PREVALENCE OF MALNUTRITION AMONG UNDER-FIVE CHILDREN RESIDING IN KAMAL GAUPALIKA, JHAPA

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ABSTRACT

Malnutrition among under-five is a major global health problem in developing countries like Nepal. It directly or indirectly affects many aspects of the child's health, adversely affecting growth and development. Also, malnutrition affects the child's ability to learn and process information and growth. This study assesses the prevalence of malnutrition among under-five children in Kamal Gaupalika, Jhapa, Nepal. First, a descriptive cross-sectional method was conducted among 60 under-five children and their mothers. The interview included semi-structured and structured questionnaires regarding socio-demographic and contributing factors of malnutrition and anthropometric measurement (analog weighing machine, measuring tape, mid-upper arm circumference) used for data collection. Then, the collected data were analyzed using SPSS-16, employing descriptive statistics (i.e. percentage, frequency, mean and standard deviation) and inferential statistics (i.e. chi-square). This study shows that 41.67% were malnourished. Among them, stunting was 20.0%, wasting was 25.0%, and underweight was 31.7%. Anthropometric measurement showed 83.3% were well-nourished, 11.7% were at risk for acute malnutrition, and 5% were moderate acute malnutrition. Family income was found to be significantly associated with malnutrition (stunting $p = 0.001$, wasting $p = 0.007$ and underweight $p = 0.000$). In contrast, there was no association in age, gender, ethnicity, mother's education, father's education, and mother's age at childbirth. Our results showed that malnutrition is prevalent in the selected study area. Therefore, community-based nutrition awareness and education programs are necessary to improve the nutritional status of children.

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DOI: https://doi.org/10.3126/nmcj.v24i2.46025

INTRODUCTION

The nutritional status of children today reflects a healthy and productive generation in the future. Improved nutrition and health enhance the learning ability of children. In the long – run, it leads to an increase in the strength of the labor force, thereby contributing positively to economic growth. The human body requires many macro-nutrients such as energy, protein, fats, and micro-nutrients to maintain good health.[1] Good nutrition is the bedrock of child survival, health, and development. Well-nourished children are better able to grow and learn, participate in and contribute to their communities, and be resilient in the face of disease, disasters, and other global crises. But for the millions of children suffering from malnutrition, the reality is stark. This chronic malnutrition will result in stunting for millions more, an irreversible condition that stunts children's physical and cognitive growth.[2]

Malnutrition refers to deficiencies, excesses, or imbalances in energy and/or nutrient intake. The term malnutrition covers two broad groups of conditions. One is undernutrition-which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age), and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). And, the other is overweight, obesity, and diet-related non-communicable diseases (such as heart disease, stroke, diabetes, and cancer).[3] Malnutrition among under-five is a major global health problem in developing countries. It directly or indirectly affects many aspects of the child's health, which may adversely affect growth and development and their ability to learn and process information and growth. For example, nearly half of all deaths in under-five children are attributable to undernutrition; undernutrition puts children at greater risk of dying from common infections, increases the frequency and severity of such infections, and delays recovery.[4]

In 2019 globally, 47 million children under five years were wasted, of which 14.3 million were severely wasted, 144 million were stunted, and 38.9 million were overweight.[4] In South Asia, 14.8% were wasted children, 33.2% were stunted, and 2.5% were overweight. Similarly, in East Asia and the Pacific, 3.7% were wasted, 11% stunted, and 6.8% were overweight. Likewise, in South Africa, 5.6% wasted, 32.7% were stunted, and 3.7% were overweight. In Latin America and the Caribbean, 1.3% were wasted, 9% were stunted, and 7.5% were overweight. Nearly two out of five stunted children lived in South Asia, while two out of five lived in Sub-Saharan Africa. More than half of all wasted children lived in South Asia and one quarter in Sub-Saharan Africa, with similar proportions for severely wasted children. At 14.8 percent, South Asia's wasting prevalence represents a situation requiring a serious need for intervention with appropriate treatment programs.[4]

