife	89(92.7)	51(91.07)	70(86.4)
Agriculture	7(7.3)	5(8.92)	5(6.2)
Others	0(0)	0(0)	6(7.4)
Total	96(100)	56(100)	81(100)
P value	0.005	0.018	0.001

Results were expressed as number and percentage, χ2 test was performed and P<0.05 was level of significance.

Table 5: Relationship between mother's education and nutritional status of the study subjects

Education of mother	Anthropometric indicators		
	HAZ	WHZ	MUACZ
	N (%)	N (%)	N (%)

No schooling	82(85.4)	73(82.0)	75(92.6)
Primary	12(12.5)	14(15.7)	6(7.4)
Secondary	2(2.1)	2(2.2)	0(0)
Total	96(100)	89(100)	81(100)
P value	0.043	0.327	0.001

Results were published as number **(%),** χ2 test was performed and P<0.05 was level of significance.

Table 6: Relationship between nutritional status of study subjects and monthly income of the family

Monthly family income	Anthropometric indicators			
	WHZ	HAZ	WAZ	MUACZ
	N (%)	N (%)	N (%)	N (%)
Lower income (<5360 tk)	5(8.9)	6(6.25)	7(7.86)	9(11.11)
Lower middle income (5360-21270 tk)	39(69.64)	64(66.66)	64(71.9)	60(74.07)
Upper middle income (21271-65761 tk)	12(21.4)	26(27.1)	18(20.2)	12(14.8)
Total	56(100)	96(100)	89(100)	81(100)
P value	0.010	0.029	<0.001	<0.001

Results were published as number **(%),** χ2 test was performed and P<0.05 was level of significance.

Discussion:

Promoting healthy diets and lifestyles to reduce the global burden of noncommunicable diseases requires a multisectoral approach involving the various relevant sectors in societies.[17, 18]. Based on the results of the study, it appears that undernutrition in the form of underweight, stunting, wasting along with different grades of malnutrition and nutritional deficiency signs was found among preschool children aged 3-5 years old of Chakma tribe of Rangamati Sadar Upazilla. Moderate (-3SD to <-2SD) to severe underweight (<-3SD) were 23.8% and 76.2% study subjects had normal weight for their age. Moderate (-3SD to <-2SD) to severe (<-3SD) stunted children were only 25.6% and 74.4% children were normal. Moderate to severe wasting were 14.7% whereas normal child was 85.3%. But when mild underweight, stunted & wasted were classified in the percentage of normal level then it was

decreased. In BDHS 2011 suggests that the level of underweight, stunting and wasting was 36%, 41% and 16% respectively among under five children.[6] A study by Karim and Khan showed that 49% of children were under weight, 43% were stunted and 20% were wasted.[19] Another study in 1995-96 showed that 64.2% of all children were underweight whereas 60.4% and 17% were stunted and wasted respectively.[20] But among the children of tea workers unveils much higher level of malnutrition than that of national surveys. Prevalence of wasting is 42.3% whereas those of stunting and underweight are 80.2% and 73% respectively.[8] Another study was conducted in Bangladesh showed that Severe underweight of Khulna, Chittagong, Dhaka, Rajshahi, Barisal and Sylhet division were 9.3%, 12.9%, 11.1%, 12.8%, 16.0% and 17.5% respectively. [21] More than the half of the children (59.8%) had below median – 2SD Body weight and similar findings have been reported by another study of the Sarguja tribes in India.[22] Prevalence of under-nutrition of another the study was 63.83%19. In addition to this (67%) also reported a nearly similar observation in the Babina block of the Jhansi district (UP).[23] Higher prevalence of under nutrition was also observed among preschool children in the slum area of Udaipur (73%).[24] The finding in tribal areas of Maharashtra (71.6%) were similar.[25] Another study was found that thinness, normal weight and overweight was 67.2%, 31.9%, and 0.8 %, respectively.[26] National Nutrition Monitoring Bureau (NNMB) also reported a higher prevalence of under nutrition in boys (63%) compared to girls (42%) among tribal children from nine states in southern India.[27] Significant association was found between mother occupation, education of mother, monthly family income and all form of child nutritional status. The association between child nutrition and certain socio-economic characteristics such as parental education, occupation, and household economic status has been documented in several analyses.[8-30] Several studies reveal that children of illiterate mothers have a higher risk of severe

malnutrition and this inference is consistent with other studies.[4,31-34]

