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Nutritional Status of Under-Five Years' Children in Pahari Caste Community of Nepal

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ABSTRACT

Background: Undernutrition remains a persistent public health challenge globally, particularly among marginalized populations such as the Pahari caste in Nepal. Understanding the multifactorial determinants of child nutrition is essential for developing effective, targeted interventions aligned with sustainable development goals. The objective of this study is to assess the nutritional status and associated determinants among under-five children in the Pahari community of Makwanpur District, Nepal.

Method: A mixed-methods approach was employed. Quantitative data included anthropometric assessments (weight-for-age, height-for-age, and weight-for-height) and dietary surveys conducted among a representative sample of under-five children and their caregivers. Qualitative data were collected through in-depth interviews and focus group discussions to explore perceptions of nutrition, cultural norms, and barriers to optimal feeding practices.

Result: Quantitative analysis revealed that 35% of children were stunted, 15% wasted, and 20% underweight. Qualitative findings indicated that poor nutritional outcomes were shaped by socio-economic hardship, traditional dietary practices, and limited awareness of child nutrition.

Conclusion: Undernutrition among Pahari children is driven by a combination of socio-economic and cultural factors. Culturally sensitive, community-specific interventions are essential to improving child nutrition and health in marginalized populations.

Key words: nutritional status; under-five children; Pahari caste; Makwanpur district; dietary practices; socio-cultural determinants.

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INTRODUCTION

Child nutrition is a critical determinant of health, cognitive development, and long-term productivity. In low-income countries such as Nepal, undernutrition among children under five remains a pressing public health issue. Malnutrition-manifesting as stunting, wasting, and underweight-undermines both individual potential and national development.[1] The Pahari caste, a historically marginalized indigenous group residing in Nepal's rural hill regions, including Makwanpur District, faces significant socio-economic challenges. These include multi-dimensional poverty, food insecurity, limited access to healthcare, and inadequate sanitation services. Such structural disadvantages heighten the risk of undernutrition among children in this community.[2] According to the 2016 Nepal Demographic and Health Survey (NDHS), national prevalence rates of stunting, wasting, and underweight among under-five children were 36%, 10%, and 27%, respectively. However, these figures may underrepresent the true burden in marginalized groups like the Pahari, where disaggregated data and culturally specific interventions are lacking.[3] Several interrelated factors contribute to the persistence of

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undernutrition in Nepal. Economic constraints are a primary barrier, limiting households' ability to access sufficient and nutritionally diverse foods. Maternal health and nutrition also play a crucial role, as inadequate antenatal care and poor maternal dietary intake can negatively affect child growth and development. Cultural beliefs and traditional norms often influence feeding practices, shaping what, when, and how children are fed. In addition, limited access to healthcare-especially in geographically isolated areas-impedes the early diagnosis and management of nutritional deficiencies. Poor sanitation and hygiene further exacerbate the issue by increasing children's exposure to infections, which in turn reduce nutrient absorption and impair growth. Despite the presence of national nutrition programs, these community-specific determinants are often overlooked, resulting in suboptimal outcomes.[4] This study addresses this gap by employing a mixed-methods approach to assess the nutritional status of under-five children in the Pahari community and to explore the socio-cultural and structural factors influencing it..

METHODS

This study employed a mixed-methods design, integrating a cross-sectional quantitative survey with qualitative ethnographic methods and Participatory Action Research (PAR). The combination of methodologies enabled a comprehensive understanding of both the measurable and contextual dimensions of child under nutrition within the Pahari community. The study was conducted in Ward No. 2 of Bagmati Rural Municipality, Makwanpur District, Nepal. This area was selected due to its high concentration of the Pahari population, a historically marginalized indigenous group residing in rural hill regions. The study population consisted of children aged 6 to 59 months residing in the selected Pahari community.

The inclusion criteria for the study required that participants be children aged between 6 and 59 months, who are permanent residents of the study area, with parental or guardian consent obtained for their participation. Conversely, the exclusion criteria ruled out children who were outside the specified age range, non-residents of the study area, those with known chronic health conditions affecting growth, and cases where parental or guardian consent was not provided.