In Bangladesh, about 5.5 million children under-five years (36 percent) suffer from chronic malnutrition, and 14 percent are acutely malnourished.[5] In Sri Lanka, 17.3% were stunted, 15.1% wasted, and 2% were overweight, under-five children as per the UNICEF report of 2016.[6] Similarly, in Pakistan, four out of ten children under five years of age are stunted, 40.2%, while 17.7% suffer from wasting. The double burden of malnutrition is becoming increasingly apparent, with almost one in three children underweight (28.9%) alongside a high prevalence of overweight (9.5%) in the same age group. Over seven years, the prevalence of overweight among children under five has almost doubled, increasing from 5.0% in 2011 to 9.5% in 2018.[7] In 2019, according to a UNICEF report in India, stunting was 35%, wasting 17.0%, and overweight 2.0% among under-five children.[8] In Nepal, 45.0% of under-five children are malnourished, according to UNICEF's report of 2019.[9] According to the 2016 Demographic and Health Survey (DHS), thirty-six percent of children under-five are stunted, 10.0% are wasted, 27.0% are underweight, and 1.0% are overweight.[10] Nutrition levels are affected by food intake, access to safe drinking water, and education about the right selection of food. Underweight children in cities and the rise in obesity result from the proliferation of junk food replacing traditional nutrient-rich grains.[11] Child malnutrition is caused by a combination of inadequate or inappropriate food intake, frequent child infections, lack of mothers' knowledge regarding child nutrition, feeding practices, hygiene, and sanitation. From birth to two years of age, the period is important to a child for desirable physical, mental, and cognitive growth, health, and development.[12]

MATERIALS AND METHODS

A descriptive cross-sectional study design was used for the study. The research study was conducted among under-five children (6 to 60 months) and their mothers in the community of wards 5 and 6 of Kamalgaupalika, Jhapa. Non -probability purposive sampling technique was used for data collection. Interview schedules containing structured and semi-

structured questions were developed. All collected data were reviewed and checked daily for completeness and accuracy. Data were organized and coded. SPSS 16 was used for the data analysis. Statistical tests: Descriptive statistics (mean, frequency, standard deviation, and percentage) and inferential statistics (Chi-square test) were applied.

Prevalence of malnutrition was found in three major indicators of malnutrition based on Z score of height for age, weight for height, weight for age indicated as stunting, wasting, and underweight, respectively. According to WHO standards, stunting refers to child with length/height for age Z-score below -2 standard deviation (SD) of the median of a reference standard. Wasting is defined as the children with weight for height Z-score is below -2 standard deviation from the median of a reference standard. Underweight is defined as the children with weight for age Z-score is below -2 standard deviation from the median of a reference standard. Likewise, moderate acute malnutrition is weight for height between -3 and -2 Z-scores of the WHO child growth standard medians and/or mid upper arm circumference (MUAC) greater or equal to 115mm and less than 125mm. Whereas, severe acute malnutrition is very low weight for height i.e. below -3 Z-score of the median WHO growth standard by visible severe wasting or by the presence of nutritional oedema. The anthropometric measurements such as analog weighing machine, measuring tape, mid upper arm circumference was used for data collection. Z-score was used to determine underweight, stunting and wasting based on WHO growth standard 2007 using WHO Anthro 2011 software version 3.2.2.

RESULTS

The main findings of the study are presented in the four subsections:

Finding of socio-demographic information:

Table 1 shows that less than half, i.e. 30.0% of respondents were of age 25-36 months, whereas 49-60 months (23.3%), 13-24 months (20.0%), 37-48 months (15.0%), and remaining 11.7% of the respondents were of age 6-12 months. Furthermore, more than half, i.e. 53.3%, were male, and the remaining 46.7% were female. Regarding ethnicity, more than half of respondents, i.e. 56.7%, were Disadvantaged Janajatis, 21.7% were upper-caste groups, and 21.7% were relatively advantaged *Janajati*. In addition, more than half of the respondents (53.3%) were *Hindu,* 25.0% were *Kirati,* and 21.7% were *Buddhist*.

