Socio-demographic and Healthcare-seeking Predictors of Undernutrition among Children Under-five Years of Age in a Western District of Nepal

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ABSTRACT

Background: Undernutrition is highly prevalent in Nepal, which interferes with physical and mental development among children. It is one of the severe health problems contributing to the significant portion of the disease burden. This study aimed to explore socio-demographic and healthcare-seeking related predictors of undernutrition among children under five years old in Dang, Nepal.

Methods: This was a descriptive cross-sectional study. A sample of 426 children was participated through stratified proportionate random sampling to identify socio-demographics and healthcare-seeking predictors of undernutrition. Multivariable regression was applied to identify the independent predictors of undernutrition.

Results: This study found that children below 24 months of age were more likely to be undernourished than children aged 24-36 months. Female children (OR=2.32, 95% CI: 1.19-4.54), illiterate or non-formally educated women (OR=4.09, 95% CI: 1.84-9.08), mother's occupation other than a housewife (OR=13.05, 95% CI: 4.19-40.68), labor work of father (OR=2.40, 95% CI: 1.04-5.57) had increased risk of undernutrition among children. Similarly, food insufficiency from their land, antenatal care visit, postnatal care visit, and delivery place were significantly associated with childhood undernutrition among children.

Conclusions: The study showed that undernutrition among children is associated with age and gender of children, educational attainment of the mother, food sufficiency, health-seeking practices of the mother during pregnancy, delivery, and postnatal. Socio-demographics and health-seeking practices related predictors must be explicitly considered to address undernutrition among children under the age of five years.

Keywords: Children; health care seeking; Nepal; socio-demographic factors; undernutrition.

INTRODUCTION

Worldwide, undernutrition has become the most common 'disease' of children. Globally, an estimated one third (32%) of under-five-year-old children (178 million) are stunted, and 112 million are underweight.[1] Undernutrition remains the primary cause of child mortality and morbidity.[1] In developing countries, malnutrition is responsible for 54% of all deaths among children under-five.[2] In Nepal, there has been a slight improvement in nutritional-status than in NDHS-2011 (stunting-36%, wasting-10%, and underweight-27%), as shown by NDHS-2016.[3] This undernutrition figure is still remarkably high, and the scenario is further miserable in rural-settings.[3]

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The nutrition programme is one of the most prioritized health programs to meet the child health targets of sustainable development goals by 2030.[4] Most importantly, undernutrition is one of the leading causes of under-five morbidity and mortality in Nepal, especially in rural settings.[3,4] Therefore, this study aimed to identify underlying socio-demographic and health seeking factors associated with childhood undernutrition, which could provide programmatic directions to reduce undernutrition.

METHODS

A quantitative descriptive cross-sectional study design was applied to identify the sociodemographic and health-seeking predictors of undernutrition among children. This study utilized baseline data of a community based nutritional intervention project conducted in the rural areas of the Dang district of Nepal, by a non-governmental organization named Health Foundation Nepal (HFN). HFN implemented the community-based nutritional intervention project in the communities of Saudiyar, Laxmipur, and Dharna villages of the district. A preliminary study by HFN explored that community had predominantly *Tharu* ethnic groups (a disadvantaged ethnic group in Nepal) with children whose nutritional status needed to be improved. HFN organized screening camps in each ward from September 2016-March 2017 to identify the undernourished children. Female community health volunteers, youth clubs, and local leaders were requested to organize and manage the camps.

Undernutrition was ascertained by using the Height For Age (HFA), Weight For Height (WFH), and Weight For Age (WFA) indicator according to the World Health Organization (WHO)'s new child growth standards 2006.[5] The criterion for stunting, wasting, and underweight was: Z-score less than -2 standard deviations (SDs) below the median value.[5] Nutritional status of mother was measured by Body Mass Index (BMI) and it was categorized as underweight (<18.5), normal (18.5-24.9) and over weight (≥25). Education was classified as illiterate, non-formal education, primary schooling up to grade five, secondary schooling from grade six to ten, have completed school leaving certificate (SLC/SEE) and above. Ethnicity was categorized as five different ethnic groups based on Health Management Information System (HMIS) classification of Department of Health Services, Nepal.[7] Antenatal care (ANC) visit by pregnant women was classified as 1st, 2nd, 3rd and 4th visits to health facility. Postnatal care (PNC) refers to the check up by postnatal mother and categorized by 1st, 2nd and 3rd visits to health facility. Place of delivery was defined as home or institutional delivery. Food sufficiency was measured in terms of whether the respondents have sufficient food for a year to the family from their own or contracted land.

