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Original Article

Maternal Education, Reported Morbidity and Number of Siblings are Associated with Malnutrition among Lodha Preschool Children of Paschim Medinipur, West Bengal, India

*Samiran Bisai[1], Dilip Mahalanabis[1], Amitava Sen[1], Kaushik Bose[2]

[1]Society for Applied Studies, Salt Lake, Kolkata, West Bengal, India.
[2]Department of Anthropology, Vidyasagar University, Midnapore, India.

Abstract

Introduction

Malnutrition among tribal preschool children is highly prevalent in almost all states of India and is the predisposing factor for morbidity as well as mortality. Aim of the study was to detect prevalence of malnutrition and their associated factors.

Materials and Methods

This cross-sectional study on 141 children aged 1-5 years , of Lodha tribal were included in the present study. Data was collected in pre-structured questionnaire, which included household socio-demographic data, morbidity status of child and anthropometric measurements like height, weight. Statistical analyses were undertaken using MedCalc statistical software.

Results

The overall prevalence of malnutrition in the form of underweight, stunting, wasting and overweight was 40.4%, 29.8%, 34.0%, 5.0%, respectively. According to the World Health Organization (WHO) classification of severity of malnutrition, the overall prevalence of underweight and wasting was very high, indicating a critical situation. The reported morbidity was 20.6% and majority of children suffered from diarrhoea (7.8%). The results revealed that morbidity status, number of sibling, mother literacy status had significant association on underweight more importantly ($P<0.05$**)**; rate of underweight was significantly higher among children who had reported morbidity, no of sibs 3 and above and or illiterate mothers. They had 3.7, 2.15 and 2.81 times greater risk of being underweight. Similarly, children having morbidity had more than 3 times greater chance of developing wasting.

Conclusion

The Lodha pre-school children were suffering from nutritional stress which was associated with reported morbidity, mother's lack of education and high number of siblings.

Key Words**:** Children, Lodha, Malnutrition, Morbidity, Preschool, Tribe.

Corresponding Author:

Dr. Samiran Bisai, Tribal Health Research Unit, Regional Medical Research Centre for Tribals, ICMR, Garha, Nagpur Road, Jabalpur, MP, 482003, India.
Email: sbisai@hotmail.com
Received date: Sep 28, 2014 ; Accepted date: Oct 12, 2014

Introduction

Malnutrition is a widespread nutritional disorder in developing countries. About 146 million children under five are underweight in the developing world and more than half of them live in South Asia including India. India has 49% underweight children, which share 39% of the world's underweight children. Numerically, 57 million children are underweight in India (1).

The rate of underweight among preschool children in West Bengal varies from 20% to 64% (2-7). These rates are higher in socially and economically vulnerable communities.

The tribal populations of India are recognized as socially and economically vulnerable (2-6), and majority of them reside in rural and inaccessible areas of the country.

Lodha is one such particularly vulnerable tribe (earlier known as primitive tribe), mostly found in Paschim Medinipur district of West Bengal, India. According to the latest census, the total tribal population in Paschim Medinipur district was 8,80,015, which constitute 14.9% of the district's total population (8). Out of them 51,772 were Lodha, which constitute about 5.88% of the total tribal population of the district. More than 96% of Lodha people reside in rural area of the district. Their mother tongue is Lodha, which is akin to Savara, an Austro-Asiatic language group (9). Traditionally, Lodhas are forest dwellers, but now they have started cultivation either as owner or as agricultural labourers and are also engaged in hunting and fishing. Their staple food is rice and they prefer to eat the meat of mollusc and the tortoise.

Anthropometry has become a practical tool for evaluating the nutritional status of populations, particularly of children in developing countries. Generally, three anthropometric indicators are often used to assess nutritional status during childhood: wasting (low weight-for-height), underweight (low weight-for-age) and stunting (low height-for-age) (10). Growth during childhood is widely used to assess adequate health, nutrition and development of children, and to estimate overall nutritional status as well as the health status of a population. Undernutrition is the most important cause of death in this age group in developing countries including India, where high rates of under five morbidity and mortality are present. Seven out of ten childhood deaths in India are due to respiratory infections, diarrhoea and malnutrition (11).

