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Nutritional Status and its Associated Factors Among Under-5 Madhesi Dalit Children Residing in Birgunj Metropolitan City

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ABSTRACT

Introduction: Malnutrition is a major public health issue in Nepal. This study finds out the status of nutrition and explores the factors associated with the nutritional status among under-5 children in Madhesi Dalit residing in Birgunj Metropolitan City, which helps to map out the magnitude and distribution of malnutrition.

Methods: A descriptive cross-sectional study was conducted among 227 under-5 Madhesi Dalit children. Purposive sampling was used to select wards of Birgunj. Face-to-face semi-structured interviews with mothers and anthropometric measurements of 6-59-month-old children were used to collect data. Data entry and analysis were done using IBM SPSS version 20 software. Descriptive statistical analysis was performed, as well as chi-square and Fisher's exact tests to analyze data and assess the association between variables.

Results: This study showed that 95.2% of children were well-nourished and 4.8% of children were malnourished. It shows that the nutritional status of Madhesi Dalit children of Birgunj Metropolitan City was well-nourished. Factors associated with nutritional status were found to be the age of children (6-59 months) (CI= 95%, x2 = 4.740, p-value= 0.029 and df= 1) and sex of children (CI= 95%, x2= 6.2, p-value= 0.045 and df= 2).

Conclusions: The study concluded that the age and sex of the child have a significant association with the nutritional status of children. Factors other than the study factors of this study could be taken to find more influencing factors of nutritional status.

Keywords: *Nutritional status; Children; Prevalence.*

INTRODUCTION

Nutritional health plays a significant role in the growth and development of children, directly influencing their physical, immune, and cognitive functions.[1] The present burden of malnutrition, which includes both undernutrition and overnutrition, across the globe and in Nepal, is huge, making it a public health burden.[1,6]

Madhesi Dalits are at higher risk of malnutrition due to socio-economic disparities, poor nutritional awareness, and limited access to healthcare.[4] Various research on the nutritional status of children in Nepal exists, but research on Madhesi Dalit children of Birgunj Metropolitan City is not present.

This study aims to assess the nutritional status of 6-59 months children of the Madhesi Dalit community and identify the association between the nutritional status of children and various factors like sex of the child, age of the child, age of the mother during delivery, education of mother, occupation of parents, knowledge status of mother on nutrition.

METHODS

This study was a descriptive cross-sectional study conducted in Birgunj Metropolitan City, Parsa. The

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study was carried out in wards no. 1, 9, 16, 17, 20, 22, 23, 25, and 26 of Birgunj Metropolitan City, Parsa. The target participants were scattered throughout the metropolitan city. With the help of the Health Section staff, these wards were selected.

The study populations were children aged 6-59 months from the Madhesi Dalits community and their mothers. All 6-59-month-old Madhesi Dalit children, whose mothers gave us informed consent, were included in the study.

Similarly, children who didn't come under the Madhesi Dalit category or were over 59 months were excluded from the study.

The sample size of the study was calculated using the formula: $n = z^2pq/d^2$

Here, the prevalence of malnourished children (p) was 16.7%, taken from a study conducted among 6-59-month-old children in Parsa District in 2022. The confidence interval was 95%. The sample size was 206.5. After adding a 10% error, the final sample size was 227.

Convenience sampling was done to select the study area, i.e. Birgunj Metropolitan City. Purposive sampling was used to select 9 wards, i.e. 1, 9, 16, 17, 20, 22, 23, 25, and 26, among 32 wards in Birgunj. A total of 9 wards were selected to improve representativeness. Similarly, to select the 227 respondents, convenience sampling was done. The age of children, along with their caste, was verified first for accurate representation. Children from various socio-economic backgrounds were included, and also selecting only easily accessible participants was avoided.

The study utilized both face-to-face interviews and anthropometric measurements to collect nutrition-related data on children. A structured and semi-structured questionnaire was employed to gather demographic details, including the child's age, sex, mother's education level, family income, parental occupation, maternal age at first childbirth, and maternal knowledge of nutrition.