Table 1: Distribution of respondents according to socio-demographic information		
Variables	**n**	**%**
Age (Months)		
6-12	7	11.7
13-24	12	20.0
25-36	18	30.0
37-48	9	15.0
49-60	14	23.3
Mean: 31.3 SD±27.90	**Min (6)**	**Max (60)**
Gender		
Female	28	46.7
Male	32	53.3
Ethnicity		
Disadvantaged *Janajati*	34	21.7
Relatively advantage *Janajati*	13	21.7
Upper caste group		
Religion		
Buddhism	13	21.7
Hinduism	32	53.3
Kirant	15	25.0

According to the mother's occupation, 50.0% (30) of respondents were homemakers, 36.7% (22) were in agriculture, and 13.3% (8) were in business. And, according to the father's occupation, 35.0% (21) of respondents were in agriculture, 26.7% (16) business, 20.0% (12) foreign employment, 13.3% (8) employees, and 5.0% (3) were labor. According to the family structure, more than half of the respondents (55.0%) lived in a nuclear family, whereas 45.0% were from a joint family. Similarly, according to the family size, 51.7% have 5-10 family members, and 48.3% have less than five members.

Table 2 shows that in the case of education status of the mother, almost all of the respondents, i.e. 96.7% were literate, among which 6.7% could just read and write, 33.3% had studied up to 8, 53.3% studied up to higher secondary level, 3.3% had studied up to university/college level and remaining 3.3% were illiterate. On the other hand, in the case of education status of the father, almost all of the respondents, i.e., 98.3% were literate, among which 3.3% could just read and write, 20.3% had studied up to 8, 70.0% studied up to higher secondary level, 5% had studied up to university/college level and remaining 1.7% were illiterate. According

to family income, half of the respondents i.e. 50.0% (30) family income was Rs (48,751-97,450), 35.0% (21) was Rs. (36,551- 48,750) and remaining 15.0% (9) was Rs. (24,351-36,550). According to the mother's age during childbirth, more than half of the respondents, i.e. 66.7% were 20-35 years, 25.0% were less than 20 years, and the remaining 8.3% were less than 20 years.

Table 2: Distribution of the respondents according to education

Variables	n	%
Education status of the mother		
Illiterate	2	3.3
Literate:	58	96.7
Read and write	4	6.7
Basic (up to 8th standard)	20	33.3
Higher secondary level (9-12th standard)	32	53.3
University/ college level	2	3.3
Education status of the father		
Illiterate	1	1.7
Literate:	59	98.3
Read and write	2	3.3
Basic (up to 8th standard)	12	20.3
Higher secondary level (9- 12th standard)	42	70
University/ college level	3	5

3.2 Contributing factors of malnutrition

Table 3 depicts, in case of child weight at birth, the majority of respondents, i.e. 80.0% was 2500-3500 gm, 15% was >3500 gm, and the remaining 5.0% was <2500. Almost all respondents, i.e. 98.3%, visited for antenatal checkups, whereas 1.7% did not visit for an antenatal checkup. Regarding times of antenatal checkup, 26.7 % of mothers visited three times, 25.0% visited four or more, and the remaining 6.7% visited two times. In the case of delivery location, almost all respondents, i.e. 98.3%, delivered children at the hospital and the remaining 1.7% delivered at home. In the case of delivery types, 51.7% of the respondents had caesarean, and the remaining 48.3% had a normal delivery. 51.7% of respondents visited for a postnatal checkup, and the remaining 48.3% did not visit.

Table 3: Distribution of respondents according to the birth history of the child

Variables	n	%
Weight at birth(grams)		
<2500	3	5.0
2500-3500	48	80.0
>3500	9	15.0
Antenatal checkup		
Yes	59	98.3
No	1	1.7
If yes, times of ANC checkup		
Two	4	6.8
Three	16	27.1
Four or more	39	66.1
Place of delivery		
Home	1	1.7
Hospital	59	98.3
Type of delivery		
Normal	29	48.3
Caesarian	31	51.7
Postnatal checkup		
Yes	31	51.7
No	29	48.3

