Prevalence of malnutrition and its associated factors among 6-59 months children attending the pediatric outpatient department in a tertiary care center in rural Nepal

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ABSTRACT

Introduction: Children constitute the most vulnerable group of any community. Their nutritional status is a sensitive indicator of community health and nutrition. Malnutrition is a very common problem in children under five years of age in Nepal and is a significant contributor to mortality and morbidity accounting for more than half of all child deaths. This study was done to assess the burden of malnutrition and associated factors among children aged 6-59 months.

Methods: This was a hospital based cross-sectional study, conducted from June 2022 to May 2023 at the Pediatrics OPD of Karnali Academy of Health Sciences (KAHS), Jumla. A total of 164 children were enrolled for this study. Anthropometric measurements were used as per WHO guidelines to assess three nutritional status: Underweight, stunting, and wasting using descriptive statistics and chi square test were applied using SPSS 16 to assess social and predisposing factors. All the data were recorded in the preformed proforma. It was then analyzed with the help of SPSS version 16. p-value< 0.05 was considered statistically significant.

Results: Prevalence of stunting, wasting, and underweight were 38.4%, 39.1%, and 39.7% respectively. The prevalence of stunting and underweight was seen more in males than in females whereas wasting was very similar in both sexes.

Conclusion: The findings showed that there is a high prevalence of malnutrition in Jumla, so monitoring of nutrition status in children should be taken seriously and needs to be addressed.

Keywords: Children, malnutrition, nutritional status

INTRODUCTION

Malnutrition is one of the most widespread causes of morbidity and mortality among children and adolescents throughout the world [1]. 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 [2]. Under nutrition places children at an increased risk of infection, impaired physical and mental growth, poor socio-emotional development due to deficiencies of micro and macro nutrients like protein, iodine, iron and vitamin A [3]. Malnutrition refers to deficiencies, excesses, or imbalances in energy and/or nutrient intake. The term malnutrition covers two broad groups of conditions. One is under nutrition which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age), and micro nutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). And, the other is overweight and obesity [2,4].

Over 10 million under-five children annually die from the diseases which are preventable and treatable almost all these deaths occur in developing countries. Malnutrition is responsible for over 50% of these 10-11 million under-five deaths from preventable diseases [5]. Twenty- five percent of children under five in Nepal are stunted, 8% are wasted and 19% are underweight according to Nepal demographic health survey 2022 [6]. Nepal suffers from extensive malnutrition ranking in the top 10 countries with the highest prevalence of stunting (less than -2 S.D scores) and the top 20 countries by the number of stunted children less than 5 years of age worldwide [7].

So, this study was conducted in the rural part of Nepal to evaluate the prevalence of malnutrition in children 6-59 months of age along with its relationship with several demographic factors. Anthropometric measurements like age, gender, length, height, weight were used as per guidelines of WHO (World Health Organization), to assess nutritional status (Table 1) based on standard deviation score (Z score) [8].

Table 1: Classification of malnutrition for weight for height, height for age, and weight for age

Classification	Z score
Normal	Z score between -2 to +2
Moderately malnourished	Z score between -2 to -3
Severely malnourished	Z score < -3

METHODS

This hospital-based cross-sectional study was carried out at the Pediatrics Out-Patient Department (OPD) of Karnali Academy of Health Sciences (KAHS) from June 2022 to May 2023. KAHS is a tertiary care center located in Karnali Province. Institutional ethical clearance was obtained from the Institutional Review Committee (IRC) of KAHS prior to commencing the study (Ref: 2078/079/54). The sample size was calculated by using prevalence formula, n = Zα2 PQ /d2 where Zα = 1.96,

P= 36% and d= 7.5% assuming 36% prevalence of stunting children with reference to Nepal Demographic Health Survey (NDHS, 2016) report.

The research study was conducted among 164 under-five children (6 to 59 months) attending OPD fulfilling the inclusion criteria after taking consent from care takers. A non-probability purposive sampling technique was used for data collection. Data were collected using a semi-structured questionnaire and anthropometric measurements.

The collected data were organized, coded, and entered into Statistical Package for Social Sciences (SPSS) version 16.0. After tabulating all the data, it was then analyzed using both descriptive and inferential statistics. The nutritional status was then measured by WHO standard and MUAC standards. Anthropometric indices were calculated using reference medians recommended by WHO and classified according to standard deviation units (z scores) based on the WHO criteria. The chi-square test was applied to test the association between nutritional status and its associated factors. A p-value less than 0.05 was considered statistically significant.

RESULTS
Among the total 164 children, 90(54.8%) were male and 74(45.2%) were female, with a Male: Female ratio of 1.2:1, as shown in Table 2. The age-wise distribution showed that the majority of the children (52.4%) were in the 25- to 48-month age group, 32.4% in the 49- to 59-month age group, and 15.2% in the 6- to 24-month age group. Ethnicity distribution revealed that majority of the study population was Dalit (29.8%), followed by Chhetri (29.2%) and Tamang (17.1%).