Anthropometric measurements, including height, weight, and Mid-Upper Arm Circumference (MUAC), were used to assess nutritional status. Height was measured using a height measuring scale, weight with a weighing scale, and MUAC with a MUAC tape. Malnutrition was assessed using WHO standard indices: height-for-age (stunting), weight-for-age (underweight), and weight-for-height (wasting). The classification followed WHO Growth Standards, using Z-scores: <-2 standard deviations (SD) for moderate malnutrition and <-3 SD for severe malnutrition. Acute malnutrition was determined using MUAC, with a cutoff of <12.5 cm for moderate and <11.5 cm for severe malnutrition, as per WHO guidelines, along with MUAC to determine acute malnutrition. Similarly, the children who didn't come under the above mentioned forms of malnutrition were regarded as well-nourished in this study.

Tool validity was ensured through a comprehensive literature review and pre-testing on 10% of the sample in a similar setting, while reliability was maintained by measuring weight three times for accuracy and checking data consistency to prevent missing or incomplete information.

The collected data were entered into SPSS version 20 for analysis. Data cleaning was performed to check for missing values, inconsistencies, and outliers. Descriptive statistics, including frequency and percentage, were used to summarize categorical variables. For numerical variables, measures of central tendency (mean, median) and dispersion (standard deviation) were computed as appropriate.

A chi-square test was used to determine associations between categorical variables, while Fisher's exact test was applied when expected frequencies were below five in any cell.

Before we collected data, we got an approval letter from Birgunj Metropolitan City. We also received written and verbal consent from the mothers of the children. Sufficient information about the study, benefits, likely harms, and voluntary participation were given. Ethical approval was obtained from the IRC Committee of Nobel College, Sinamangal (Ref: 080/81/206).

RESULTS

The sample size of the study was 227. The characteristics of the study participants are presented in the table below.

Table 1: Characteristics of study participants

Variables	Categories	n (%)
Child's Age (months)	6-11	29 (12.8)
	12-23	63 (27.8)
	24-35	50 (22.0)
	36-47	52 (22.9)
	48-59	33 (14.5)
Child's Gender	Male	125 (54.9)
	Female	102 (45.1)
Maternal Age at First Childbirth (years)	<20	45 (19.8)
	20-24	115 (50.7)
	≥25	67 (29.5)
Maternal Education	Illiterate	126 (55.5)
	Literate	101 (44.5)
Maternal Occupation	Homemaker	218 (96.0)
Maternal Nutrition Knowledge	Adequate	42 (18.5)
	Inadequate	185 (81.5)
Maternal Nutritional Practice	Adequate	101(44.5)
	Inadequate	126 (55.5)

The study outlines key demographic information about children and their mothers. Of the children surveyed, 12.8% were aged 6-11 months, 27.8% were 12-23 months, 22% were 24-35 months, 22.9% were 36-47 months, and 14.5% were 48-59 months. The gender distribution indicated that 54.9% were male and 45.1% were female.

Among the mothers, 19.8% had their first child before age 20, 50.7% between ages 20-24, and 29.5% at 25 or older. A significant majority, 55.5%, were illiterate, while 96% were homemakers. In terms of nutrition knowledge, only 18.5% had adequate knowledge, with 81.5% having inadequate understanding. Nutritional practices showed that 44.5% of mothers followed adequate practices, whereas 55.5% did not. Among the children, 4.8% were malnourished, while 95.2% had normal nutritional status.

For the association, Fisher's exact test revealed that there was a significant association between the nutritional status and age of the child at p= 0.029 as well as the nutritional status and sex of the child at p= 0.045. However, no associations were found between nutritional status and other study variables such as the age of the mother during first childbirth, educational status of the mothers and fathers, occupation of the parents, economic status of the family, number of children in the family, and the knowledge and practice of nutrition among mothers.

Table 2. Nutritional status of children

Nutritional Status	Frequency n (%)
Well-nourished	216 (95.2)
Malnourished	11 (4.8)
Total	227 (100)

Among the total 227 children, 95.2% of children were found to be well-nourished and the remaining 4.8% of children were found malnourished.

Table 3: Association between nutritional status of children and age of children

Current age of child	Nutritional Status (n=227)		Fisher's Exact Test (P-value)
	Well-nourished	Malnourished	
a. 6-32 months b. 33-59 months	125 (92.6%) 91 (98.9%)	10 (7.4%) 1 (1.1%)	0.029 (Significant Association)

The Fisher's Exact Test results show a significant association (p-value = 0.029) between age group and nutritional status. Children aged 33-59 months had a higher proportion of well-nourished children (98.9%) compared to children aged 6-32 months (92.6%). This indicates that age influences nutritional status, with older children being better nourished.

