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Prevalence of undernutrition among musahar children aged between 12 to 59months in urban siraha district, Nepal

Abstract

Childhood is the most vulnerable phase in the life of human being; nutritional inadequacies result in hampering the growth of the body and mind. Musahar community are most deprived and fall under untouchable caste among Hindu caste hairarchy system. Descriptive cross- sectional study was conducted to assess nutritional status of under-five age children of musahar community of urban Siraha District, Nepal. Simple random sampling technique was adopted to select children for the assessment. A structured questionnaire was used to collect data from 255 children paired with their mothers. Anthropometric measurements and basic associated factors were collected. SPSS version 16.0 and WHO Anthro 3.2.2 version were used for data analysis. Bivariate and multivariate logistic regression analyses were conducted to assess factors associated to nutritional status of children. Statistical association was declared. Out of 255 musahar children, 47%, 36% and 21% of them were stunted, underweight, and wasted respectively. All three types of undernutrition were prevalence among 10% of total children. According to WHO Classification for assessing severity of malnutrition by prevalence ranges among children under-five years of age, the stunting, wasting and underweight rate were classified as very high. The study found significant difference in stunting with sex, socioeconomic status and age of child where as wasting was not found statistically significant with sex of the children. Musahar community had 65% children who had at least one kind of under-nutrition. Out of them, nearly half children were in critical condition (below -3SD) and they need immediate intervention. Key Words: Stunting, wasting, underweight, Musahar community.

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Introduction

Undernutrition among children is a key public health problem in developing countries including Nepal.[1–3] More than 26,000 under-five children die around the world each day mostly conditions due to escapable causes. Nearly all of them live in developing countries or, more specifically in 60 developing countries.[4] Every year 7.6million under-five children die such preventable malnutrition and its related causes. Similarly, next prevalent cause of under-five mortality is low birth weight which leads to the intergeneration cycle of malnutrition especially in female.[5,6] A child's entire life is determined in huge measures by the food given to him during his first five years. Childhood is a period of fast growth and development, and nutrition is one of the influencing factors in this period.[7]

If we look at information from Nepal Demographic and Health Survey (NDHS) 2001, the percent prevalence for underweight and wasted children of under-five years of age are 48.3 and 9.6%.[8] Around 50% of the under five children are stunted[8] and NDHS 2006 reveals that the percent prevalence for underweight and wasted children of under five years of age are 39% and 13%.[9] Forty nine percent of the under five children are stunted.[9] Similarly, NDHS 2011 shows that the percent prevalence for stunting, underweight and wasting children for under five years of age are 41%, 29% and 11% respectively.[10] Looking at these figures we can say that rapid decline is not observed in wasting and slight decline in underweight and stunting can be seen.

Childhood undernutrition existed in various degrees in different ecological zones and developmental regions of Nepal. Various factors may play the role of predictor variables while explaining the state of undernutrition. Based on the Human Development Index (HDI) Siraha district was found average level of other plain districts of Nepal.[11]

The Musahar community, in Terai Nepal, is socially and economically one of the most marginalized communities in Nepal and they are poorest amongst poor. The Musahar community falls under the category of the Dalit. The Musahars, they are famous as named by "rat eaters". It is considered the worse of the Dalit groups, the untouchables, which are the most segregated communities in Nepal. They are discriminated for their skin colour, religion, and traditions. They belongs the Hindu religion. Considering the low progress of health and socio-economic indicators, this community was selected for the study. This study was focused to assess the nutritional status of under-five (12-59) months children and to find out the factors associated with childhood undernutrition.

Methods

The present study was a community based cross sectional study carried out in urban Siraha district of Nepal among children aged 12-59months from January to April 2016 in Musahar community. Ethical approval was taken from Institutional Ethics Committee, K.S. Hegde Medical Academy, Nitte University, India.[12] Written consent was obtained from each respondent after explaining the objectives and methods of the study. Children aged between 12 to 59months and who belongs to Musahar community was included and Child with physical disability, ill, not staying with mothers and absent during the visit were excluded from the study. The objectives of the study was