Early childhood malnutrition is a serious public health problem in India including West Bengal. There is inadequate data available on health and nutritional status among Lodha tribal children of West Bengal (2,12-14). Therefore, the present study was undertaken to report the prevalence of malnutrition in the form of underweight, stunting, wasting and their associated factors among Lodha preschool children in Paschim Medinipur district of West Bengal, India.

Materials and Methods

This community based cross sectional study was carried out in two villages namely Daharpur (Narayangarh) and Shyamraipur (Kharagpur-I) of Paschim Medinipur district, West Bengal during February to April, 2012. Villages were selected from two community development blocks (Narayangarh and Kharagpur-I) under Kharagpur subdivision of Paschim Medinipur district, West Bengal (Figure.1).

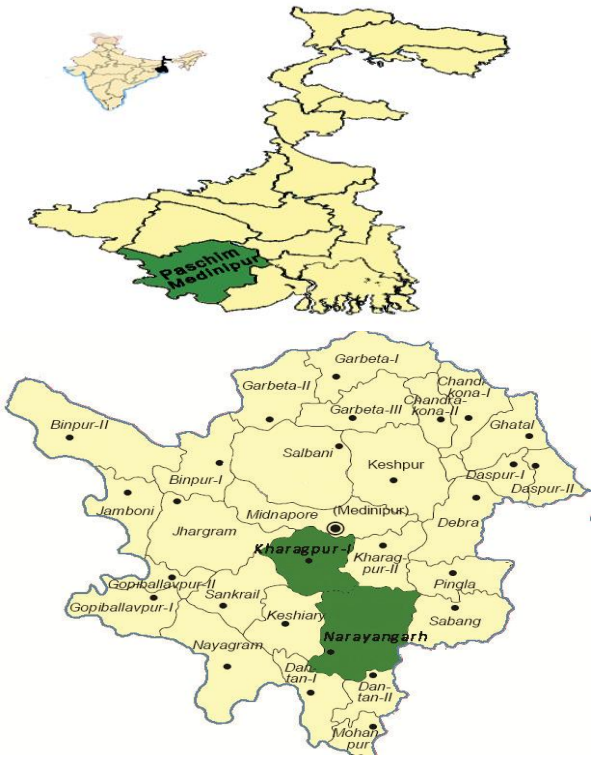

Fig.1: Map showing the study villages under community development block Narayangarh and Kharagpur-I.

A total of 141 (boys=67, girls=74) children aged 1-5 years were assessed from two villages. The estimated number of study subjects was calculated to be 137 by the formula: $n = (z^2 \times p \times q) / d^2$, where, z = 1.96 at 95% confidence interval, p is the prevalence of stunting (35%) among Lodha preschool children (2), q = 1- p and d is the desired precision (8%). Therefore, 141 individuals were selected following Probability proportional to size (PPS) sampling method. Parents were informed about the objectives of the study and their consent was obtained. The study protocol was approved by the institutional ethics committee.

All information such as on age, sex, height, weight and morbidity status (last two weeks prior to the survey date) of children along with household socio-economic and demographic profile was collected on a pre-tested questionnaire by house to house visit following interview and examination. Anthropometric measurements like height and weight were made and recorded by a trained investigator following the standard technique (15) using weighing scale and anthropometer to the nearest 0.1 kg and 0.1cm, respectively. Children were considered as underweight, stunted and wasted if their Weight-for-age (WAZ), Height-for-age (HAZ) and Weight-for height (WHZ) z-scores were below -2.0 SD of the World Health Organization (WHO) multicentre child growth reference (16). We followed the WHO (10) classification for assessing severity in malnutrition by rate prevalence ranges of these three indicators among children:

Classification assessment for severity of malnutrition by percentage prevalence ranges (10)

Classification	Low (%)	Medium %)	High (%)	Very high(%)
Underweight	<10	10-19	20 - 29	≥ 30
Stunting	<20	20-29	30 - 39	≥ 40
Wasting	<5	5-9	10 -14	≥ 15

Statistical analyses were undertaken using Med Calc statistical software. For anthropometric data, a software package based on WHO multicenter growth study database as provided by Emergency nutrition assessment (ENA for SMART 2011) software was used.