Conclusion:

This study demonstrates that malnutrition among preschool tribal children in Bangladesh is on a decreasing trend, although both the prevalence of severe and moderate underweight is still very high in Bangladesh and a severe public health problem in this developing society though this study showed that ethnic children nutritional status is good compare than others area of Bangladesh. In this study mothers education and family income play a vital role of children nutritional status. Nutrition intervention program, mother's education and reduction of poverty can play an important role to reduce malnutrition in our country.

Competing interests
The authors declare that they have no competing interests.

Authors' contributions
MH: contributed his intellectual ability to conception and design of the research, interpretation of data, and data collection, drafting the article, final approval of the version to be published**; TK:** contributed her intellectual ability to conception and design of the research, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content, and final approval of the version to be published; **MRS:** contributed her intellectual ability to conception and design of the research; **AH:** contributed his intellectual ability to conception and design of the research; All of the above authors read and approved the final manuscript.

Acknowledgements

References:

Vipinchandran, K.P. 2009. "Nutritional Status of Preschool Children: A Socio-Economic Study of Rural Areas of Kasaragod District in Kerala." Abstract of PhD thesis, December 2009. [1]

Malnutrition. StudyMode.com. Retrieved 03, 2013, from http://www.studymode.com/essays/Malnutrition-1500577.html [2]

Rayhan, I., Khan, S.H. 2006. "Factor's causing malnutrition among under five children in Bangladesh." *Pakistan Journal of Nutrition* 5(6): 558-562. [3]

The United Nations Children's Fund (UNICEF). The State of the World Children. New York, USA: UNICEF, 2004. [4]

Sachs, Jeffrey D. 2004. Excerpt "Economics and Nutrition: How do they intersect?" *SCN news* 28 -July 2004. [5]

Bangladesh Health and Demographic Survey 2011, Bangladesh Maternal Mortality Survey 2001. [6]

Volkmann, C.S. UNICEF Representative in Iran, UNICEF's Progress for Children: A Report Card on Nutrition is available at UNICEF's Information Resource Centre in Tehran. [7]

Myaz, S.S.A., Hasan, M.R., Shamim, S., Dev, A., Kamar, S. 2010. "Nutritional status of 1-5 years children of the tea workers in Sylhet division." *Bangladesh J Child Health* 34 (1): 11-16. [8]

Website of UNDP: http://www.undp.org.bd. For REOPA: www.reopabd.org;

http://www.undp.org.bd/projects/proj_detail.php?pid=57 cited 8/5/2012. [9]

Bairagi, R., Chowdhury, M.K. 1994. "Socioeconomic and Anthropometric Status and Mortality of Young Children in Rural Bangladesh." *Int J Epidemiol* 23:1179-84. [10]

Ghost, S. 2004. "Child malnutrition." *Econ Polit Wkly* 39: 4412-4413. [11]

A.A. Fisher, J.A. Laing, and J.W. Townsend. 1991. *Handbook for Family Planning Operations Research*, 2nd ed. Population Council. New York, USA. 40-46. [12]

Family income classification was made according to 2006 GNI per capita and was calculated using the WB Atlas method (The Daily Star, 2011). [13]

United Nations. 1986. "How to Weigh and Measure Children: Assessing the Nutritional Status of Children in Household Surveys." Department of Technical Cooperation for Development and Statistical office. New York, USA. 6-65. [14]

WHO Anthro for personal computers, version 3.2.2, 2011: Software for assessing growth and development of the world's children. Geneva: WHO, 2010. [15]

WHO. Child Growth Standards: Length/height-for-age, weight-for-age, weight-for length, weight-for-height and body mass index-for-age: methods and development. Geneva: World Health Organization, 2006. [16]

