



Nutritional Status of Under-five Children and its Associated Factors in Dhulikhel Municipality, Kavrepalanchok, Nepal

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ABSTRACT

Background: The nutritional status of children under five years is not only a crucial indicator of their present health status but also offers insight into socio-economic and other factors within a community. The study aimed to assess the nutrition status of under-five children with its associated factors.

Methods: This study was quantitative cross-sectional conducted among 323 under-five children in all 12 wards of Dhulikhel municipality. Face-to-face interviews were carried out with the mothers of under-five children using standard questionnaires, and anthropometric tools.

Results: This study found that the prevalence of stunting, wasting, underweight, and overweight was 33.6%, 9.3%, 23.5%, and 14.5% respectively. Nearly 86.4% of the households of Dhulikhel municipality were food secure whereas 13.6% of the households were insecure. Availability of kitchen gardens showed a statistically significant association with a lower prevalence of wasting (6.2%) and underweight (18.6%). The proportion of stunting and underweight children was significantly higher (56.8% and 50% respectively) among households that were not food secure.

Conclusion: Among the children surveyed, nearly half had at least one form of malnutrition. Food insecurity was associated with a higher prevalence of stunting and underweight. Availability of kitchen gardens was associated with a lower prevalence of wasting and underweight in this study. Food insecurity and agro-health-based programs must be considered while designing interventions to curb various forms of malnutrition.

Keywords: Malnutrition, socioeconomic factors, stunting, under-five children

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BACKGROUND

Adequate nutrition is vital for children's proper growth and development, predominantly during the early years of life.(1) However, millions of children worldwide are still suffering due to a lack of adequate nutrition. According to a report by the United Nations Children's Fund (UNICEF), one out of three children worldwide do not grow according to their potential due to malnutrition and two out of three children don't even get the minimum

diet that they require for proper growth.(2) In the context of Nepal, where childhood malnutrition remains a persistent challenge, understanding the prevalence of nutritional problems and determinants of nutritional status among under-5 children is imperative for effective public health interventions. According to the Nepal Demographic Health Survey (NDHS) 2022, 25% of the under-five children were stunted, 18% were wasted, 9% were underweight, and 1% were overweight.(3) The same report shows

that the percentage of stunted children was highest in Karnali Province (36%) and lowest in Bagmati Province (18%). Additionally, wasting was highest in Lumbini Province (16%).(3)

The nutritional status of children under the age of five years is not only a crucial indicator of their present health status but also offers insight into socio-economic and other factors within a community. Studies have shown that the number of family members, education level of mother/father, wealth quintile, possession of land, etc. are some of the factors shown to affect the nutritional status of the children.(4,5) The result of the NDHS 2022 also corroborates some of these findings with its results showing that maternal education and health quintile affect the percentage of undernourished children.(3)

Another factor that can affect nutritional status is the food security status of the household. Food security is strongly associated with household characteristics such as family size, gender, age, education levels, land ownership, household income, remittance, and improved access to markets and roads.(6) Food security of a household has also been shown to impact the health status of the children.(7)

Understanding the situation and finding out what causes nutritional problems is important. This helps us create specific plans to improve the health of children in the community. The aim of the study was to assess the nutrition status of under-five children and household food security status in Dhulikhel municipality. It also assesses the factors associated with the nutritional status of children.

METHODS

This cross-sectional study was carried out in all the wards of Dhulikhel municipality between April to November 2021. Under-five children who have been residing for at least one year in this municipality and their mothers were included. Children who were below 6 months of age, severely ill, and not available at the time of the survey were excluded from the study. The total sample size was calculated based on the prevalence of stunting in Bagmati province (29.4%) (8) and the sample size was calculated to be 321. Proportionate random sampling was used to select the required number of children. Details of the sampling process are available as a supplementary information file. Written informed consent was obtained from the children's mothers before enrolment. Once the consent was signed, a face-to-face interview was conducted using pretested structured questionnaires. The questionnaire consisted of various sections that collect information on socio-demographic and household characteristics, nutritional status, and food security status of the households.

The questionnaires for food security were adapted from the Household Food Insecurity Access Scale (HFIAS) (9), which is also used by NDHS for measurement of food security. There are two types of questions asked in the questionnaire: Occurrence questions and frequency-of-occurrence questions. Nine occurrence questions inquired about the presence of a particular condition related to food insecurity within the last four weeks. After each severity question, there is a corresponding frequency-of-occurrence question that assesses the frequency with which the reported condition took place in the preceding four weeks.

Based on the responses, four food insecurity categories were created: food-secure households, mildly food-insecure households, moderately food-insecure households, and severely food-insecure households. The four categories were later merged into food secure and insecure. A portable height scale and weighing machine were used to measure the height/length and weight of the children respectively. The nutritional status of the children was classified according to WHO Classification of nutritional status of children under 5 years of age.(10) The chi-square test was used for bivariate analysis to study the association between nutritional outcomes and associated factors. The level of statistical significance was set at 5%. The collected data was analyzed by using Statistical Package for Social Sciences (SPSS) software version 25.

