

Prevalence of Protein-calorie Malnutrition Among Tharu and Bote (Fisherman) Children: A Case Study of Chitwan District

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Protein-calorie malnutrition (PCM) is a serious problem prevalent among children under five years of age in Nepal. At least, 20 percent of Nepalese children die before reaching five years of age and the majority of these deaths are due to malnutrition.¹ The degree of PCM varies from mild to severe and its prevalence is widespread throughout the Kingdom of Nepal. It is reported that the PCM has affected more than 50 percent of the total child population and it has deprived children of their physical and mental potential.² The **National Nutrition Strategies** reports that-

Almost two thirds of the total population in the country under five years of age are affected with moderate to severe degrees of protein-calorie malnutrition.³

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This paper is based on the data the author collected for his Master's thesis in 1983.

1. National Nutrition Coordination Committee (National Nutrition Strategies (Kathmandu: Nutrition Section, Department of Health Services, 1978)
2. Bishnu Bhandari, Socio-economic Characteristics and Nutritional Status of Nepalese Children in Chitwan, Unpublished M. S. Thesis (University of Wisconsin, Madison) 1985
3. National Nutrition Coordination Committee (NNCC), National Nutrition Strategies (Kathmandu: Nutrition Section, Department of Health Services, 1978).

PCM, as the name itself donotes, is a deficiency disease caused by an inadequate intake of protein or calorie or both⁴ Gomez et al. were among the first to define malnutrition in terms of deficit in weight for age.⁵ Their classification is expressed as a percentage of the standard weight for a given age. Children above 90 percent of the standard are normal, those between 75 percent to 90 percent have first degree malnutrition, those between 60 to 75 percent have second degree malnutrition and those below 60 percent have third degree malnutrition.

In order to determine past (chronic) and present (acute) malnutrition, Waterlow developed a classification based on height for age and weight for height. This can be used as a basis for categorizing children normal, stunted (deficit in height for age), wasted (deficit in weight for height), or both wasted and stunted. He developed a simple 4-cell classification of nutritional status in terms of the percent of height for age and weight for height reference medians.⁷ The classification is diagrammatically presented below:

Simplified 4 cell Classification of Nutrition Status Weight for Height by Weight for Age.

Weight for Height	Height for Age (percent of Standard)	
	More than 80	Less than 80
More than 80	Normal to Mild	Stunting (chronic)
Less than 80	Wasting (acute)	Stunting & Wasting

Similarly, Jelliffe suggested that the status of children's nutrition in a community could be assessed by measurement of arm circumference, generally at the

4. L. S. Greene, *Malnutrition, Behavior, and Social Organisation*, Edited, (New York, Academic Press, 1977).
5. R. Gomez, Ramos, S, Frenk, J. Craviote, R. Chavez and J. Vazquez, "Mortality in Second Degree and Third Degree Malnutrition," *Journal of Tropical Pediatrics*, 1976, 2:77-83.
6. J. C. Waterlow, R. Buzina, W. Keller, J. M. Lane, M. Z. Nichaman and J. M. Tanner, "The Presentation and Use of Height and Weight Data for Comparing the Nutritional Status for Groups of Children under the Age of 10 years," *Bulletin of World Health Organisation*, 1977, Vol. 50 (4), : 489-498.
7. His Majesty's Government of Nepal, *Nepal Nutrition Status Survey*, Kathmandu, Nepal, 1976.

mid-point of the upper arm.⁸ Through the use of the mid-upper arm measurement (MUAC), it is possible to calculate the amount of body fat, the extent of muscle development and wasting. It has recently been considered as an alternative to the other anthropometric measurements of PCM as it is easy, convenient, and subject to little error under field conditions. According to MUAC index children above 80 percent of the standard are normal, those between 70 to 80 percent have mild PCM and those having less than 70 percent have severe PCM.

UNICEF/NEPAL has developed a plastic Arm Band tape to determine the nutritional status of children. This tape has been colored, like the traffic light, into green, yellow and red. According to the tape, green color indicates no PCM (normal), yellow color indicates that the child suffers from mild to severe malnutrition and red indicates that the child suffers from severe malnutrition.

The prevalence of malnutrition among children in Nepal varies from index to index and time to time.⁹ However, some major studies such as the *Nepal Nutrition Status Survey, 1975*, later published by Brink et al. reported that 50 percent of the sampled children suffered from second and third degree malnutrition.¹⁰ The survey, through the use of the Waterlow index showed 55 percent of the children suffered from stunting, wasting and concurrent stunting and wasting. These show that there is high prevalence of malnutrition among children in Nepal.