According to the history of breastfeeding, almost all respondents, i.e. 96.7%, were given colostrum milk, and the remaining 3.3% were not given. In the case of breastfeeding after delivery, 53.3% were breastfed 2-4 hours, 18.3% were breastfed within an hour, 16.7% were breastfed immediately after birth, and 11.7% were breastfed after four hours. Table 4 shows that in the case of the feeding method, more than half of the respondents, i.e. 55%, were breastfeeding, 41.7% were both, and the remaining 3.3% were bottle-feeding. Among 27 respondents who had been given bottle-feeding, 23.3% were given cow's milk, and the remaining 21.7% were given formula milk. Similarly, in the case of bottle cleaning methods, most of the respondents, i.e. 33.3%, use boiling water, 10% use soap and water, and the remaining 1.7% use clean water. More than half of the respondents, i.e. 56.7%, were exclusively breastfed, and the remaining 43.3% did not exclusively breastfeed. Among 26 respondents who had not exclusively breastfed, 38.3% were due to insufficient milk, and the remaining 5% were due to the mother's disease. More than half of the respondents, i.e. 60.0%, were not

continuing breastfeeding, and the remaining 40.0% were continuing breastfeeding. Among 36 respondents not continuing breastfeeding, the duration for one year was 8.3%, two years was 23.3%, two and half years was 20.0%, and the remaining 8.3% for three years.

Table 4: Distribution of respondents according to feeding pattern		
Variables	n	%
Method of feeding		
Breastfeeding	33	55.0
Bottle-feeding	2	3.3
Both	25	41.7
Type of Milk for Bottle-feeding		
Cow's milk	14	23.3
Formula milk	13	21.7
Method to Clean Bottle		
Clean Water	1	1.7
Boiling	20	33.3
Soap and Water	6	10.0
Exclusively Breastfeeding		
Yes	34	56.7
No	26	43.3
If no		
Insufficient Milk	23	38.3
Disease condition of the mother	3	5.0
Child continuing breastfeeding		
Yes	24	40.0
No	36	60.0
If no, the duration for breastfeeding		
One year	5	8.3
Two years	14	23.3
Two and half years	12	20.0
Three	5	8.3

Table 5 illustrates that 58.3% of respondents performed weaning at age six months or more, and the remaining 41.7% performed weaning at an age less than six months. In the case of food for weaning, more than half of the respondents, i.e., 58.3%, were given *jaulo*, 26.7% porridge, and the remaining 15% adult food. For feeding per day, 46.7% were fed four times, 30% three times, and the remaining 23.3% more than four times. Based on the type of food given, most of the respondents, i.e., 90% adult food, 8.3% *sarbottam pitho*, and the remaining 1.7% *jaulo*. Similarly, according to the source of drinking water, 61.7% of respondents use tube wells

and the remaining 38.3% use tap. And, more than half of the respondents, 51.7%, did not purify drinking water, whereas 48.3% purified. Among 29 respondents, for a water purification method, 28.3% used filtration, and the remaining 20% used boiling. All respondents, i.e. 100.0%, were immunized. The majority of the respondents, i.e. 83.3%, were given vitamin A within six months, and 16.7% were not given. In the case of deworming tablets, the majority of the respondents, i.e. 83.3%, were given, and 16.7% were not given tablets within six months. According to treatment, most respondents, i.e. 85.0% (51), go to the clinic and the remaining 15.0% (9) hospital.

Table 5: Distribution of respondents according to weaning and food		
Variables	n	%
Weaning Age		
Less than six months	25	41.7
Six months or more	35	58.3
Food for weaning		
Adult Food	9	15.0
Jaulo	35	58.3
Porridge	16	26.7
Feeding per day		
Three	18	30.0
Four	28	46.7
More than four	14	23.3
Type of food		
Adult Food	54	90.0
Jaulo	1	1.7
Sarbotam Pitho	5	8.3

According to hospitalization, most respondents, i.e. 80%, were not hospitalized, whereas 20% were hospitalized. Among 40 diseased children, 38.3% suffered the common cold, 11.7% suffered pneumonia, 11.7% suffered jaundice, and 5% suffered diarrhea. Based on the birth order of a child, 40% (24) were second child, 38.3% (23) were first child, 15.0% (9) was the third child, and the remaining 6.7% (4) were the fourth child. Most of the respondents, i.e., 85%, had one under-five child, whereas 15% had two. In the case of birth spacing between children, 41.7% had more than four years, 21.7% had 2-4 years, and 6.7% had less than two years. Based on the use of family planning, more than half of respondents, i.e. 53.3% (32), did not use any family planning, and the remaining 46.7% (28) used family planning.