Student's t-test was undertaken to assess group differences in mean weight, height, WAZ and HAZ and WHZ scores. Two-way ANOVA analyses were undertaken to test for age-sex differences in mean weight and mean height. Proportion test was performed to test for differences in prevalence of underweight, stunting and wasting between sexes. Morbidity status (MS) of the children was categorized into the following two categories: yes and no. Number of sibs of the children (NS) was grouped in to two categories: Less than three sibs (<3 sibs) and three & above sibs (≥3 sibs). Similarly Maternal literacy status (MLS) was grouped in to two categories: illiterate and literate. Chi-

square tests were performed to evaluate the association between discrete variables. Logistic regression analyses (dependent=underweight, stunting and wasting status= yes/no) were performed separately with MS, NS, MLS as independent variables as well as together both MS and NS as independent variable. Significant level was set at ($p<0.05$).

Results

The age and sex specific means of weight and height were analysed. (Figures 2 and 3) show the age-sex distribution of mean body weight and height of the children studied. The increase in weight and height with advancing age was similar in boy and girls (Figure 2, 3).

The z-score for WHZ, WAZ and HAZ was calculated as against WHO recent child growth standard. Overall mean z-scores for WHZ, WAZ and HAZ was (-1.24 ± 1.91), (-1.65 ± 1.46) and (-1.40 ± 1.75), respectively.

Details age specific mean z-score for WHZ, WAZ and HAZ are shown in (Figure.4).

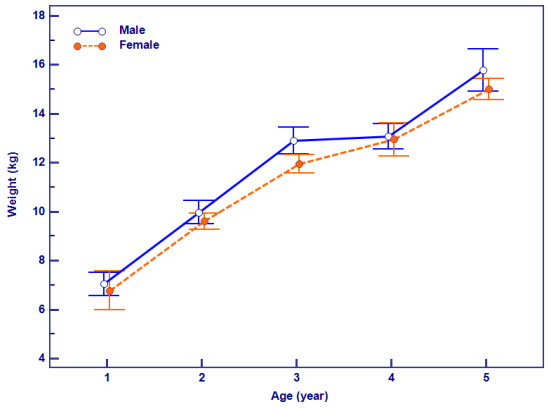

Fig. 2: Age-sex distribution of mean ± SE weight

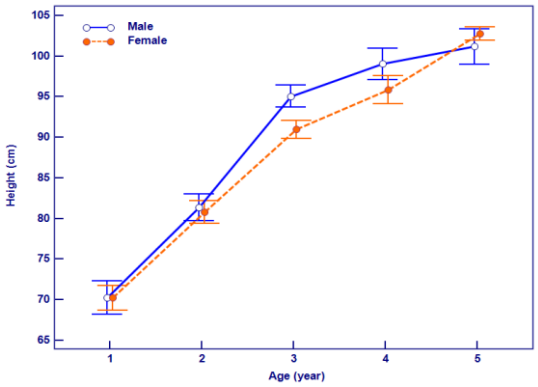

Fig.3: Age-sex distribution of mean ± SE height

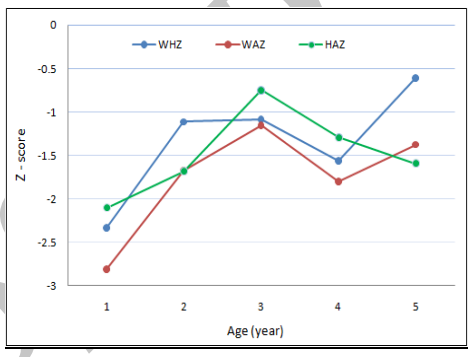

Fig.4: Age-wise distribution of mean WHZ, WAZ and HAZ scores

The overall prevalence of underweight, stunting, wasting and overweight was 40.4%, 29.8%, 34% and 5.0% respectively (Table.1).

The rate of underweight, stunting and wasting was higher among boys than in girls. However, the differences were not statistically significant ($P>0.05$). Age specific prevalence of undernutrition in the form of underweight, stunting and wasting is presented in (Figure.5).