None of the studies have studied the magnitude of PCM prevalent among the children of different castes and tribes employing the indices such as Gomez, Waterlow and MUAC and the arm band tape developed by UNICEF/NEPAL. It is therefore proposed here to investigate the degree of protein-calorie malnutrition (PCM) prevalent among the Tharu and

8. E. F. Jelliffe and D. B. Jelliffe, "The Arm Circumference as a Public Index of Protein-Calorie Malnutrition of Early Childhood," *Journal of Tropical Pediatrics*, 1969, Vol. 15 (4).
9. R. J. Martorell, Leslie and P. Mock, "The characteristics and Determinants of Child Nutritional Status in Nepal," *The American Journal of Clinical Nutrition*, 1984, Vol. 39:79-84.
10. E. W. Brink, I. H. Khan; J. L. Splitter; N. W. Stachling; J. M. Lane and M. Z. Mehaman, "Nutritional Status of Children in Nepal," *The American Journal of Clinical Nutrition*, 1976 vol. 18:79-84.

Bote children under 6 years of age in the Chitwan District. The primary objective of this study is to compare the nutritional status of the Tharu and Bote Children with that of the children from other castes.

Materials and Methods:

The anthropometric measurements such as height, weight and arm circumference were taken from 358 children of one ward from Mangalpur and Patihani Village Panchayats in Chitwan district. In order to avoid the systematic sampling bias caused by the lack of a road map and an up-dated household census, all the children under 6 years of age were studied in the wards. The body weight of a child was taken by the Salter Hanging scale to the nearest five tenths of a kilogram. Similarly, heights were taken by a wooden scale to the nearest five tenths of a centimeter. The heights and weights were converted into The National Academy of Sciences (NAS) reference medians.¹¹ The plastic arm band tape developed by UNICEF/NEPAL was marked in centimeters for accuracy and the mid-upper arm was measured both in colors and centimeters. The measurements of arm circumferences were taken as accurately as possible to the nearest five-tenths of a centimeter. Simultaneously, other information related to socio-economic status of the household heads were also collected by the author.

Results and Discussion

The percentage distribution of children according to the Gomez Table 1, Percentage Distribution of Children by Caste by Weight for Age (Gomez Index).

Caste	Gomez Index				Total	N
	Normal	First Degree	Second Degree	Third Degree		
Tharu	16.7%	45.8%	37.5%	-	100	24
Bote	12.5%	31.3	43.8	12.5	100	32
Other Caste	14.9	35.0	39.4	10.6	100	302
Total	14.8	35.5	39.7	10.1	100	358

11 World Health Organisation, 1983. *Measuring Change in Nutritional Status*. Geneva.

classification is presented in Table 1. The Tharu children are slightly better off nutritionally and Bote children worse off. Even on the first, second and third degree malnutrition, the Bote children fare well behind the children from the Tharu and other castes/ethnic groups. Indeed, none of the Tharu children show third degree malnutrition.

Like the Gomez classification, the Waterlow index also indicates similar patterns of distribution of the children affected by malnutrition (see Table 2). Even the percentage of stunting, wasting and concurrently stunting and wasting children indicate that the severity of PCM is seen more in the Bote children. Thus, this index also indicates a high prevalence of PCM among the Bote children. Like in the Gomez classification, this index does not show any concurrent stunting and wasting in Tharu children, children from other castes are mediocre.

Table 2. Percentage Distribution of Children According to Caste by Waterlow Index.

Caste	Waterlow Index					N	
	Normal	Stunted	Wasted	Stunting & Wasting	Total		
Tharu	62.5%		29.2%	8.3%	—	100	24
Bote	21.9		53.1	15.6	9.4	100	32
Other Caste	40.3		43.4	11.6	4.7	100	302
Total	40.2		43.3	11.7	4.7	100	358

The result according to the MUAC index is presented in Table 3. The Table indicates similar patterns as shown by Gomez or Waterlow indices, where a higher percentage of Tharu children are nutritionally better off than the Bote children. However the table indicates that the trend in the distribution of the prevalence of mild malnutrition is a bit different where the percentage of Bote children suffering from mild malnutrition is 45.2 which is higher than that of the children from the Tharu castes but the percentage of the other caste children suffering from mild malnutrition is 49.3, which is the highest of all caste children.

Table 3: Percentage Distribution of Children According to Caste by MUAC Index.