Table 6: Distribution of Respondents according to the prevalence of level of malnutrition

Variables	n		%	
	Yes	No	Yes	No
Stunting	12	48	20.0	80.0
Wasting	15	45	25.0	75.0
Underweight	19	41	31.7	68.3

Table 7: Distribution of respondents according to mid-upper arm Circumference

Variables	n	%
>13.5 cm	50	83.3
12.5-13.5 cm	7	11.7
11-12.4cm	3	5.0

Table 8: Association of stunting with selected socio-demographic variables

Variables	Stunting		P-value
	Yes (%)	No (%)	
Age (Months)			
6-24	4 (22.2)	14 (77.8)	0.740
25-60	8 (19.0)	34 (81.0)	
Gender			
Female	3 (10.7)	25 (89.3)	0.093
Male	9 (28.1)	23 (71.9)	
Ethnicity			
Disadvantaged *Janjati*	8 (23.5)	26 (76.5)	0.434
Others	4 (15.4)	22 (84.6)	
Mother's education status			
Illiterate	2 (100.0)	0 (0.0)	0.37
Literate	10 (17.2)	48 (82.8)	
Father's education			
Illiterate	0 (0.0)	1 (100.0)	1.000
Literate	12 (20.3)	47 (79.7)	
Family income			
Rs. 48,751-Rs. 97,450	1 (3.3)	29 (96.7)	**0.001***
Others	11 (36.7)	19 (63.3)	
Mother's age at childbirth			
<20	2 (40.0)	3 (60.0)	0.259
≥20	10 (18.2)	45 (81.8)	

P value significant at ≤ 0.05

Note: Ethnicity Others = Relatively advantage *Janjati*, Upper caste group

Family Income Others = Rs 36,551- Rs 48,750, Rs 24,351-Rs 36,550

3.3 Level of malnutrition

This study finds 41.67% had malnutrition. Table 6 shows, level of malnutrition, 20% stunting, 25% wasting and 31.7% underweight. Similarly, **Table 7** depicts, mid upper arm circumference 83.3% were >13.5 cm, 11.7% were 12.5-13.5cm and 5.0% were 11-12.4 cm.

3.4 Association of malnutrition with socio-demographic variables

Table 8 shows stunting had a statistically significant association with the family income of respondents (p=0.001), using the Chi-square test. But there was no association seen with age, gender, ethnicity, mother's education status, father's education status, and mother's age.

Table 9: Association of wasting with selected socio-demographic variables

Variables	Wasting		P-value
	Yes (%)	No (%)	
Age (Months)			
6-24	5 (27.8)	13 (72.2)	0.754
25-60	10 (23.8)	32 (76.2)	
Gender			
Female	6 (21.4)	22 (78.6)	0.550
Male	9 (28.1)	23 (71.9)	
Ethnicity			
Disadvantaged *Janjati*	8 (23.5)	26 (76.5)	0.764
Others	7 (26.9)	19 (73.1)	
Mother's education Status			
Illiterate	1 (50.0)	1 (50.0)	0.441
Literate	14 (24.1)	44 (75.9)	
Father's education Status			
Illiterate	1 (100.0)	0 (0)	0.250
Literate	14 (23.7)	45 (76.3)	
Family income			
Rs48,751-Rs97,450	3 (10)	27 (90.0)	**0.007***
Others	12 (40.0)	18 (60.0)	
Mother's age at childbirth			
<20	2 (40.0)	3 (60.0)	0.591
≥20	13 (23.6)	42 (76.4)	

P Value significant at ≤ 0.05

Note: Ethnicity Others = Relatively advantage *Janjati*, Upper caste group

Family Income Others = Rs 36,551- Rs 48,750, Rs 24,351-Rs 36,550

Table 9 depicts wasting had a statistically significant association with the family income of respondents (*p*=0.007), using the Chi-square test. But there was no association seen with age, gender, ethnicity, mother's education status, father's education status, and mother's age. Table 10 illustrates underweight had a statistically significant association with the family income of respondents (*p*=0.000), using the Chi-square test. But there was no association seen with age, gender, ethnicity, mother's education status, father's education status, and mother's age.