It was observed that the rate of undernutrition was higher at the age of one year and it decreased with increasing age. However, the pattern showed that the lowest rate of under nutriton was noted at the age of three years.

Table 1: Nutritional status based on WAZ, HAZ, WHZ scores

Nutritional status	All n = 141	Boys n = 67	Girls n = 74	p-value
Underweight (WAZ-score <- 2 SD)	40.4 % (32.7 - 48.7)	43.3 % (32.1 - 55.2)	37.8 % (27.6 - 49.2)	0.62
Stunting (HAZ-score < - 2 SD)	29.8 % (22.9 - 37.8)	32.8 % (22.8 - 44.7)	27.0 % (18.2 - 38.1)	0.57
Wasting (WHZ-score < - 2 SD)	34.0 % (26.7 - 42.2)	37.3 % (26.7 - 49.3)	31.1 % (21.7 - 42.3)	0.61
Overweight /Obese (WHZ-score > 2 SD)	5.0 % (2.4 - 9.9)	6.0 % (2.3 - 14.4)	4.1 % (1.4 - 11.3)	0.89

Values are percentage and 95% confidence interval.

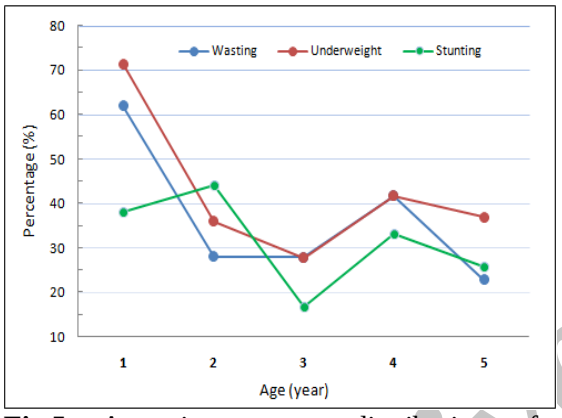

Fig.5: Age-wise percent distribution of wasting, underweight and stunting

Morbidity data were collected according to The overall prevalence of underweight, stunting, wasting and overweight was 40.4%, 29.8%, 34% and 5.0% respectively (Table.1).

The rate of underweight, stunting and wasting was higher among boys than in girls. However, the differences were not statistically significant (P>0.05). Age specific prevalence of undernutrition in the form of underweight, stunting and wasting is presented in (Figure.5).

It was observed that the rate of undernutrition was higher at the age of one year and it decreased with increasing age. However, the pattern showed that the lowest rate of under nutrition was noted at the age of three years.

, and it was found that a total of 20.6% children had suffered from morbidity in the last two weeks prior to survey. The major reported morbidity was diarrhoea followed by cough and fever (Figure.6).

Growth status of children were also analysed in relation to MS, MLS and NS. Results revealed that the mean WAZ ($t=2.75$, $p<0.01$) and WHZ ($t=2.55$, $p<0.05$) scores were significantly lower in children having reported morbidity than children with no reported morbidity (Figure.7).

Similarly, significantly lower mean WAZ ($t=2.77$, $p<0.01$) and WHZ ($t=2.77$, $p<0.005$) scores were found among children with illiterate mothers (Figure.8).

However, the lower mean WAZ, HAZ and WAZ scores were among children with number of sibs three and above, but the differences was not statistically significant (Figure.9).