The required sample size of 374 for the study was calculated using a formula[6], taking a proportion of undernutrition as 0.27[3] and allowable error as 4.5%. With adjusting a 15% non-response rate, the final sample size was 430. Of the 1680 children who attended the screening program, we included all the 79 undernourished children screened in the program, and the remaining 374 normal children were selected proportionately and randomly to meet the desired sample. We excluded 4 children from the analysis because we did not get detailed information of those children. Therefore, the final analysis was carried out among 426 respondents. Pretesting of the tools was carried out among 30 children and their mothers in the adjacent village of the study area. Interview questionnaire and recording formats were the tools for data collection. Trained staff nurses and health assistants in the project were utilized for the data collection. The youngest child under five years of age of a mother was included in the study. However, if more than one child of a mother was found undernourished, all undernourished children were included for baseline. Children with a physical disability created a measurement problem, and children whose mothers were not giving consent were excluded.

The data were entered and analyzed using IBM statistical package for social sciences (IBM SPSS) 21 version, and WHO Anthro software 3.2.2 version. The bivariate and multivariate analyses were carried out to identify the factors of undernutrition. Potential predictive factors were analyzed first by bivariate analysis, and those of having a p-value less than 0.1 at bivariate analysis and the variables having clinical relevance were subjected to logistic regression to control the possible confounders. P-value of <0.05 was considered to be significant where confidence interval (CI) for odds ratio (OR) was set for 95%. The outcome variable of interest for the cross-sectional study was the dichotomous variable – having and not having undernutrition.

Ethical approval for the study was obtained from the Institutional Review Board of the Institute of Medicine, Kathmandu Nepal (approval no: 275(6-11-E)[2]/074/75), as well as from the Health foundation Nepal Kathmandu (approval no: 054-073/74). The objectives, benefits, and harms of the study were explained to the respondent mothers. Then informed consent was taken from them before taking interviews by the research assistants.

RESULTS

The study revealed a higher proportion (51.9%) of children in the age group 7-24 months, followed by the age group 25-36 and 37-60 months. The median age of children under study was 23 months. The proportion of girls was slightly higher than that of boys, 50.7% girls and 49.3% boys. Regarding the education of mothers, most of them had a formal education of primary or above. The majority of mothers were housewives, and only 4% were engaged in labor work. The proportion of fathers working in agriculture/household and working as labor was almost similar (nearly 35.0%). The Tharu ethnic group was more than half (50.7%) in the study area. The second-largest ethnic group Brahmin/Chhetri, consisted of nearly one-fourth (24.6%), followed by Magar (17.8%) in the area (Table 1).

Table 1. Socio-demographic characteristics of the study population of Dang, Nepal (field study 2016-17).

Characteristics	Under nourished (79) n(%)	Normal (347) n(%)	Total (426) n(%)
Age of children (months)			
0-6	0(0.0)	42(12.1)	42(9.9)
7-24	61(77.2)	160(46.1)	221(51.9)
25-36	8(10.1)	80(23.1)	88(20.7)
37-60	10(12.7)	65(18.7)	75(17.6)
Median age of children (months)	22.0	24.0	23.0
Sex of children			
Male	30(38.0)	180(51.9)	210(49.3)
Female	49(62.0)	167(48.1)	216(50.7)
Education of mother			
Illiterate	10(12.7)	36(10.4)	46(10.8)
Non-formal education	16(20.3)	7(2.0)	23(5.4)
Primary	17(21.5)	23(6.6)	40(9.4)
Secondary	24(30.4)	151(43.5)	175(41.1)
SLC or above	12(15.2)	130(37.5)	142(33.3)
Occupation of mother			
House wife	64(81.0)	338(97.4)	402(94.4)
Labour work	15(19.0)	2(0.6)	17(4.0)
Business or job	0(0.0)	7(2.0)	7(1.6)
Ethnicity			
Tharu	38(48.1)	178(51.3)	216(50.7)
Brahmin/chhetri	17(21.5)	88(25.4)	105(24.6)
Magar	17(21.5)	59(17.0)	76(17.8)
Dalit	7(8.9)	22(6.3)	29(6.8)
Food sufficiency for a year			
Sufficient	66(83.5)	335(96.5)	401(94.1)
Not sufficient	13(16.5)	12(3.5)	25(5.9)

Of the total malnourished 25(5.9) children, about half (50.6%) were moderately wasted and underweight, while 38.0% were severely wasted and underweight. Similarly, 15.2% had moderate, and nearly three-fourth (73.4%) had severe stunting status, as shown in Table 2.

Table 2. Nutritional level of undernourished children according to z-score at baseline.