Table 2: Socio-demographic characteristics of family (n=164) : Distribution of respondents

General Characteristics	Frequency (n = 164)	Percentage (%)
Age of Children (in months)		
6-24	25	15.2
25-48	86	52.4
49-59	53	32.4
Ethnicity		
Brahmin	24	14.6
Chhetri	48	29.2
Tamang	28	17.1
Newar	5	3.04
Dalit	49	29.8
others	10	6.09
Religion		
Hindu	108	65.8
Buddhist	38	23.2
Christian	14	8.6
Others	4	2.4
Occupation		
Agriculture	110	67.1
Service	9	5.4
Labour	32	19.5
Business	3	1.8
Other	10	6.2
Family		
Nuclear	34	20.7
Joint	130	79.3
Family Member		
Less or equal to 4	109	66.4
More than 4	55	33.6

The majority (65.8%) of the households were followers of the Hindu religion, and 23.2% followed Buddhism. Agriculture (67.1%) was the most common occupation of the parents among professions like service, labour and business.

Table 3 shows, in case of child weight at birth, the majority of respondents, i.e. 59.8% was less than 2500 gm and the remaining 40.2% was more than 2500. Most of the respondents, i.e. 96.3%, visited for antenatal checkups, whereas 3.7% did not visit for checkup. 61.5% 0f children got delivered at health facilities (institutional delivery) and the rest 38.5% had home delivery.

Table 3: Distribution of respondents according to the birth history of the child (n=164)

Variables	Frequency(n)	Percentage(%)
Birth weight		
Less than 2500 gram	98	59.8
2500 gram or more	66	40.2
Antenatal checkup		
Yes	158	96.3
No	8	3.7
Place of delivery		
Health facilities	101	61.5
Home	63	38.5
Type of delivery		
Normal	139	84.7
Casearean	25	15.3

Table 4 shows level of malnutrition, 38.4% stunting, 39.1% wasting and 39.7% underweight.

Table 4: Distribution of respondents according to the prevalence of level of malnutrition (n=164)

Variables	Frequency (n=164)		Percentage (%)	
	Yes	No	Yes	No
Stunting	63	101	38.4	61.6
Wasting	64	100	39.1	60.9
Underweight	65	99	39.7	60.3

Following Table 5 depicts mid upper arm circumference(MUAC) as 61.5 % had MUAC >12.5 cm, 25.0% had MUAC 11.5-12.4cm and 13.5% with MUAC <11.5 cm.

Table 5: Distribution of respondents according mid upper arm circumference(n=164)

Variables	Frequency(n=164)	Percentage (%)
>12.5 cm	101	61.5
11.5-12.4 cm	41	25.0
<11.5 cm	22	13.5

Frequent illness and birth weight was significantly associated with stunting and underweight in the study(p-value<0.05).

Table 6: Nutritional status of children (n=164)

Variable	Weight for age			Height for age			Weight for height		
	Normal	Moderate	Severe	Normal	Moderate	Severe	Normal	Moderate	Severe
Gender									
Male	54(60%)	24(26.6%)	12(13.4%)	53(58.8%)	23(25.5%)	14(15.7%)	57(63.3%)	20(22.2%)	13(14.5%)
Female	45(60.8%)	20(27%)	9(12.8%)	48(64.8%)	15(20.2%)	11(15%)	43(58.1%)	19(25.6%)	12(16.3%)
P value	0.9754			0.6915			0.7909		
Age Group (in months)									
6-24	20(80%)	5(20%)	0 (0%)	18(72%)	5 (27.7%)	2 (0.3%)	20(80%)	4(16%)	1(4%)
25-48	51(59.3%)	22(25.5%)	13(15.2%)	48(55.8%)	18(21%)	20(23.2%)	50(58.1%)	20(23.2%)	16(18.7%)
49-59	28(52.8%)	17(32.1%)	8(15.1%)	35(66%)	15(28.3%)	3(5.7%)	30(56.6%)	15(28.3%)	8(15.1%)
P value		0.1404			0.0468			0.2331	
Education status (mother)									
Illiterate	53(55.2%)	28(29.1%)	15(15.7%)	53(55.2%)	25(26%)	18(18.8%)	57(59.3%)	22(22.9%)	17(17.8%)
Literate	46(67.6%)	16(23.5%)	6(8.9%)	48(70.5%)	13(19.1%)	7(10.3%)	43(63.2%)	17(25.1%)	8(11.7%)
P value		0.2311			0.1213			0.5792	
Frequent illness									
Yes	61(58.6%)	24(23.2%)	19(18.2%)	56(53.8%)	26(25%)	22(21.2%)	66 (63.4%)	23(22.1%)	15(14.5%)
No	38(63.3%)	20(33.3%)	2(3.4%)	45(75%)	12(20%)	3(5%)	34(56.6%)	16(26.7%)	10(16.7%)
P value		0.0161			0.0079			0.6890	
Birth Weight									
Less than 2500 gm	58(59.2%)	25(25.6%)	15(15.2%)	52(53.1%)	26(26.5%)	20(20.4%)	55(56.1%)	25(25.5%)	18(18.4%)
2500 gm or more	41(62.2%)	19(28.7%)	6(9.1%)	49(74.3%)	12(18.2%)	5(7.5%)	45(68.2%)	14(21.2%)	7(10.6%)
P value		0.4956			0.0156			0.2459	
Exclusive breast feeding									
Yes	57(68.6%)	19(22.9%)	7(8.5%)	55(66.3%)	17(20.4%)	11(13.3%)	54(65.1%)	15(18.1%)	14(16.8%)
No	42(51.8%)	25(30.9%)	14(17.3%)	46(56.7%)	21(26%)	14(17.3%)	46(56.8%)	24(29.7%)	11(13.5%)
P value		0.0672			0.4587			0.2173	