Table 10: Association of underweight with selected socio-demographic variables		
Variables	**Underweight**	**P-value**
	Yes (%)	**No (%)**	
Age (Months)			
6-24	6 (33.3)	12 (66.7)	0.856
25-60	13 (31.0)	29 (69.0)	
Gender			
Female	8 (28.6)	20 (71.4)	0.630
Male	11 (34.4)	21 (65.6)	
Ethnicity			
Disadvantaged *Janjati*	9 (26.5)	25 (73.5)	0.322
Others	10 (38.5)	16 (61.5)	
Mother's education status			
Illiterate	1 (50.0)	1 (50.0)	0.537
Literate	18 (31.0)	40 (69)	
Father's education status			
Illiterate	1 (100.0)	0 (0.0)	0.317
Literate	18 (30.5)	41 (69.5)	
Family income (NRs.)			
48,751- 97,450	3 (10.0)	27 (90.0)	**0.000***
Others	16 (53.3)	14 (46.7)	
Mother's age at childbirth			
<20	2 (40.0)	3 (60.0)	0.648
≥20	17 (30.9)	38 (69.1)	

P Value significant at ≤ 0.05

Note: Ethnicity Others = Relatively advantage *Janjati*, Upper caste group

Family Income Others = Rs. 36,551 - Rs. 48,750, Rs. 24,351 - Rs. 36,550

DISCUSSION

In the present study, the prevalence of stunting, wasting, and underweight among under-five children is 20.0%, 25.0%, and 31.7%, respectively. This present study shows a lower prevalence of stunting, higher prevalence of wasting, and similar prevalence of underweight than the finding of Gautam and Acharya (2020) in Sindhupalchowk, Nepal, which is stunting 47.0%, wasting 11.3% and underweight 30.4%[13]. In this study, anthropometric measurement shows 5.0% moderate acute malnutrition, 11.7% risk for acute malnutrition, and 83.3% well-nourished, which shows the inconsistent result with the study conducted in Sindhupalchowk, Nepal by Gautam and Acharya (2020), which shows 4.3% acute malnutrition, 25.2 % risk for malnutrition and 70.4 % well-nourished[13].

In the present study, birth weight of child <2500gm was 5.0%, four complete ANC visits were 25.0%, initiation of breastfeeding immediately after birth 16.7%, colostrum feeding was 96.7%, exclusive breastfeeding was 56.7%, weaning at age less than six months was 41.7%, source of drinking water, i.e. tap 38.3% and water purification 48.3%. This study shows a very high prevalence of wasting and being underweight. Still, much lower prevalence of stunting than other research done by Chataut and Khanal (2016) in the rural area of Nepal, which is wasting 7.0%, underweight 18.9%, and stunting 39.9%.[14] Furthermore, the finding of this study shows a similar prevalence of wasting and a much lower prevalence of stunting and underweight compared to research done by Shah *et al*.[15] (2016) in Siraha, Nepal, which is wasting 21.0%, stunting 47.0%, and underweight 36.0%. At another hand, the finding of this study shows the lower prevalence of stunting, the similar prevalence of underweight, and higher prevalence of wasting in comparison to other research was done by Popat *et al*.[16] (2014) in Vadodara, India, which is stunting 46.1%, underweight 32.4% and wasting 17.2%.

In the present study, the prevalence of stunting, wasting, and underweight among under-five children is 20.0%, 25.0%, and 31.7%, respectively. This present study shows a lower prevalence of stunting, a higher prevalence of wasting, and a similar prevalence of underweight than the finding of Das and Gulshan (2017) in Bangladesh, which is stunting 36.2%, wasting 15%, and underweight 33.0%.[17] Furthermore, this study shows a significant association between stunting, wasting, and underweight with family income, i.e. (p= 0.001, 0.007 & 0.00) respectively, and no association was seen with

other selected socio-demographic variables. Therefore, the present study is consistent with the study conducted by Das and Gulshan (2017) in Bangladesh, which shows there was an extremely significant association between stunting, wasting, and underweight with family income (p= 0.000).[17]