Nutritional Status	Under weight n(%)	Wasting n(%)	Stunting n(%)
Normal (z-score: > -2SD)	9(11.4)	9(11.4)	9(11.4)
Moderate (z-score: -2SD to -3SD)	40(50.6)	40(50.6)	12(15.2)
Severe (z-score: < -3SD)	30(38.0)	30(38.0)	58(73.4)

Multivariate logistic regression presents that the age of children between 25-36 months was significantly less likely to suffer from undernutrition than younger children (OR=0.28, 95% CI: 0.10-0.81). Female children were 2.3 times more likely to be undernourished than males (OR=2.32, 95% CI: 1.19-4.54). The odds of getting undernourishment among children was 4.09 times higher among mother who were illiterate or only had non-formal education than who had at least primary education (OR=4.09, 95% CI: 1.84-9.08). The occupation of mothers other than homemakers was found a risk factor for undernutrition among children (OR=13.05, 95% CI: 4.19-40.68). The labor work of the father, food sufficiency in a family was statistically significant with childhood undernutrition. Health-seeking behaviors such as antenatal care (ANC) visits and postnatal care (PNC) visits were significantly associated with undernutrition among under-five-year-old children. This study also showed that home delivery had almost three times risk of having undernutrition among children under five years of age (OR=2.96, 95% CI: 1.03-8.44), as depicted in Table 3.

Table 3. Socio-demographics and healthcare-seeking variables associated with undernutrition, multivariate analysis.

Variables	Unadjusted OR (CI at 95%)	Adjusted OR (CI at 95%)	p-value
Age of children			
0-24 months		Ref.	
25-36 months	0.33(0.15-0.72)	0.28(0.10-0.81)	0.019
37-60 months	0.51(0.25-1.05)	0.75(0.31-1.84)	0.529
Sex of child			
Male		Ref.	
Female	1.76(1.07-2.91)	2.32(1.19-4.54)	0.014
Education of mother			
Illiterate or non-formal	3.47(1.97-6.12)	4.09(1.84-9.08)	0.001
Primary or above		Ref.	
Occupation of mother			
House wife		Ref.	
Others	8.80(3.69-20.98)	13.05(4.19-40.68)	<0.001
Occupation of father			
Agriculture /HH work		Ref.	
Labour work	2.92(1.52-5.59)	2.40(1.04-5.57)	0.041
Business or job	1.03(0.41-2.60)	0.78(0.25-2.38)	0.657
Migrant labour	1.18(0.63-2.23)	0.97(0.43-2.21)	0.939
Food sufficiency for a year			
Sufficient		Ref.	
Not sufficient	5.50(2.40-12.58)	4.81(1.44-16.11)	0.011
ANC visit			
< 4 visits	9.15(5.32-15.74)	8.82(4.02-19.37)	<0.001
≥ 4 visits		Ref.	
PNC visit			
No visit	5.95(3.52-10.06)	6.99(2.81-17.40)	<0.001
At least one visit		Ref.	
Place of delivery			
Home	3.25(1.95-5.42)	2.96(1.03-8.44)	0.043
Institution		Ref.	

DISCUSSION

This study demonstrated that 73.4% and 38.0% of children under the age of five years were found to have severely stunted and wasted, respectively. In addition, we found that undernutrition was strongly associated with study subjects, socio-demographic attributes such as children's age, gender, educational attainment of the mother, food sufficiency, and healthcare-seeking practices of mothers during pregnancy, delivery and postnatal. Children from 25-36 months of age were significantly less likely to be undernourished than children aged 24 months or below. This finding is just opposite to the NDHS 2016[3], where undernutrition (stunting and wasting) increases with the age of the children, peaking at age 24-35 months. The higher prevalence of undernutrition among 24-35 months children may have been due to faulty feeding practices such as early initiation of complementary feeding, non-exclusively breastfeeding up to the first six months, and high prevalence of diarrhea, ARI, and fever in this age group.[7,8] Additionally, such results in the study might be due to low awareness among mothers of the importance of nutrition during the 1,000 days' golden period. The 1,000 days is a period between a woman's pregnancy and her child's second birthday. Proper nutrition during the 1,000 days' window can improve children's health and well-being and significantly reduce the human and economic burden of diseases.[9,10] Studies conducted in India comply with the finding that the prevalence of undernutrition among 24-35 months children were higher.[11,12] However, the study's finding parallels other forms of undernutrition (wasting), which is more prevalent among under two years of children from the same survey.[3]