This research was conducted among 430 children. A probability sampling technique was employed to ensure a representative selection of participants from the Pahari community. Clusters of Pahari households were identified within Ward No. 2 of Bagmati Rural Municipality using geographic criteria. These clusters were defined based on settlements with a high concentration of Pahari residents. Within the selected clusters, households with at least one child aged 6-59 months were identified. From these, simple random sampling was conducted to select households for inclusion. In cases where multiple eligible children were present in a household, the youngest child was selected to reduce age-related recall bias and to maintain consistency in developmental assessment. Quantitative data were collected using structured questionnaires and standardized anthropometric equipment, including digital weighing scales, height/length measuring boards, and mid-upper arm circumference (MUAC) tapes. Dietary information was gathered using a 24-hour dietary recall and a food frequency checklist. The quantitative techniques included anthropometric measurements, dietary surveys, and socio-demographic interviews with caregivers of children aged 6-59 months. Qualitative data collection utilized semi-structured interview guides, focus group discussion (FGD) guides, and observational checklists. In-depth interviews were conducted with mothers or primary caregivers, while FGDs were held with community members to explore cultural perceptions, practices, and barriers related to child nutrition. Participant observation further enriched contextual understanding by capturing everyday behaviors and environmental conditions. Quantitative data were analyzed using IBM SPSS Statistics Version 16. Descriptive statistics-including means, standard deviations, and proportions-were computed to summarize the data. Inferential statistical analyses, such as chi-square tests, bivariate analysis, and multivariate logistic regression, were employed

to identify associations and predictors of malnutrition. All anthropometric indicators were interpreted using World Health Organization (WHO) child growth standards. Qualitative data were analyzed using thematic content analysis. Transcripts from interviews and FGDs were coded manually, and emerging themes were identified through iterative review. Triangulation with observational data enhanced the credibility of findings. Sensitivity analysis was performed to ensure consistency across different sub-groups within the community. The study received ethical approval from the Institutional Review Committee of the Madan Bhandari Academy of Health Sciences (MBAHS). Informed written consent was obtained from all parents or legal guardians of participating children. Anonymity and confidentiality were strictly maintained throughout the research process, and all data were used exclusively for academic purposes.

RESULTS

This study provides a comprehensive analysis of the nutritional status of under-five children in the Pahari community of Makwanpur District, Nepal. The findings offer critical insights not only for this specific community but also for similar marginalized groups across Nepal. These results can serve as a foundation for generating hypotheses concerning dietary patterns, cultural feeding practices, healthcare utilization, and the effectiveness of existing governmental nutrition programs.

The results are intended to support community health centers, local leaders, and policymakers by providing fresh evidence on child nutrition. Furthermore, the study seeks to raise awareness within the community about the determinants influencing child nutrition, potentially benefiting similar ethnic populations nationwide. The highest proportion of children (26%) belonged to the 24-35 months age group. Gender distribution was nearly balanced between male and female children.

Table 1. Age and gender distribution of children.

Variables	Frequency (%)
Age group (months)	
6-11	54(12.60)
12-23	96(22.30)
24-35	112(26.00)
36-47	85(19.80)
48-59	83(19.30)
Gender	
Male	220(51.20)
Female	210(48.80)

Table 2. Maternal education.

Education Level	Frequency (%)
No formal education	150(34.90)
Primary education	165(38.40)
Secondary education	90(20.90)
Higher secondary or above	25(5.80)

A significant portion of mothers (73.3%) had only primary or no formal education, highlighting a crucial area for educational intervention.

Table 3. Household food security.

Food Security Status	Frequency (%)
Food secure	258 (60.00)
Mildly food insecure	110(25.60)
Moderately food insecure	52(12.10)
Severely food insecure	10(2.30)

Though the majority were food secure, over one-third of households experienced some level of food insecurity.

Approximately 35% of children were stunted, 20% were underweight, and 15% were wasted-indicating significant nutritional deficiencies.

Meal frequency and dietary diversity were significantly associated with nutritional status.

Early and exclusive breastfeeding showed statistically significant associations with improved

Table 4. Anthropometric measurements.

