Original Article

Prevalence of Protein-Energy Malnutrition among Under-five Dalit Children in Selected VDCs of Morang District

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ABSTRACT

Background: The degree and distribution of malnutrition depends on several factors; political and economic situation, education, environment, food pattern, cultural believes, etc. Dalits are the people who are religiously, culturally, socially and economically oppressed, excluded and treated as untouchables; and they belong to different geographical region, language, culture and castes. Therefore, their children are more prone to poor health and various kinds of diseases including malnutrition. So, the present study aimed to assess the prevalence of Protein Energy Malnutrition (PEM) among under-five dalit children and the factors associated with it.

Methods: Descriptive cross-sectional study was conducted among 238 under-five dalit children in four selected VDCs of Morang District using cluster sampling technique. Data were collected using interview schedule and anthropometric measurements. Data analysis was done using statistical Package for social sciences (SPSS) version 11.5.

Results: Out of 238 children, one-fourth of them belong to age group 12-23 months and more than half (52.9%) were male. The prevalence of PEM was assessed in terms of underweight, stunting and wasting and was found to be 16.8%, 11.3% and 14.7% respectively. Underweight was found to be statistically significant with father's educational level and antenatal care visit of the mother. Stunting was found to be statistically significant with mother's occupation and wasting was found to be significant with age of the child, type of family, weaning and distance of the health facility.

Conclusion: Prevalence of Protein-energy malnutrition was found to be higher in those children with nuclear family, illiterate parents, poor antenatal care, delayed weaning practices and availability of health facility.

Keywords: Protein-Energy Malnutrition, Under-five, Dalit Children

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INTRODUCTION

Malnutrition accounts for at least half of all childhood death worldwide. Despite of the economic development, childhood malnutrition still remains a significant public health problem in developing countries.[1] Worldwide 156 million children under-five are stunted and 50 million are wasted. More than half of all stunted and more than two thirds of all the wasted children under-five lived in Asia.[2] Seventy to eighty percentage of undernourished children worldwide live in lower- and middle-income countries, including Nepal.[3]

Nepal ranks 3rd in terms of poor nutrition among the 12 countries of South Asia. Malnutrition contributes to around 56% child deaths in Nepal and it is associated with many of the risk factors for maternal death.[4] In 2011, forty-one percentage of children under five in Nepal were stunted, 11% were wasted, and 29% were underweight, while in 2016 the prevalence of stunting, wasting and underweight are 36%, 10% and 27% respectively.[5-6] Though there is decrease in the rate of prevalence of malnutrition, there is long way to go to achieve Sustainable Development Goals.[7,8] The proportion of underweight and stunting is slightly higher for Dalit children than non-Dalit in Nepal.[9]

Dalits are the people who are religiously, culturally, socially, economically and historically oppressed, excluded and treated as untouchables. They are the most vulnerable group for malnutrition including PEM due to their living conditions, cultural practices, nutritional status, economic condition, etc. The exclusions and discrimination experienced by dalits in Terai region is even worse than that in hilly region. Among terai dalits, *dom* and *musahar* community have the worst situation.[9-10] Infant mortality (116.5 per 1000 live births) and under-five mortality (171.2 per 1000) among dalit is much higher compared to the national average of 75.2 and 104.8 per 1000 respectively.[9,11] In order to bring decrement in the morbidity and mortality rate, it is necessary to prevent and treat the causes.

Early diagnosis of protein energy malnutrition will prevent complications from occurring in children. However, there is very little evidence of early and precise diagnosis of PEM among the children of Dalit family in Morang district. Therefore, the current study aims to assess the prevalence of protein energy malnutrition among Dalit children.

MATERIALS AND METHODS

A descriptive cross sectional study design was adopted to carry out this study from August 2015 to September 2016 in four selected Village Development Committees (VDCs) of Morang District.

Sample size was calculated by using the formula; $n = 4pq/L^2$ (Cochran, 1963), assuming 41% prevalence of stunted children with reference to Nepal Demographic Health Survey (NDHS, 2011) report.[5] Since cluster sampling was used in the study and as the individuals living in the same area tend to share similar characteristics (design effect), the sample size, as determined above, was multiplied by 1.5. Assuming 10% non-response rate, the required sample size was 238. Children from 4 VDCs of Morang District were selected as study participant. Dalit children, more than equals to 6 months and less than 60 months, whose parents were willing to give consent were included in the study. While, under-five dalit children who were physically disabled and whose height and weight could not be measured were excluded from the study.