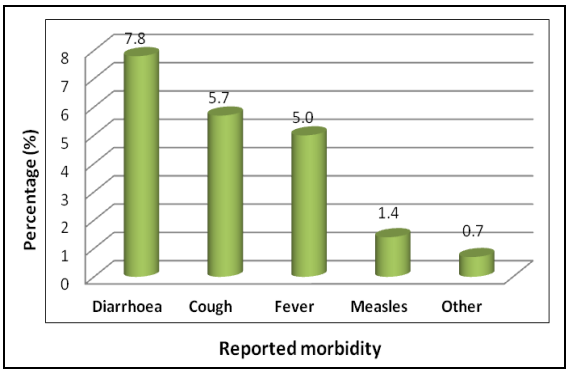

Fig.6: Prevalence of reported morbidity of Lodha preschool children

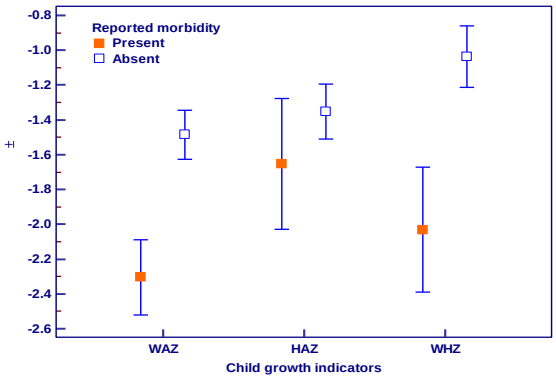

Fig.7: Differences of mean WHZ, WAZ and HAZ scores by morbidity status

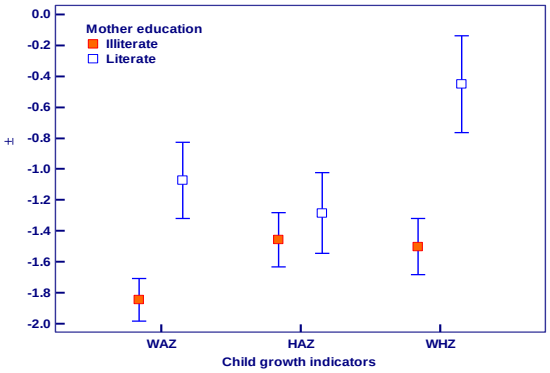

Fig.8: Differences of mean WHZ, WAZ and HAZ scores by mother's education

A separate logistic regression analysis was undertaken with underweight, stunting and wasting as dependent variables and MS, NS, MLS as independent variables (Table.2).

The results revealed that MS (Wald=8.89, p<0.01), NS (Wald=4.76, p<0.05), MLS (Wald=9.42, p<0.01) had significant impact on underweight. However, the MS had significant positive impact on child wasting (Wald=6.89, p<0.01).

The rate of underweight was significantly higher among children who had reported morbidity, number of sibs 3 and above and their mother was illiterate.

They had 3.7 (95% Confidence interval (CI): 1.57-8.74), 2.15 (95% CI: 1.08-4.28) and 2.81 (95%CI: 1.11-7.10) times greater risk for developing underweight. Similarly, children having morbidity had more than 3 (95% CI: 1.33-7.12) times greater chance of developing wasting.

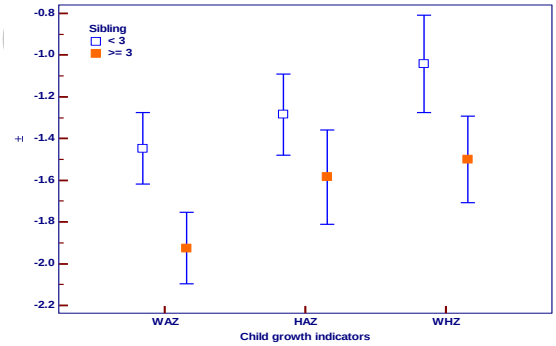

Fig.9: Differences of mean WHZ, WAZ and HAZ scores by number of sibling

Table 2: Logistic regression analyses in relation of mother education, reported morbidity and number of siblings with malnutrition

Independent Variable	Under weight	OR (95% CI)	Stunting	OR (95% CI)	Wasting	OR (95% CI)
Mother's education						
Illiterate	51 (48.1)	2.81* (1.11-7.10)	37 (34.9)	2.44 (0.89-6.70)	40 (37.7)	1.65 (0.70-3.86)
Literate	6 (17.1)	1.00	5 (14.3)	1.00	8 (22.9)	1.00
No. of sibling						
≥ 3	31 (50.8)	2.15* (1.08-4.28)	18 (29.5)	1.02 (0.49-2.12)	25 (40.9)	1.72 (0.85-3.48)
< 3	26 (32.5)	1.00	24 (30.0)	1.00	23 (28.8)	1.00
Reported morbidity						
Present	19 (65.5)	3.7** (1.57-8.74)	10 (34.5)	1.32 (0.55-3.14)	16 (55.2)	3.08** (1.33-7.12)
Absent	38 (33.9)	1.00	32 (28.6)	1.00	32 (28.6)	1.00