Saha, K.K., Frongillo, E.A., Alam, D.S., Arifeen, S.E., Persson, L.A., and Rasmussen, K.M. 2009. "Household food security is associated with growth of infants and young children in rural Bangladesh." *Public Health Nutr*. 12: 1556-1562. [17]

Hackett, M., Quinonez, H.M., and Alvarez, M.C. 2009. "Household food security associated with stunting and underweight among preschool children in Antioquia, Colombia." *Pan Am J Public Health* 26: 506-510. [18]

Karim, R., Khan, I.N.M., and Akhtaruzzaman, M. 2004. *The Bangladesh Development Studies* 30: 129- 35. [19]

Ahmed, S.S., Jahan, K., and Arefin, S. 2005. "Nutritional Status of Under Six Children in Bangladesh: Evidence Based From Nutrition Survey of Bangladesh, 1995- 96." *Jalalabad Medical Journal* 2: 17-19. [20]

Rahman, A., Chaudhury, S., Karim, A., and Ahmed, S. 2008. "Factors associated with nutritional status of children in Bangladesh: A multivariate analysis." *Demography India* 37(1): 95-109. [21]

Rao, V.G., Yadav, R., Dolla, C.K., Kumar, S., Bhondeley, M.K. & Ukey, M. 2005. "Undernutrition & childhood morbidities among tribal preschool children." *Indian J Med Res* 122: 43-47. [22]

Bhattacharyya, K. and Sarkar, T.K. 2010. "Nutritional Profile of Children Under 5 Years of Age in a Tribal Community in the District of Maldah, West Bengal." *Journal of Primary Care & Community Health* 23 Sept 1: 184. [23]

Chakraborty, S., Gupta, S.B., Chaturvedi, B., Chakraborty, S.K. 2006. "A Study of protein energy malnutrition (PEM) in children (0-6 years) in a rural population of Jhansi district (UP)." *Indian J Community Medicine.* 31:291-292. [24]

Tripathi, M.S. and Sharma, V. 2006. "Assessment of nutritional status of preschoolers in slum areas of Udaipur city." *Indian J Public Health* 50:33-34. [25]

Chirmulay, D. and Nisal, R. 1993. "Nutritional status of tribal under-5 children in Ahmadnagar district, Maharashtra in relation to weaning/ feeding practices." *Indian J Pediatr.* 30:215-222. [26]

Bisai, S., Ghosh, T., De, G. K., and Bose K. 2010. "Very High Prevalence of Thinness among Kora-Mudi Tribal Children of Paschim Medinipur District of West Bengal, India." *EJBS* 3 (1): 43-49. [27]

Rao, K.M., Laxmaiah, A., Venkaiah, K., and Brahmam, G.N. 2006. "Diet and nutritional status of adolescent tribal population in nine states of India." *Asia Pac J Clin Nutr* 15: 64-71. [28]

Rahman, M., Roy, S. K., Ali, M., Mitra, A. K., Alam, A. N. and Akbar M S. 1993 Maternal nutritional status as a determinant of child health. Journal of Tropical Pediatrics, 39: 86-89. [29]

Goodburn, E., Ebrahim, G.J., and Senapati, S. "Strategies of educated mothers use to ensure the health of their children." *Journal of Tropical Pediatrics* 36: 235-239. [30]

Bhuiya, A., Zamicki, S. and D'Souza, S. 1986. "Socioeconomic differentials in child nutrition and morbidity in a rural area of Bangladesh." *Journal of Tropical Pediatrics* 32: 17-23. [31]

Vir, S. C. and Nigam, A. K. 2001. "Nutritional Status of Children in the State of Uttar Pradesh – Programme Implications." *NFI Bulletin* 22:1. [32]

Roy, N. C. 2000. "Use of mid-upper arm circumference for evaluation of nutritional status of children and for identification of high-risk groups for malnutrition in rural Bangladesh." *Journal of Health, Population and Nutrition* 18(3): 171-180. [33]

Chowdhury, A. Y. and Bhuiya, A. 1993. "Effects of biosocial variables on changes in nutritional status of rural Bangladeshi children, pre and post monsoon flooding." *Journal of Biosocial Science* 25: 351-357. [34]