Caste	MUAC Index				
	Normal	Mild	Severe	Total	N
Tharu	36.4%	40.9%	22.7%	100	22
Bote	9.7	45.2	45.2	100	31
Other Caste	20.7	49.3	30.0	100	280
Total	20.7	48.3	30.9	100	333

The measurements as shown by the Arm Band tape in colors are presented in Table 4. According to the Table, the percentage of children showing green color is highest (56.5%) among the Tharu children, second being the children of other castes at 37.2. The percentage of the Bote children is only 22.6. Thus, a higher percentage of the Tharu children are nutritionally better off. On the other hand, a higher percentage of the Bote children show yellow and red colors, second being the children from other castes.

Table 4: Percentage Distribution of Children According to Caste by Arm Band Tape color.

Caste	Arm Band color				
	Green	Yellow	Red	Total	N
Tharu	56.5%	17.4%	26.1%	100	23
Bote	22.6	35.5	41.9	100	31
Other Caste	37.2	33.0	29.8	100	285
Total	37.2	32.2	30.6	100	339

Malnutrition as related to geographical regions.

For convenience, the children have been categorized into three caste groups: Tharus, Botes and other castes. The Tharus and Botes who are homogeneous in nature are aborigines of Chitwan, whereas the other caste groups who are heterogeneous in nature are settlers migrated from hill districts of Nepal. Spatially speaking, the caste groups discussed here represent two

geographic regions of Nepal: Hill by migrants and inner Terai by natives. Compared to migrants' children, the prevalence of protein-calorie malnutrition is high on the Bote children but low on the Tharu children. In other words the migrant children are nutritionally better off than the Bote children, but worse off than the Tharu children. Although the nature of data collected here do not permit us to compare the occurrence of protein-calorie malnutrition prevalent in Terai and Hill regions of Nepal, findings suggest that among the natives and migrants engaged in agriculture the aboriginal Tharu children appear to be nutritionally better off than the migrants' children. In case of the native Botes, who are engaged in fishing occupation their children are nutritionally worse off than the migrants'.

Summary

This is an investigation of protein-calorie malnutrition (PCM) prevalent among the Tharu and Bote (fisherman) children under six years of age in two village panchayat wards of the Chitwan district in the Monsoon Season of 1983. Anthropometric measurements of 358 children were taken and the occurrence of PCM was calculated based on the standards developed by Gomez, Waterlow and MUAC (Mid upper arm circumference) classifications. Also the Arm Band Tape was used to find out colorcoded scheme on the arm circumference measurement. Our findings suggest that the Tharu children are nutritionally better off than the children from the Bote tribes and other castes. Of them, Bote children are worse off. The percentage of children suffering from PCM varies from 59.7 to 85.3 depending on the index used.

Conclusion and Policy Implication:

The above results indicate that nutritional status of children below five years of age is extremely poor. The data raise a number of questions that need to be answered with the utmost priority. The most important ones among them are: why are these percentages so high? Is it because rural children are really nutritionally worse off in Nepal, or that inappropriate indices are being employed to measure the extent of PCM prevalent in our children. Food habits, nutrient content in food and the linkages of PCM to socio-economic and spatial characteristics are other questions that are raised by these results.

Why is the nutritional status of the Bote children so low? Possible reasons

for this findings can be attributed to their occupations. Bote people fish as their primary occupation. They rise early in the morning to go fishing for the whole day and sell their catch in the evening in the local town to get cash, which is partly used for buying that day's ration of food and a large proportion of it is used to buy local liquor. Thus, a large proportion of their meagre income is spent, on the purchase of liquor and not on food for the family and kids. These persons might have caused a high prevalence of PCM among the children of the Bote tribes. The Tharu and other castes are directly or indirectly involved in farming. The Tharu are a hard working people, who spend a fairly large amount of their earnings on food, feast and festival even at the high cost of clothing. On the other hand, other caste people, who are migrants from the hill regions are involved in farming or businesses or other types of cash generating occupations. However, a concrete conclusion about the nutritional status of other caste children would not be possible from the results as the other categories are composed of heterogeneous populations of Brahmins, Chetry, Gurung, Magar etc, and show variations in their socio-economic characteristics.

Although the panchayat-wards selected were fairly representative of the Chitwan district still we cannot generalize the nutritional situation for the whole of Nepal. However, we can assert that a rehabilitative program to upgrade the nutritional situation of the Bote children is urgently needed. Also, it is suggested that His Majesty's Government pay a specific attention to lift this ethnic group out of their poverty cycle by adopting special programs, distribution of land to these groups and motivating them to farm, would be one way of alleviating their impoverished conditions. Thus, these two steps should be taken immediately both at national as well as grassroot level to rescue this tribe from this silent disease.