Four Village Development Committees (VDCs) of Morang District were selected as four clusters

namely Bahuni, Dangihat, Banigama and Jhorahat, as these VDCs of Morang District constitute maximum dalit population as per the census 2011. Then the list of wards where most of the Dalit family reside was prepared. Simple random selection of the 2 wards from each VDCs was done through lottery method. After selection of wards, the list of the households of 8 wards were obtained from respective VDC offices, then with the help of FCHVs (Female Community Health Volunteers), the total number of households with under-five child were determined and it was approximately 593 altogether in 8 different wards. Proportionate sampling was done to determine the number of households from each ward and finally the samples were selected randomly by the lottery method again from each ward. From each household only one child was assessed for the data collection.

Research instrument consisted of five parts. Part I: socio-demographic information; Part II: perinatal information; Part III: information about breastfeeding, supplementary and complementary feeding; Part IV: health related information of the children; and Part V: anthropometric assessment of the children. The tool was pretested in Haraicha VDC of Morang district with 10% of the sample and minor modifications were done after the pretest. The data collected from pre-test wasn't included in the actual study.

Ethical approval was obtained from the Institutional review committee of B.P Koirala Institute of Health Sciences (IRC/674/015). Door-to-door survey with the help of the health personnel such as local Female Community Health Volunteers and Community Medical Assistant was done after obtaining permission from the respected VDC offices. After explaining procedure and purpose of the study, an informed consent was read to the participant's legal guardian/parent and once the consent was signed, a face-to-face interview was conducted using a pretested structured and semi-structured interview schedule. Anthropometric measurements were assessed using standard techniques. All the children included in the sample, under the age of 24 months, had their length measured using a length measuring board (Infantometer). For the children over the age of 24 months, height was measured using a measuring tape on the basis of principle of stadiometer. Similarly, weighing machine (or Bathroom scale, manufactured by Ramon Surgical Company, Delhi) capable of measuring weight in kg to the nearest 100gm was used to measure weight of children. The weighing scale and infantometer were calibrated at 0 before each measurement.

Protein Energy Malnutrition was assessed as underweight, stunting and wasting. Underweight was assessed as percentage of children who are between -1SD to -2SD as mild, -2SD to -3SD as moderate and <-3SD as severe underweight from median weight for age; stunting as percentage of children who are between -1SD to -2SD for mild, -2SD to -3SD for moderate and <-3SD for severe stunted from median height for age; and wasting as percentage of children who are between -1SD to -2SD for mild, -2SD to -3SD for moderate and <-3SD for severe wasted from median weight for height of WHO Child Growth Standards.[12]

Data was analyzed using statistical Package for social sciences (SPSS) version 11.5. Descriptive statistics; mean and standard deviation (SD) was used to find the prevalence of PEM in terms of underweight, stunting and wasting. Inferential statistics i.e. Chi-square test was used to assess the association of PEM with selected demographic and other variables.

RESULTS

Among 238 children, all belong to Hindu religion and majority of them (62.2%) were from joint family. Less than half (45.8%) of fathers of the children were illiterate and more than half (52.9%) of the mothers were illiterate. According to World Bank, 2015, with the cut-off point of (< $1.9), most of the families (89.5%) were below poverty line. One-fourth of the children were between age group 12 to 23 months. More than half of the children (52.9%) were male.

Most of the mothers (96.2%) had gone through antenatal check-up during pregnancy but among them, only 65.5% had visited health care centre for four times or more. More than half (51%) of the children were born at hospital but still there was higher prevalence of home delivery i.e. 42%.

One out of six children (16.4%) were breastfed only after 12 hours of delivery. Almost one-third (32%) of the children had stopped breastfeeding before 24 months and nearly 1/5th of them (18.4%) have started weaning after 12 months.

Table 1: Classification of PEM in terms of underweight, stunting and wasting

Types of PEM	**Level of PEM**	
	Mild	**Moderate**
Underweight	34 (14.3%)	6 (2.5%)
Stunting	22 (9.2%)	5 (2.1%)
Wasting	30 (12.6%)	5 (2.1%)

Two out of fifteen children had not completed immunization as per their age. More than 1/5th (21.8%) of the children were not supplemented with vitamin A and 1/4th of them were not given anti-helminthic medicine which is supplied by the government. One-fifth of the children who suffered illness didn't get any treatment.