Significant level: *p<0.05, **p<0.01

Discussion

Malnutrition is the underlying cause of more than half of all deaths in children under five years worldwide. About 80% of malnourished children live in Asia, 15% in Africa, and only about 5% in Latin America. Most countries in Asia have high to very high level of malnutrition (underweight, stunting and wasting), the prevalence being far higher in Southern Asia. South-eastern Asia ranks second in the descending order of prevalence of underweight and third for wasting and stunting. According to the WHO Health statistics in 2012 for India, the proportion of underweight was 43.5% and stunting was 47.9%. Earlier nationwide survey documented, 54.5% of tribal children in India were underweight, 53.9% were stunted and 27.6% were wasted (17). In West Bengal, the corresponding rates were 59.7%, 58.6% and 20.7%, respectively (18). In the present study, the overall prevalence of malnutrition in the form of underweight, stunting, wasting and overweight was 40.4%, 29.8%, 34.0% and 5.0%, respectively. According to the WHO (10) classification of severity in malnutrition, the overall prevalence of underweight and wasting was very high, indicating a critical situation.

The prevalence of underweight is less in the present study as compared to some others where 61.7% of Kora-Mudi (4), 61.5% of Munda and Oraon(5), 61.4% of Lodha (12), and 63.9% of Santal(6) tribal children were found to be underweight. A survey conducted among Lodhas from January-March 2008 in Paschim Medinipur district had also shown 30% under 5 children to be having moderate underweight and 20% as severe underweight, which is also higher than the present study (2).

As reported in previous studies (2,4), our study found that boys were more likely to suffer from undernutrition than girls. This could be due to increased nutritional needs among boys or the influences of early childhood diseases in boys (19).

It has been well documented that mother's education has a direct impact on the nutritional status of the children (17, 20). This finding is similar to the results of the present study where high degree of child undernutrition exists among this group. A study reported that significantly more than half (59%) the children of illiterate mothers as compared to children of literate mothers were undernourished (20). It is well known that literate mothers adopt many improved behaviours related to maternal and child health care, feeding and eating practices which result into a healthy nutritional status of the children (21).

The presence of sibling in a family has a significant and negative impact on the rate of child underweight (7, 22). It is evident that the presence of siblings in a family decreases the resource allocation among the siblings (23, 24). A study from rural Guatemala found that children living in a household with four or more siblings had more chances to be stunted than children living in a family with fewer siblings (25). Our results are thus supported by previous studies, where living with many siblings has been shown to be associated with the nutritional status of children (22, 25). The possible explanation for such a relationship may be understood through the 'dilution effect' factor (22). This effect is apparently due to the presence of more siblings in the household, which affects intra-household food allocation, and owing to cultural norms about feeding practices, in most cases the youngest child in the household, are deprived from optimum nutrient intake. These nutrient insufficiencies are mainly reflected through the high prevalence of underweight (4). Underweight is used as a composite indicator to reflect both acute and chronic under nutrition (10).

One of the limitations of our study was that detailed information on socio-

economic conditions was not considered. Future investigations should lay more emphasis on these and other associated socio-demographic variables of undernutrition. Such studies would generate very useful information on factors associated with undernutrition. Results of these future studies would be very useful for the effective formulation of health and nutritional promotion and intervention programmes with the objective of reducing preschool undernutrition. In conclusion, our study demonstrated that the Lodha pre-school children were suffering from nutritional stress, which was associated with reported morbidity, mother's lack of education and high number of siblings. Appropriate effective measures should be under taken to reduce this high rate of under nutrition.

Conflict of interest: None

Acknowledgment

The authors sincerely acknowledge the support extended by Dr. Neeru Singh, Director, Regional Medical Research Centre for Tribals (ICMR), Jabalpur for providing the facilities.

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