to assess the nutritional status of children aged 12-59months and to identify the factors associated with the nutritional status of the above study population. Considering the prevalence of under nutrition as 50% with 95% confidence interval and a 5% margin of error, sample size for the study was calculated by using cross sectional formula for finite population.[13]

$$n=NZ^2P(1-P)d^2(N-1)+Z^2P(1-P) \text{ where } N=746$$

Total calculated sample size was 254. Simple random sampling method was applied to identify the required sample size. Out of all urban areas (Lahan municipality, Asanpur Golbazar municipality, Mirchaiya municipality and Siraha municipality) of Siraha district: first of all, the list of children name having aged 12-59months was taken from Female Community Health Volunteers (FCHV). Total numbers of children having aged 12-59months were 746. Random numbers were generated in Microsoft Excel the sample was obtained, after which those children were located with the assistance and details provided by the Female community health volunteers (FCHV).

A pre-tested semi structured questionnaire was used for collecting data from mother regarding socio-economic status, demographic information, health seeking practice, feeding practices and knowledge. Anthropometric data of the children was collected using standard instruments such as infantometer, stadiometer, weighing scale, and MUAC measuring tape. Pretesting was done in 25 samples in Lahan Municipality in Musahar community and some modification on question order and necessary filter options were added to the questionnaire. Questionnaire was translated in to local language

Weight measurement

The weight was taken using a digital weighing scale (UNICEF No.S0141021) and recorded to the nearest 0.01kg. The scales were checked for accuracy before taken to the field.

Height measurement

The children height and length was measured with a Stadiometer (UNICEF No.S0114520) and Infantometer (UNICEF No.S0114530) respectively and was recorded to the nearest 0.1cm. The length was taken in a lying position for less than 25months children and height was taken in standing position for more than 24months children. All children were measured barefoot, and without caps or hairdo.

Mid upper arm circumference (MUAC)

MUAC was measured in centimetres, to the nearest 0.1cm, using standard UNICEF MUAC measuring tapes (UNICEF No.S0145620). For malnutrition cases found: Each child that was found with severe acute malnutrition (<115mm MUAC) was referred to the closest health facility or to the FCHV.

Age

An event calendar was used to state the age as accurate as possible. Age was written down with "day/month/year" and "age in months". The Nepali date was converted into English date. Analysis was carried out at three levels. Data entry was done in Microsoft excel. Calculation of z-score was done by using software WHO ANTHRO v3.2.2. Further data analysis was done by using SPSS 16.0 software.

a. Univariate Analysis: descriptive analysis for all predictors and outcome variables.

b. Bivariate Analysis: Chi square test was used to find association between predictors and outcome variables.

c. Multivariate Analysis: the significant variables (p-value<0.05) observed in bivariate analysis were included in multivariate analysis.

Logistic regression model was applied to examine independent associations between explanatory variables and binary dependent variables. Chi-square test was applied to test the logistic regression model for goodness of fit.

For validation of this study, Relevant questionnaire was taken from NDHS for developing questionnaire based on study objectives and variables, using related and relevant available standard questionnaire with necessary modification in the local context. Age of child was calculated by using their date of birth date. Birth date was asked with mother and verified cross checking with immunization if it is available.

For reliability of this study, Data collected with the support from the community health workers. Weighing machine was checked frequently every fifth child by using 2kg standard weight. Data was checked for errors and omissions on same day in the field and the consistency of data was maintained.

Results

Total 255 samples were collected for the study. Final analysis carried out on 255 samples. This represents 100% sample coverage. Table 1 shows the mean weight of children is 12kg with 2.89 SD. Minimum and maximum weight is 6kg and 19kg respectively, with a range of 13. The mean height of children is 91cm with 10.61 SD. Minimum and maximum height is 55cm to 108cm with a range of 53. Mean age of children is 35months with 14.05 SD. Minimum and maximum age is 12months to 59months with a range of 47.