Measurement	Mean ± SD	Median	Range	Underweight %	Stunted %	Wasted %
Height (cm)	89.5 ± 8.2	89	70–105	-	35%	-
Weight (Kg)	12.2 ± 2.1	12	4–16	20%	-	15%
MUAC (cm)	13.5 ± 1.3	13.5	8–17	-	-	-

Table 5. Dietary patterns and nutrient intake.			
Dietary Aspect	**Adequate n (%)**	**Inadequate n (%)**	**p-value**
Meal frequency (≥3 meals/day)	280 (65%)	150 (35%)	0.02*
Dietary diversity (≥4 food groups/day)	194 (45%)	236 (55%)	0.01*
Protein intake	242 (55%)	198 (45%)	0.43
Vitamin A intake	220 (50%)	220 (50%)	0.058

Table 6. Maternal practices.			
Practice	**Adherent n (%)**	**Non-adherent n (%)**	**p-value**
Early breastfeeding initiation	301 (70%)	129 (30%)	0.01*
Exclusive breastfeeding (6 months)	258 (60%)	172 (40%)	0.02*
Complementary feeding (timely)	236 (55%)	194 (45%)	0.23

Table 7. Socioeconomic determinants.			
Factor	**Positive Impact n (%)**	**Negative Impact n (%)**	**p-value**
Household food security	258 (60%)	172 (40%)	0.11
Parental education (primary+)	215 (50%)	215 (50%)	0.03*
Access to safe drinking water	280 (65%)	150 (35%)	0.42

nutritional outcomes.

Only parental education showed a significant impact on child nutrition (p-value = 0.03).

Table 8. Comparative nutritional status.				
Indicator	**Pahari (%)**	**Province (%)**	**National (%)**	**p-value**
Underweight	20%	15%	18%	0.04*
Stunted	35%	25%	30%	0.22
Wasted	15%	10%	12%	0.013*

Underweight and wasting were significantly higher in the Pahari community compared to provincial and national averages.

The study revealed several critical systemic challenges that hinder effective child nutrition interventions. First, awareness and education gaps-particularly the lack of maternal knowledge on nutrition-significantly affect feeding practices and dietary choices. Second, limited healthcare accessibility remains a major concern, emphasizing the urgent need for more local clinics equipped with trained staff to support maternal and child health. Economic constraints also emerged as a major barrier, with the affordability of nutritious foods being a persistent issue for many households. Cultural influences further complicate efforts, as traditional beliefs and practices often conflict with recommended feeding guidelines, thereby limiting their adoption. Lastly, gaps in policy implementation-especially the lack of coordination among health, nutrition, and development sectors-undermine the effectiveness and sustainability of nutrition programs. These interconnected challenges call for a comprehensive, multi-sectoral approach to improve child nutrition outcomes.

The study highlighted several critical challenges impacting child nutrition. Widespread misconceptions about proper child feeding, along with a strong reliance on traditional foods, often restricted dietary diversity and compromised nutritional value. Economic hardship further contributed to inconsistent access to nutritious meals, especially among low-income households. Exclusive breastfeeding practices were frequently disrupted due to the heavy workload of mothers, limiting the time and energy they could dedicate to infant feeding. Additionally, seasonal fluctuations in food availability led to periodic shortages and reduced dietary quality. These issues underscore the urgent need for culturally sensitive, community-based nutrition programs that address local beliefs, economic constraints, and practical barriers in a sustainable and context-appropriate manner.

Assessment of dietary practices among children in the Pahari community revealed that 65% received three or more meals per day, meeting the recommended meal frequency, while 35% had fewer than three meals daily, indicating inadequate feeding frequency. Dietary diversity was limited, with only 45% of children consuming four or more food groups per day, whereas 55% consumed less than four food groups. Protein intake was adequate in 55% of children, but 45% were deficient, and only half of the children met the recommended daily intake of vitamin A. These

findings highlight that child nutrition in the Pahari community is adversely influenced by a complex interplay of economic constraints, cultural norms, maternal factors, and dietary habits. To effectively improve nutritional outcomes, interventions must be tailored to local challenges, incorporating nutrition education, maternal support programs, improved healthcare access, and culturally sensitive food initiatives.

Grains and cereals emerged as the most universally consumed food group among under-five children in the Pahari community, with nearly all participants consuming them daily. These staples-primarily rice, maize, and wheat-formed the cornerstone of the children's diet and served as the principal source of daily energy intake. Vegetables and fruits were consumed by approximately 60% of children on a daily basis. However, both the variety and quantity of these foods were limited, potentially impairing the intake of essential vitamins and minerals such as vitamin A, vitamin C, and folate. This limited diversity may contribute to underlying micronutrient deficiencies despite moderate consumption levels. Protein intake reflected a reliance on animal-based sources, with 55% of children consuming meat, fish, or eggs. Conversely, plant-based proteins such as lentils and beans were less frequently included in the diet, indicating a potential gap in overall protein quality and diversity. This imbalance suggests a limited intake of essential amino acids from varied sources.