Table 1 depicts distribution of PEM. Among 238 children, 40 (17%) of the children were underweight, 27 (11.3%) were stunted and 35 (14.7%) were wasted. Among the underweight children, 2.5% were moderately underweight. Similarly, among the stunted and wasted, 2.1% each were moderately stunted and wasted. None of the children were severely malnourished

Table 2: Association of underweight, stunting and wasting with selected variables

Characteristics	**Categories**	**Underweight**			**Stunting**			**Wasting**		
		Yes	**No**	**p-value**	**Yes**	**No**	**p-value**	**Yes**	**No**	**p-value**
Type of the family	Nuclear family	18	72	0.304	8	82	0.405	20	70	**0.014****
	Joint family	22	126		19	129		15	133	
Family Size	≤5	26	105	0.165	15	116	0.955	25	106	**0.035****
	>5	14	93		12	95		10	97	
Fathers educational level	Illiterate	25	84	**0.020****	17	92	0.057	18	91	0.469
	Literate	15	114		10	119		17	112	

*Mother's occupation status	Unemployed	37	184	1.000	22	199	**0.030****	35	186	0.145
	Employed	3	14		5	12		0	17	
Age of the child	<3 years	24	110	0.605	15	119	0.934	26	108	**0.020****
	≥3 years	16	88		12	92		9	95	
*Antenatal check-up during pregnancy	Yes	36	193	**0.046****	24	205	0.069	34	195	1.000
*Weaning	Yes	39	195	0.532	27	207	1.000	32	202	**0.011****

***** Fisher's Exact Test was used ** Significantly associated at p-value <0.05

Table 2 depicts association of underweight, wasting and stunting with selected variables, where underweight was found to be significantly associated with father's educational level and antenatal visits of the mother, stunting was significantly associated with mother's occupation, and wasting was significantly associated with type of the family, age of the child and weaning status of the child.

DISCUSSION

In this study, 16.8% of the children were underweight, 11.3% were stunted and 14.7% were wasted. The results are low in comparison to the national data except for the wasting.[6] The reason behind this might be due to geographical variations and variation of the cultural practice regarding feeding of the children in different region of Nepal. The other reason could be small sample size of the current study. Similarly, the results are also low in comparison to the study conducted in Dhankuta, and Rupandehi, Nepal.[10,11] Various studies conducted in India, Pakistan, Sri-Lanka and Ethiopia shows consistent findings from the current study.[13-16] In this study, 6.7% of the children were moderately malnourished for underweight, stunting and wasting i.e below -2SD and none of the children were severely malnourished (below -3SD). The study done in Ilam, found that 14% were moderately malnourished and 6% were severely malnourished.[17] The result of this study contradict with the study carried in Dhankuta.[10] For underweight, one-sixth (14.3%) of the children were below -1SD (mild underweight) and 2.5% were below -2SD (moderate underweight); for stunting, 9.2% were below -1SD and 2.1% were below -2SD; and for wasting, 12.6% were below -1SD and 2.1% were below -2SD which is contradictory with the study done in Dhankuta and Kapilvastu District of Nepal.[10,18] In addition to this, the findings also contradicts with the study done in India and Nigeria.[13,19] The contradiction of the result might be due to environmental influence, geographical variations and cultural beliefs and practices regarding nutrition.

Underweight was found to be significantly associated with father's educational status. A study conducted in Nigeria and a systematic review carried in Sub-saharan Africa concluded, children with illiterate fathers are more likely to suffer from undernutrition.[19,20] Status of antenatal checkup was found to be significantly associated with underweight, while number of antenatal visits had no significant association. The study conducted in Pakistan found, undernutrition was high among those children

born to the mother who had visited antenatal clinic 3 times or more.[14] Similarly study conducted in Kunchha VDC, Nepal also found number of antenatal visits to be significantly associated.[21] In this study, children whose mothers were housewife tends to suffer less from stunting than those of working mother. A study conducted in Sri-Lanka also found maternal employment to be one of the factors associated with undernutrition.[15] Wasting was found to be significantly associated with type of the family, family size, age of the child and delayed weaning. The findings are similar with the study done in Nepal, Sri-Lanka, Sub-saharan Africa, India and Nigeria.[10,15,19,20,21,22] In this study, sex of the child, maternal literacy, father's occupation, socioeconomic status, low birth weight of the children, number of siblings, birth interval and duration of breastfeeding had no any significant association; whereas various studies showed undernutrition to be associated with these factors.[10,14-16,19,20,23] Role of nutritional pattern and behavior as a determining factor of PEM could not be assessed. The generalizability of the study is limited because of the small sample size.

CONCLUSION

There was a prevalence of mild and moderate level of underweight, stunting and wasting among the Dalit children. Parent's educational level, type of family, mother's occupation, antenatal care visit to the health facility and weaning practice play a major role in determining status of PEM. Further study with larger sample size can be conducted to explore prevalence and other factors associated with PEM among Dalit children.

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