Table 1 According to NDHS, prevalence of under-nutrition in Nepal

	Undernutrition Status		
	Stunting (%)	Underweight (%)	Wasting (%)
NDHS 2001	50	48.3	9.6
NDHS 2006	49	39	13
NDHS 2011	41	29	11

In order to scrutinize the prevalence of child malnutrition, weight-for-height Z-score (WHZ), weight-for-age Z-score (WAZ), and height-for-age Z-score (HAZ) were used. The result of the survey proved that out of 255 children under-five (12-59)months of age, 21%, 36%, and 47% were malnourished as measured by WHZ (wasting), WAZ (underweight), and HAZ (stunting) scores, respectively (Table 2). Whereas the prevalence of severe wasting, severe underweight and severe stunting were found to be 9%, 12% and 20% respectively. The average height-for-age Z-scores, weight-for-height Z-score and weight-for-age Z-score for the children are -1.52, -0.36 and -1.1 respectively (Table 3).

Similarly underweight or wasting is 40%, stunting or wasting were 57% and stunting and underweight were 60%. At least one of undernutrition children was 65%. Only underweight, only stunting and only wasting children were 7%, 24% and 4% respectively. 16%, 22% and 11% children were under the both undernutrition indicators (underweight & wasting), (underweight & wasting) and (wasting & stunting) respectively and 10% of children were found under the all undernutrition indicators (Underweight & Stunting & Wasting). Normal children were found 35% who were not under the any of the undernutrition indicators.

Table 2 Frequency distribution of weight, height and age (N=255)

Statistics	Weight in KG	Height/Length in CM	Age in month
Mean	12	91	35
Std. Deviation	2.89	10.61	14.05
Range	13	53	47
Minimum	6	55	12
Maximum	19	108	59

Table 3 Distribution of children, according to WHO classification of malnutrition (N=255)

Types	Severe		Moderate		Total		Mean Z score	
	N	%	N	%	N	%	N	%
Wasted (<-2SD)	23	9	31	12	54	21	-0.36±1.88	
Stunted (<-2SD)	51	20	68	27	119	47	-1.52±1.74	
Underweight (<-2SD)	31	12	60	24	91	36	-1.1±1.41	

Prevalence of under-nutrition according to MUAC measurement shows that higher proportion 14% (n=36) of children had severe malnutrition, and nearly 6% children had moderate malnutrition whereas 11.5cm cut off point for severe malnutrition. The bivariate analysis was carried out for the socio-demographic variables, educational and occupational status, health service utilization, feeding practice and morbidity against the major malnutrition indicators i.e. stunting, wasting and underweight. It is evident from the calculation that there is no significance obtained for the indicator-underweight against any of the above mentioned variables. Hence the bivariate analysis for only the stunting and wasting indicator are described below (Table 4).

From the Table 4, it is clearly evident that there is a significant association found among the sex, age of the child and monthly income of family with respect to stunting. Female children are 1.316 [COR, 0.807-2.146] times lesser risk than males for stunting. Aged of 24 to 36months of children is 2.19 [COR, 1.08 - 4.451] times less risk for stunting than less than 24months children. In the case of monthly income, NRs 11 to 15 thousand earning families are 0.419 [COR, 0.218 - 0.804] and more than 19 thousand earning families are 0.466 [COR, 0.229 - 0.948] times high risk for stunting than those earning less than 11 thousand NRs per months. Those children whose father's having international employment are at 0.062 [COR, 0.005-0.76] time's high risk for stunting than formal employment. Children born through assisted type of delivery are 0.222 [COR, 0.060 - 0.816] times

high risk for stunting with respect to normal delivery.

Sex of the child had a significant association with wasting. Female prevalence of wasting is more than that in male, prevalence of wasting is 14% in male and 40% in female. Female children are 0.43[COR, 0.221-0.843] times high than males for wasting.

For multi-variate analysis only the indicator stunting was considered. The factors which are considered for analysis are Gender, age of the child, monthly income of family, father's occupation and type of delivery. Underweight and wasting indicators were not considered as there were no statistically significant values obtained (Table 5).

The table is obtained by using binary logistic regression model for multivariate analysis. Adjusted odds ration statistically significant for 24 to 36 age group, formal employment and farmer of child's father occupation, and normal and caesarean type of delivery of child in prevalence of stunting. Age group 24 to 36months children were found 0.25 [OR, 0.111 - 0.561] times high risk for stunting than 48 to 60 age group children. Similarly International employed father's children were found 0.092 [AOR, 0.010 - 0.857] times and 0.033 [AOR, 0.002 - 0.515] times less risk for stunting than farmer and formal employment fathers child. And Assisted born children were found 0.069 [AOR, 0.007 - 0.660] times and 0.18 [AOR, 0.043 - 0.752] times less rick for stunting than caesarean and normal children respectively.