Dairy product consumption was notably low, with only 40% of children regularly consuming milk or dairy-based items. This indicates a potential deficiency in calcium, a nutrient critical for bone growth and skeletal development during early childhood. Fats and oils were present in the diets of 70% of children, mainly introduced through cooking practices. While this provides necessary energy and essential fatty acids, the quality and quantity of fat intake should be monitored to ensure it supports, rather than undermines, overall nutritional health.

Carbohydrate intake was found to be adequate in most children, as expected from the high consumption of grain-based foods. These carbohydrates provided the bulk of daily energy requirements. Protein adequacy showed mixed results; only about 50% of the children met the recommended intake levels. This underscores the need to improve access to and education about both animal and plant-based protein sources. Fat consumption appeared sufficient, contributing to overall caloric intake and supporting the absorption of fat-soluble vitamins such as A, D, E, and K.

Micronutrient analysis revealed key areas of concern. Iron intake was insufficient in approximately 30% of children, primarily due to limited consumption of iron-rich foods such as meats and dark green leafy vegetables. This raises a significant risk of iron-deficiency anemia, which can impair cognitive development and immune function. Calcium intake was insufficient in 60% of the sample population, reflecting the low intake of dairy products. This presents a serious concern for bone development during a critical growth phase. Vitamin A intake was found to be adequate in only 50% of the children. The remaining half are at risk of deficiency, which could lead to visual impairment, weakened immunity, and increased morbidity. The low intake of vitamin A-rich foods-such as dark green leafy vegetables, orange-fleshed fruits, and animal liver-highlights the urgent need for dietary diversification and targeted supplementation.

The growth monitoring chart, used to track the growth and development of children under five in the Pahari community, provided essential data on the nutritional status and health trends among this age group.

A significant proportion of children fell below the standard weight-for-age percentiles, indicating underweight conditions. 20% of the children were classified as underweight, reflecting chronic malnutrition and inadequate nutritional intake. Stunting was prevalent, with 35% of children showing heights below the standard height-for-age percentiles. This high rate of stunting suggests long-term nutritional deficiencies and poor overall growth, likely due to persistent food insecurity and inadequate dietary diversity. The prevalence of wasting, where children's weights were significantly low for their heights, was 15%. This acute malnutrition indicates

recent or ongoing severe nutritional deficits and possible illness, requiring immediate intervention. The mean height for children was recorded at 89.5 cm, with a standard deviation of 8.2 cm, showing a broad range in growth outcomes. The mean weight was 12.2 kg, with a standard deviation of 2.1 kg, also indicating variability in nutritional status. The mean MUAC measurement was 13.5 cm, with a standard deviation of 1.3 cm. MUAC is a key indicator of malnutrition; the readings showed that a notable portion of children were at risk of malnutrition.

DISCUSSION

The study reveals a significant prevalence of malnutrition among under-five children in the Pahari community, influenced by socio-economic factors. Stunting and underweight rates are particularly concerning, reflecting chronic malnutrition. Socio-economic disparities, particularly in income and parental education, play a crucial role in dietary diversity and nutritional outcomes.[5]The findings from this study provide a comprehensive overview of the nutritional status of children under five years in the Pahari community of Nepal. Several key aspects have emerged from the analysis, shedding light on the multifaceted challenges and potential areas for intervention. The age distribution indicates that the largest group of children is within the 24-35 months range (26.00%), followed by the 12-23 months group (22.30%). This skew towards younger children highlights the critical need for early childhood nutrition interventions.[6] The gender distribution is relatively balanced with 51.20% males and 48.80% females, suggesting that any nutritional interventions will need to be equally accessible and effective for both genders.[7]