Table 4. Association between nutritional status of children and sex of children

Sex of child	Nutritional Status (n= 227)		Fisher's Exact Test (P-value)
	Well-nourished	Malnourished	
a. Male b. Female	121 (98.4%) 95 (91.3%)	2 (1.6%) 9 (8.7%)	0.045 (Significant Association)

The Fisher's Exact Test results show a significant association (p-value = 0.045) between sex and nutritional status. Among male children, 121 (98.4%) were well-nourished, while 2 (1.6%) were malnourished. For female children, 95 (91.3%) were well-nourished, and 9 (8.7%) were malnourished. This indicates that male children have a significantly higher proportion of being well-nourished compared to female children.

DISCUSSION

In this study, 95.2% of children were found to be well-nourished, while only 4.8% were malnourished. The prevalence of well-nourished children in this study is significantly higher than the findings from a study conducted in the Parsa district in 2022, where only 69.1% of children were well-nourished.[1] Similarly, a study conducted in Eastern Terai reported that 38.38% of children had low weight-for-age, and 46.06% had low height-for-age.[2] The differences in findings could be due to variations in the study areas, as Birgunj is a city within the Parsa district and may have different socio-economic and healthcare conditions.

A cross-sectional study conducted in Vietnam found that households with more than three children had a higher prevalence of malnutrition compared to those with fewer children.[3] However, the current study did not establish any significant association between the total number of children in a household and their nutritional status. The same Vietnamese study also reported a significant association between the sex of the child and nutritional status ($p<0.05$), as well as between the age of the child and nutritional status ($p<0.05$), which aligns with the findings of this study. These results indicate that a child's nutritional status is influenced by both age and sex.

Conversely, a study conducted in Dalit communities of Jessore City, Bangladesh, found that parental occupation and educational status were significantly associated with children's nutritional status.[4] This contradicts the findings of the present study, which did not establish such an association. Similarly, a study conducted in India also reported a significant association between maternal education and occupation with children's nutritional status.[2] The difference in findings could be due to differences in sample size and population characteristics between Nepal, Bangladesh, and India.

Additionally, a case-control study conducted in Nepal's Kavre district reported a significant association between maternal age at their first childbirth and children's nutritional status.[5] However, this study did not find such an association, which may be due to differences in caste, cultural practices, or geographic variations between the Terai and hilly regions of Nepal.

Despite its contributions, this study has certain limitations. It did not account for factors beyond those studied that may have influenced nutritional status. Moreover, the findings cannot be generalized to all Madhesi Dalit children aged 6–59 months in Birgunj Metropolitan City due to the limited sample size and study scope. The study was conducted on a small scale within a restricted time frame, which may also have affected the comprehensiveness of the results.

Alongside the sample size and geographic limitations, there were other methodological concerns. Convenience sampling, which was used to select the study participants, may have introduced some selection bias, making the sample potentially unrepresentative of the larger Madhesi Dalit population in Birgunj. Furthermore, measurement errors in the anthropometric data, such as inaccuracies in weight, height, or MUAC measurements, may have led to some degree of misclassification of nutritional status, especially.

CONCLUSION

This study revealed that while most of the children were well-nourished, the status of knowledge on nutrition was found to be inadequate in most mothers. Similarly, nutritional practice was also found to be inadequate for most mothers. There were significant associations with the age and sex of the children. Older children (33-59 months) were better nourished compared to younger ones, and male children were better nourished than female children.

To address the knowledge gap in mothers regarding nutrition, maternal nutrition education programs focusing on mothers could be implemented by health posts in Birgunj Metropolitan City. Specific programs could focus on improving knowledge of infant and young child feeding (IYCF) practices, the importance of breastfeeding, and the introduction of complementary foods. Workshops and community-based nutrition education initiatives could be designed to enhance mothers' understanding of balanced diets and micronutrient-rich foods. These programs could include hands-on demonstrations and interactive sessions to improve practical knowledge and skills in nutrition.

Additionally, targeted programs by the local government of Birgunj should be introduced to promote the nutritional status of girl children, such as awareness campaigns that challenge gender norms and encourage equal access to nutrition and healthcare for girls. To improve the economic situation, the local government could focus on providing vocational training in skills such as tailoring, carpentry, and small-scale agriculture to generate income within the community.

Moreover, future research could consider other factors beyond those studied, such as maternal mental health, access to clean water, sanitation, and the role of community and social support networks, to identify influencing factors on the nutritional status of children under five in the Madhesi Dalit community.

CONFLICT OF INTEREST

None

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