Ethical approval for this study was obtained from the Institutional Review Committee of the Institute of Medicine, Tribhuvan University (Reference number: 90(6-11) E2-078/079. The study adhered to ethical principles ensuring participants' right to withdraw at any time without any negative consequences. Confidentiality of all collected data was strictly maintained throughout the research process.

RESULTS

There was a total of 323 respondents in the study. The results demonstrated that the major religion followed was Hindu (68.2%), followed by Buddhism (22.8%). Similarly, the most common ethnic group was Janajati (43.7%), followed by Brahmin (27.2%), and Chhetri (15.8%). Furthermore, most of the mothers had acquired higher education (43.3%), with only 3.7% being illiterate. The majority (48.3%) of the people living in this municipality are involved in agriculture. Additionally, 48.6 % of the families lived in nuclear families, while 47.7 lived in joint families and the rest in extended families.

Additionally, the household characteristics have been illustrated in Table 1.

Table 1. Household characteristics of the study participants (n=323)

Variables	Frequency	Percentage
Type of household		
Kacchi	106	32.8
Pakki	217	67.2
Availability of kitchen garden		
Yes	242	74.9
No	81	25.1
Availability of extra land other than kitchen garden		
Yes	247	76.5
No	76	23.5
Availability of toilet facility		
Yes	322	99.7
No	1	0.3
Materials used for hand washing		
Soap	322	99.7
Others	1	0.3
Main source of food		
Self-produced	56	17.3
Purchased from market	71	22
Both	196	60.7

Among the 323 under-five children, 56.3% of the children had at least any one of the nutritional problems, 33.6% were stunted, 9.3% were wasted, 23.5% were underweight, and 14.5% were overweight (Table 2). It was also observed that 86.4% of the households of Dhulikhel municipality are food secure whereas 13.6% of the households are food insecure.

Table 2. Nutritional Status of under-5 children (n=323)

Nutritional Status	Numbers	Percentage	Total Percentage
Stunting			
Mild	51	15.7	33.7
Moderate	44	13.6	
Severe	14	4.3	
Wasting			
Mild	25	7.5	9.3
Moderate	5	1.5	
Severe	0	0	
Underweight			
Mild	68	21.0	23.8
Moderate	9	2.5	
Severe	0	0	
Overweight	47	14.5	14.6
Normal weight	60	18.5	18.6

Among the socio-demographic and household characteristics, only the availability status of the kitchen garden showed a statistically significant association with wasting and underweight (Table 3). Among those who were either wasted or underweight, most of the children did not have a kitchen garden. All other factors had no statistically significant relationship with any of the nutritional outcomes. Furthermore, the study also showed that there was a statistically significant association between stunting and underweight with food security status. Among those children who were either stunted or underweight, the majority belonged to households that were not food secure. However, among those who were overweight, most belonged to households that were food secure (Table 3).

Table 3 Association of socio-demographic, household variables, and food security with nutritional outcomes (n=112)

Variables		Nutritional outcomes							
		Stunting		Wasting		Underweight		Overweight	
		Present n (%)	p-value	Present n (%)	p-value	Present n (%)	p-value	Present n (%)	p-value
Gender									
	Male	61(35.9)	0.631	17(10)	0.642	38(22.4)	0.599	30(17.6)	0.138
	Female	51(33.3)		13(8.5)		38(24.8)		18(11.8)	
Education level of mother									
	Illiterate	5(41.7)	0.617	1(8.3)	0.932	3(25.0)	0.079	0(0.0)	0.428
	General reading and writing	33(36.3)		10(11.0)		29(31.9)		13(14.3)	
	Below SLC or equivalent	23(28.7)		7(8.8)		12(15.0)		11(13.8)	
	Higher education	51(36.4)		12(8.6)		32(22.9)		24(17.1)	
Occupation of mother									
	Agriculture	62(39.7)	0.139	13(8.3)	0.194	31(19.9)	0.081	24(15.4)	0.998
	Business	18(29.5)		5(8.2)		15(24.6)		9(14.8)	
	Government job	7(22.6)		2(6.5)		6(19.4)		5(16.1)	
	Foreign Employment	2(13.3)		0(0.0)		4(26.7)		2(13.3)	
	Jobs in private sector	11(34.4)		4(12.5)		7(21.9)		4(12.5)	
	Labour	12(42.9)		6(21.4)		13(46.4)		4(14.3)	

Religion of household

Hindu	76(34.4)	0.319	20(9.0)	0.933	47(21.3)	0.347	34(15.4)	0.505
Buddhist	30(40.5)		8(10.8)		23(31.1)		8(10.8)	
Christian	6(22.2)		2(7.4)		6(22.2)		6(22.2)	
Islam	0(0.0)		0(0.0)		0(0.0)		0(0.0)	

Type of family

Single Family	55(35.0)	0.850	16(10.2)	0.105	45(28.7)	0.093	17(10.8)	0.138
Joint Family	52(33.8)		11(7.1)		28(18.2)		29(18.8)	
Extended Family	5(41.7)		3(25.0)		3(25.0)		2(16.7)	