In conclusion, this study shows that 41.7% less than half of the under five children were malnourished. Among them, stunting was 20.0%, wasting was 25.0%, and underweight was 31.7%. Anthropometric measurement shows 83.3% well-nourished, 11.7% risk for acute malnutrition, and 5.0% moderate acute malnutrition. Family income was found to be significantly associated with malnutrition. Based on the findings, it is concluded that malnutrition is prevalent among under-five children in the community of Kamalgaupalika. Therefore, community-based nutrition awareness and education programs are necessary to improve the nutritional status of children. Community awareness programs on complete antenatal checkups, exclusive breastfeeding, clean and appropriate child feeding practices, and environmental sanitation are to be carried out by health personnel.

Conflict of interest: None
Source of research fund: None

REFERENCES

1. Ekanayake S, Weerahewa J, Ariyawardana A. Role of Mothers in Alleviating Child Malnutrition: Evidence from Sri Lanka. 9th National Convention on Women's Studies. 2003; 1–20.

2. UNICEF. Nutrition. UNICEF Nepal. 2015.https://www.unicef.org/nepal/nutrition (accessed 8 July 2020).

3. WHO. Malnutrition 2017. https://www.who.int/news-room/questions-and-answers/item/malnutrition (accessed 8 July 2020).

4. UNICEF. Malnutrition. UNICEF Data Monit. Situat. Child. women. 2020. Available at: https://data.unicef.org/topic/nutrition/malnutrition/ (accessed 8 July 2020).

5. USAID. Bangladesh: Nutrition Profile. 2018; : 1–8.

6. Global Nutrition Report. Country Nutrition Profiles: Sri Lanka, The burden of malnutrition at a glance. 2016. Available at: https://globalnutritionreport.org/resources/nutrition-profiles/asia/southern-asia/sri-lanka/ (accessed 7 August 2020).

7. Ministry of National Health Services. National nutrition survey 2018, Key findings report. 2018. Available at: https://www.unicef.org/pakistan/media/1871/file/KeyFindings-NationalNutritionSurvey2018.pdf.

8. UNICEF. Nutrition. UNICEF India. 2019. Available at: https://www.unicef.org/india/what-we-do/nutrition (accessed 7 August 2020).

9. UNICEF. Poor diets damaging children's health, warns UNICEF. UNICEF UK. 2019. Available at: https://www.unicef.org.uk/press-releases/poor-diets-damaging-childrens-health-warns-unicef/ (accessed 7 August 2020).

10. Ministry of Health, New Era, ICF. Nepal Demographic and Health Survey. Kathmandu, 2016. Available at: https://dhsprogram.com/pubs/pdf/FR336/FR336.pdf.

11. Awale S. Nearly half of Nepali children still malnourished. *Nepal Times* 2019. Available at: https://www.nepalitimes.com/banner/nearly-half-of-nepali-children-still-malnourished/.

12. Baral S, Ghimire R, Uprety S, Regmi K, Lamichhane B. Nutrition in Nepal: A monthly media monitoring report, Magh 2073. 2017. Available at: https://www.herd.org.np/publications/163.

13. Gautam J, Acharya R. Nutritional status and its associated factors among under-five children in Bhimtar of Sindhupalchowk District Nepal. *Birat J Heal Sci* 2020; 4: 771–6.

14. Chataut J, Khanal K. Assessment of nutritional status of children under-five years of age in rural Nepal. *Kathmandu Univ Med J* 2016; 14: 73–7.

15. Shah SK, Shetty SK, Shingh DR, Mathias J, Upadhyay A, Pandit R. Prevalence of Undernutrition among Musahar Children Aged Between 12 To 59 Months in Urban Siraha District, Nepal. *MOJ Public Health* 2016; 4. doi:10.15406/mojph.2016.04.00093.

16. Popat C, Chaudhari A, Mazumdar V, Patel S. A cross sectional study to measure the prevalence of malnutrition and factors associated with malnutrition among under five children of an urban slum of Vadodara city. *J Res Med Dent Sci* 2014; 2: 59.

17. Das S, Gulshan J. Different forms of malnutrition among under five children in Bangladesh: a cross sectional study on prevalence and determinants. *BMC Nutr* 2017; 3: 1.