Table 4 Stunting among under five children according to various variables (N=255)

Determinants	Stunting	%	Chi- square value	P-value	COR 95% for CI
Sex					
Male (104)	57	54.8			1
Female (151)	62	41.06	4.677	0.031*	1.316 [0.807-2.146]
Age of the Child					
< 24months (64)	31	48.43			1
24 to 36months (70)	21	30			2.19 [1.08-4.451]
36 to 48months (65)	36	55	11.577	0.009*	0.757 [0.379 -1.512]
48 to 60months (56)	31	55			0.758 [0.369 -1.556]
Monthly income of family in thousand					
Less than 11 (75)	25	33			1
11 to 15 (79)	43	54			0.419 [0.218-0.804]
15 to 19 (45)	22	49	7.949	0.047*	0.523 [0.245-1.114]
More than 19 (56)	29	52			0.466 [0.229-0.948]
Father's Occupation					
Formal employment (9)	3	33			1
Daily labour (101)	45	44.5			0.622 [0.147-2.627]
Self Employment/business (15)	10	44.5	10.08	0.039*	0.25 [0.43 -1.443]
Farmer (121)	53	43.8			0.643 [0.153-2.685]
International Employment (9)	8	88			0.062 [0.005-0.76]
Type of Delivery					
Normal (234)	105	44.87			1
Caesarean (7)	3	42.8	6.069	0.048*	1.085 [0.238-4.957]
Assisted (14)	11	78.57			0.222 [0.060-0.816]

*Significant, COR, crude odds ratio; CI, confidence interval

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Table 5 Binary logistic regression model for demographic variables for Stunting

AOR, adjusted odds ratio; CI, confidence interval *Significant

Determinants	Percent	P- value	AOR (CI-95%)
Sex			
Male (104)	54.8	0.056	1.733 [0.986-3.045]
Female(151)	41.06		1
Age of the child			
< 24months (64)	48.43	0.131	0.545 [0.247-1.199]
24 to 36months (70)	30	0.001*	0.250 [0.111-0.561]
36 to 48months (65)	55	0.599	0.812 [0.375-1.761]
48 to 60months (56)	55		1
Monthly income of family in thousand			
Less than 11(75)	33	0.104	0.485 [0.203-1.160]
11 to 15 (79)	54	0.384	1.421 [0.644- 3.137]
15 to 19 (45)	49	0.933	0.963 [0.40-2.321]
More than 19 (56)	52		1
Father's occupation			
Formal employment (9)	33	0.015*	0.033 [0.002-0.515]
Daily labour (101)	44.5	0.66	0.118 [0.012-1.154]
Self Employment/business (15)	44.5	0.327	0.280 [0.022-3.559]
Farmer (121)	43.8	0.036*	0.092 [0.010-0.857]
International Employment (9)	88		1
Type of delivery			
Normal (234)	44.87	0.019*	0.18 [0.043-0.752]
Caesarean (7)	42.8	0.02*	0.069 [0.007-0.660]
Assisted (14)	78.57		1

Discussion

This study was carried out to find the proportion of under-nutrition and associated factors in children aged 12 to 59months in Musahar community of urban Siraha district of Nepal. Here prevalence of malnutrition was to be found in three major indicators of malnutrition on basis of Z score of Height for age, Weight for height, Weight for age indicate as stunting, wasting, and underweight respectively. The major findings of the study are discussed here briefly.