This study showed that female children were 2.32 times more likely to be undernourished than their male counterparts, this result is consistent with NDHS-2016 and study conducted in Bangaldesh.[3,13] Likewise, studies from Nigeria and India showed that female children under four years of age were twice as likely to be under-nourished than males.[14,15] This study finding shows that the vicious circle of undernutrition in women remains at large. Discrimination in intrahousehold food distribution and gender-based inequality might be leading to poor female nutrition early in life.[16,17]

The educational status of mothers has a significant association with child nutrition well established in the literature. This study also reveals that children whose mothers were illiterate or having non-formal education had 4.09 times of developing risk of undernutrition than mothers having primary or above education. Many studies

supported this finding, including the multiple indicator cluster survey of 2014 in Nepal, where the children whose mothers had secondary or higher education were the least likely to be underweight, stunted, or wasted compared to children of mothers with no education [18] The Nepal DHS of 2016 showed that a higher proportion of children born to mothers with no education were undernourished than mothers who had secondary level education or higher in Nepal.[3] The mothers' literacy persists as a strong predictor of a child's nutritional status. It can increase her knowledge, attitude, and practice towards food diversities, the nutritional requirement of her children, better health promoting practices and child centered caring bhaviour.[19,20]

Another protective factor in the study is the occupation of the mother as a housewife. The children whose mothers were not housewives were 13.05 times more likely to be undernourished than their counterparts. The result is consistent with another study in Nepal in 2017, where the children of those mothers whose main occupation was service were more likely to be undernourished.[21] As compared to a working woman, a homemaker can exclusively breastfeed her child and practice complementary feeding; hence her child is well nourished. Like many other surveys and studies, this study also reveals that food insufficiency plays a significant role in childhood nutrition. In this study, the families with insufficient food for a year were 4.81 times more likely to have undernourished children than families with sufficient food. The Nepal DHS of 2016 showed that a higher percentage of children were malnourished from food-insecure households as compared with children from secure food households.[21] Like this study, a Malaysian study in 2014 showed that children in food-insecure households were at least twice as likely to be underweight and three times to be stunted than children in the food-secure households.[22] The finding is evident as insufficient food at the household level relates to inadequate and less diverse dietary intake amongst mother and child, resulting in poor nutritional status. Another important factor in childhood nutrition in women's care during pregnancy is that a mother who had less than 4 ANC visits had 8.82 times higher risk of having malnourished children. The study is consistent with a study in Nigeria in 2015 where a child whose mother had less than four ANC visits during her last pregnancy was twice likely to be malnourished[14] Similarly, about half of the children with no access to ANC in Bolivia and Peru were malnourished, whereas about one-third in Colombia.[23]

The present study also presents that mothers who had at least one PNC visit were six times more likely to have well-nourished children than those who did not. A community-based cross-sectional study conducted in Northwest Ethiopia showed that mothers who had attended PNC within 1-2 day after delivery (OR=2.30, 95% CI: 1.27-4.15) were more likely to provide recommended meal frequency than mothers who had no PNC visit.[24] Similarly, mothers who had PNC visits were 2.8 times more likely to practice appropriate complementary feeding than those who did not, as found in another study of Northern Ethiopia.[25] Meeting the recommended meal frequency among children ultimately leads to better nutritional status among children. During different ANC visits, the health workers counsel expecting mothers by providing insight on nutrition requirements during pregnancy, breastfeeding, and newborn care, which affects child nutrition. Similarly, in PNC visits, they counsel mothers on nutritional requirements of mother and children along with the children's immunization schedule.

The children born at home were almost thrice likely (OR=2.96) to be undernourished as compared to born in a health facility in this study. The association was found to be significantly associated, identical to a study in Nepal in 2017. The home-born children in that study were at risk of 1.5 times than those born in a health facility.[21] Apart from safe delivery that saves lives of a mother and newborn, institutional delivery improves child nutrition by early initiation of breastfeeding including colostrum feeding and other health-seeking behavior and health care practices related to the newborn, infant, and child care.

This study could not explain the biological factors and event history of child undernutrition across their ages. Second, the results cannot be generalized throughout the country due to socio-cultural and geopolitical variation. However, this study explored some of the critical socio-demographic and healthcare-seeking predictors associated with incremental childhood undernutrition that might be beneficial at a contextual level.

CONCLUSIONS

This study showed that undernutrition among children in Nepal is still a public health issue, and is associated with socio-demographic and healthcare-seeking covariates. The study depicted that children's undernutrition is associated with age and gender of children, educational attainment of the mother, food sufficiency in the family, and health-seeking practices of the mother during pregnancy, delivery, and postnatal. Necessary steps are required to address gender construct, educational attainment of women, and food sufficiency.

CONFLICT OF INTEREST

None

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