DISCUSSION

In the present study, the prevalence of stunting, wasting, and underweight among children aged 6-59 months is 38.4%, 39.1%, and 39.7%, respectively. This present study shows a similar prevalence of stunting, higher prevalence of wasting, and of underweight than the findings of Chataut et al. in Kavre, Nepal, which is stunting 39.9%, wasting 7.0% and underweight 18.9% [9]. It was similar to the study done at Nepal Medical College Teaching Hospital by Rijal P et. al.[10]. Furthermore, the findings of this study show a higher prevalence of wasting and a much lower prevalence of stunting, as well as a similar prevalence of underweight, compared to research conducted by Shah et al. (2016) in Siraha, Nepal, which reported wasting at 21.0%, stunting at 47.0%, and underweight at 36.0% [11]. The result is actually more favorable than the results of the Nepal Demographic and Health Survey (NDHS) 2022. NDHS 2022 clearly mentioned that children in rural areas are more likely to be stunted than those in urban areas [6].

There was a significant association of frequent illness and birth weight with stunting and underweight in our study. This is due to the prolonged effect of inadequate nutrition among children under 5, which is likely attributed to lower maternal education and limited awareness of child nutrition in rural communities. The finding was similar to the findings from other studies, as mothers' role in child feeding practices and education level are associated with high rates of stunting and underweight [12,13].

Anthropometric measurement shows 61.5% well-nourished, 13.5% risk for acute malnutrition, and 25% moderate acute malnutrition. It was similar to the study performed by Babita et.al in Kathmandu [14]. Under-nutrition and weak immunological status can raise the chances of susceptibility and vulnerability to infections. In children under five, the leading causes of malnutrition are inadequate dietary intake and frequent episodes of diarrheal and respiratory diseases. In addition to severe malnutrition, even mild to moderate malnutrition increases the risk of various infections and poses a threat to the child's health [15]. All anthropometric indices in this study reveal that moderate acute malnutrition has a higher prevalence than severe acute malnutrition. However, figures for severe acute malnutrition are such that it cannot be ignored, and appropriate measures should be taken to decrease it.

The study may not be entirely representative of all children in the community, as it is a hospital-based study done on a small sample size and carried out only in one institution over a short duration of time. However, this study is among the few hospital-based assessments of malnutrition from a remote rural setting of Nepal (Jumla), providing valuable insights into nutritional challenges in hard-to-reach populations and it explored multiple associated factors (socio-demographic, birth history, feeding practices, and morbidity), which allowed for a comprehensive analysis of determinants of malnutrition.

CONCLUSION

Our study showed a high prevalence of malnutrition among children between 6 to 59 months of age. We recommend adopting policies to promote exclusive breastfeeding for the first six months of life with continuation of breastfeeding in addition to complementary feeding for up to 24 months of life. Focusing on health education, access to locally available age-appropriate food, and improving water supply and sanitation systems and hygiene practices to protect children against communicable diseases, are the main recommendations of this study.

DECLARATIONS
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Author contribution

SS and UG conceptualized and designed the research. KPT, AS, MK, As, SL, LY, and ER collected the data. SS, PPP, and UG analyzed and interpreted the data. All authors were involved in drafting and reviewing the manuscript for important intellectual content. All authors approved the final version of the manuscript for submission and agreed to be accountable for all aspects of the work.

Conflict of interest

None declared

Ethical approval

This research was approved by the IRC of KAHS with the reference number of 2078/079/54 on 15th July, 2022

Consent/Assent

Informed written consent was obtained from all the patients

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request

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