Type of house

Kacchi	32(30.2)	0.236	13(12.3)	0.198	32(30.2)	0.049	14(13.2)	0.559
Pakki	80(36.9)		17(7.8)		44(20.3)		34(15.7)	

Availability of Kitchen Garden

Presence								
Absence	83(34.3)	0.805	15(6.2)	<.001	45(18.6)	<.001	38(15.7)	0.462
	29(35.8)		15(18.5)		31(38.3)		10(12.3)	

Main source of food item

Self-produce in farms								
Market purchasing	20(35.7)	0.972	3(5.4)	0.102	13(23.2)	0.010	5(8.9)	0.333
Both	25(35.2)		11(15.5)		26(36.6)		10(14.1)	
	67(34.2)		16(8.2)		37(18.9)		33(16.8)	

Is the house food secure?

Yes								
No	87(31.2)	<.001	24(8.6)	.285	54(19.4)	<.001	46(16.5)	0.038
	25(56.8)		6(13.6)		22(50.0)		2(4.5)	

DISCUSSION

In our study, 33.6% of the children were stunted, 9.3% were wasted, 23.5% were underweight, and 14.5% were overweight. These findings vary with that of NDHS 2022, according to which 25% of under 5 children were stunted, 8% were wasted, 19% were underweight and 1% were overweight.(3) Additionally, a study done among 243 children in Dolakha and Kavre districts, illustrated that 39.9% of the children were stunted, 7.0% were wasted and 18.9% were underweight.(11)

Furthermore, our study illustrated that 13.6% of the households in Dhulikhel were food insecure. This was similar to the findings of NDHS 2022, where 13% of the population experienced either moderate or severe food insecurity.(3) However, it was in contrast to the findings of another cross-sectional study done in the Syangja district of Nepal (among 289 households) showed that more than half (52.3%) of the households were food insecure.(12)

Among those who were either wasted or underweight, most of the children did not have a kitchen garden. Not having a kitchen garden makes it difficult to get enough food. Additionally, it also means relying more on buying food from shops, this can be hazardous in cases of price hikes or shortages. Without a garden, it's also harder to get fresh fruits and veggies, which are good for health.

Except for the availability status of the kitchen garden, the association of other sociodemographic factors with the nutritional status of the children was not statistically significant. This is in contrast to other studies where factors like the number of family members, education level of mother/father, wealth quintile, etc. have been linked with the nutritional status of children.(4,5)

Our study also showed that the majority of the children who were either stunted or underweight belonged to households that were not food secure. Similar findings were found in a study in Nepal, where food insecurity was associated with undernutrition in under five children, but a significant association was seen with only wasting and underweight.(12) This may be because food security influences the nutritional status of the children, not only by guaranteeing access to quality food but also by facilitating diverse diets. However, when faced with food insecurity, children will experience a shortage of both sufficient and high-quality food. This can ultimately lead to various health issues, including malnutrition. This is supported by the results from a national survey from the United States, which showed that children in food-insecure households were more likely to suffer from various acute and chronic health issues.(7)

Our study reveals significant child malnutrition in Dhulikhel linked to food insecurity, suggesting a need

for integrated interventions combining food security programs and promotion of household kitchen gardens. However, limitations of this research include the restricted sample size and its cross-sectional design, which prevents establishing causal relationships between nutritional outcomes and associated factors.

CONCLUSION

Among the surveyed children, nearly half had at least one form of malnutrition. Food insecurity was associated with a higher prevalence of stunting and underweight. Availability of kitchen gardens was associated with a lower prevalence of wasting and underweight in this study. Food insecurity and agro-health-based programs may be considered while designing interventions to curb various forms of malnutrition.

Conflict of Interest

The authors declare no conflict of interest.

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Supplementary file

Sampling strategy

The sampling technique was proportionate random sampling.

Stage 1: First the total number under -5 from children was estimated in coordination with the health centre and Dhulikhel municipality, ie, 3319

Stage 2: Exclusion of the under five children based on the exclusion criteria above.

Stage 3: From all the wards under five name list was randomly selected to make the sample size sufficient which is 321.

Stage 4: Proportionate number of samples were selected from each ward by proportionate random sampling. The collection of samples in each ward is calculated as below.

Table 1. Distribution of sample size according to ward

Ward No	Calculation	Required sample size i.e. number of children required.
1	$280 \times 321 / 3319$	27
2	$252 \times 321 / 3319$	24
3	$233 \times 321 / 3319$	23
4	$307 \times 321 / 3319$	30
5	$153 \times 321 / 3319$	15
6	$197 \times 321 / 3319$	19
7	$400 \times 321 / 3319$	39 Actually taken 40
8	$362 \times 321 / 3319$	34
9	$354 \times 321 / 3319$	35 Actually taken 36
10	$149 \times 321 / 3319$	14
11	$375 \times 321 / 3319$	36
12	$257 \times 321 / 3319$	25