In present study prevalence of stunting, wasting and underweight among under-five year children has been found 47, 21, and 36 percent respectively. This present study shows higher prevalence of stunting, wasting, and underweight than NDHS 2011 (41%, 11%, and 29% respectively).[10] Similar study in central rural Terai region, Nepal by Yadav[13] has shown lower prevalence than this study where wasting,

stunting and underweight of children less than 3years was 31.1%, 42.3%and 45% respectively except stunting.[14]

This study found that the prevalence of severe wasted and wasted were 9% and 12% respectively which are higher prevalence in severe wasting and wasting than the Eastern Terai that severely wasted and wasted among the children were 2.2% and 10.3% respectively reported in NDHS, 2011.[10] Present study revealed that prevalence of severe stunting and stunting status of children were 20% and 27% which are higher prevalence of severe stunting, among the children in Eastern Terai that are 10.5% and 31.4% respectively reported in NDHS, 2011.[10] This Study found that prevalence of severely underweight and underweight in children were 12% and 24% which are greater than that in eastern terai region where it is 5.6% and 24% respectively as reported in NDHS, 2011.[10]

The present study showed the higher prevalence of undernutrition was in female children (16% wasted, 24% stunted and 22% underweight) as compared to male children (6% wasted, 22% stunted, and 13% underweight). The different result was shown in NDHS 2011 where male versus female was (12% wasted, 41% stunted, and 30% underweight verses 10% wasted, 40% stunted, and 28% underweight in males and females respectively).[10] However, the prevalence of stunting was higher among the females than in males. Similar finding was obtained from the survey done among less than 5years old Burmese refugee children, in Thailand.[15]

Prevalence of stunting was found high among the children whose mother had more children. This might be because in such family having many children there is partition of food, and all the children do not get equal attention and care. Colostrum feeding is one of the important determinants of nutritional status. But in this study no significant association was found between the colostrum feeding and nutritional status of the children. However, the relationship between colostrum feeding and underweight status was nearly significant as p-value obtained was 0.053.

No association was found between the type of family, number of children, PNC, ANC and nutritional status of the children. However, the prevalence of malnourished children was found highest among the joint family as there was greater numbers of joint family children in the sample size.

The multivariate results revealed that 24 to 36months of age children's nutrition was better for the nutritional status of children than the 48 to 59months of age children. Higher the age of children significantly reduced the risk of stunting. The occupation of child's father independently influenced the nutritional status of children. The results of multiple linear regression showed that international employment can reduce 9% of stunting in children than the children whose father is a farmer.

The present study found that percentage who initiated breastfeeding within one hour of birth (58.3%) was higher to previous findings from the Eastern Terai (46.8%) and national level (44.5%).[10] The proportion of mothers who initiated breastfeeding within one hour of birth was higher in the present study compared to studies from Asia (31%) and Africa (47%).[16] In a country, where undernutrition is high, appropriate breastfeeding practices are especially important. There are several possible explanations for high levels of breastfeeding and exclusive breastfeeding in Nepal. First, high levels of breastfed children might be due to public campaigns which aim to educate the mothers about infant and young child feeding practices. Second, mothers might be knowledgeable about child care because they have visited the Female Community Health Volunteers (FCHVs) or other health services. The FCHVs supports the women during pregnancy and gives advice about child health.[10] Third reason being women decides to breastfeed because it is culturally accepted and valued. A survey from Makwanpur district in Nepal found that grandmothers supported early initiation of breastfeeding.[17] At last, lack of money might encourage the mother to breastfeed the child because she cannot find any other way to feed the child.

Some of the findings of this study cannot be generalized to the mountainous and Terai (plain land) regions of Nepal due to socio-economic and cultural differences between them. The socio-economic status of the people in our study area is worse than that of other parts of Nepal therefore the prevalence of malnutrition among these group would be high than that expected in other areas of the country.

Conclusion

This study demonstrated that undernutrition continues to be a serious problem in the Musahar community. At least suffered from one of undernutrition children were 65% where as the 10% children were suffered from all three undernutrition. According to Classification for assessing severity of malnutrition by prevalence ranges among children under 5years of age, the stunting, wasting and underweight rate were classified as very high.[17] Stunting and underweight increased with age. The difference in sex was found in stunting where boys had higher chance of being stunting than the girls among 24-36month aged child. Child's father occupation played an important role in lowering the risk of chronic malnutrition (stunting) and underweight status among the children of less than 5years of age group. The result of this study indicated that the children of less than 24months had 2.19 times higher risk of suffering from chronic malnutrition (stunting).

This study has limitation of being representative of only urban Siraha district area and hence cannot be generalized for the entire population.

Acknowledgements

Conflict of interest

The author declares no conflict of interest.

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