The data on maternal education reveals that a significant portion of mothers have only primary education (38.40%), while 34.90% have no formal education. This lack of education among mothers is a critical factor that can negatively impact child nutrition.[8] Studies have shown that maternal education is strongly correlated with better child health outcomes as educated mothers are more likely to adopt health-promoting practices and access health services. Therefore, improving maternal education could be a pivotal strategy in enhancing child nutrition in the Pahari community.[9] Household food security remains a significant issue, with 40% of households experiencing some level of food insecurity. This is concerning as food insecurity is closely linked to poor nutritional outcomes in children. Additionally, access to safe drinking water, which is crucial for preventing waterborne diseases and promoting overall health, is available to 65.10% of the population.[10] However, 34.90% still rely on unsafe water sources, underscoring the need for improved water infrastructure and hygiene practices[11,12]

Anthropometric measurements indicate severe malnutrition issues, with 20% of children being underweight, 35% stunted, and 15% wasted. These rates are significantly higher than provincial and national averages, particularly for stunting and wasting. The high prevalence of stunting, which affects over a third of the children, is particularly alarming as it reflects chronic malnutrition and has long-term impacts on cognitive and physical development. Wasting, indicating acute malnutrition, also presents a significant concern and highlights the immediate need for nutritional interventions.[13,14] The study reveals that while 65% of children have an adequate meal frequency (≥3 meals/day), only 45% have adequate dietary diversity (≥4 food groups/day). This lack of dietary diversity can lead to micronutrient deficiencies, affecting overall health and development. Protein intake is adequate in 55% of cases, but Vitamin A intake is only adequate in 50%, highlighting specific nutritional gaps that need to be addressed. Significant associations were found between meal frequency, dietary diversity, and child nutrition, emphasizing the importance of promoting varied and frequent meals.[15]

Maternal health practices such as breastfeeding initiation and exclusive breastfeeding for six months are practiced by 70% and 60% of mothers, respectively, and show significant associations with better child health outcomes. However, complementary feeding practices are only adhered to by 55% of mothers, indicating room for improvement. These practices are crucial for ensuring adequate nutrition during the critical first two years of life.[16] Socioeconomic fac-

tors, including household food security and parental education, play a crucial role in child nutrition. Parental education at the primary level or above shows a significant positive impact on child nutrition. This underscores the need for educational programs that target parents, especially mothers, to improve their knowledge and practices related to child nutrition. Access to safe drinking water also impacts a significant portion of households, though not statistically significant in this study, it remains a critical area for intervention.[17] Comparative analysis with provincial and national averages shows that the Pahari community has higher rates of underweight, stunting, and wasting. The prevalence of underweight children in the Pahari community (20%) is significantly higher than the provincial (15%) and national (18%) averages, with a p-value of 0.04. Similarly, wasting affects 15% of children in the Pahari community, compared to 10% provincially and 12% nationally, with a significant p-value of 0.013. These findings highlight the urgent need for targeted interventions to address the nutritional deficiencies in this community.[18]

Limitations

This study had several limitations. On the qualitative side, findings may have been influenced by facilitator bias and the inherent subjectivity of participant responses. The qualitative data collection process was also time- and resource-intensive, requiring trained personnel, and the results may have limited generalizability beyond the specific study context. On the quantitative side, potential recall bias in dietary surveys could have affected accuracy. The absence of biochemical indicators and limited insight into behavioral factors constrained the depth of nutritional assessment. Additionally, seasonal variation in dietary intake may not have been fully captured within the study timeframe.

CONCLUSIONS

The study on the nutritional status of under-five children in Nepal's Pahari caste community highlights a multifaceted issue driven by health, education, socioeconomic, and cultural factors. Children aged 24–35 months were the largest group studied, with equal gender representation. Maternal education was low, with over 70% of mothers having only primary or no formal education, correlating with poor child nutrition. While 60% of households were food secure, 40% faced food insecurity, and 34.9% relied on unsafe water sources, compounding health risks. Malnutrition rates were high, with 20% underweight, 35% stunted, and 15% wasted. Dietary diversity and Vitamin A intake were inadequate for over half of the children. Breastfeeding practices, parental education, and food security were positively linked to better outcomes. Nutritional indicators in the Pahari community were worse than both provincial and national averages. Qualitative data revealed barriers such as caregiver knowledge gaps, poverty, limited healthcare access, and conflicting traditional practices. These findings call for culturally tailored, economically viable, and community-based interventions targeting both nutritional deficits and underlying social determinants.

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