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Factors Associated with the Nutritional Status of Adolescent School Children in Kathmandu Valley, Nepal: A Cross-Sectional Study

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Abstract

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Background: Adolescence is a critical period of growth, making nutrition a key determinant of long-term health. In Nepal, where adolescents comprise nearly 24% of the population, their nutritional status is a significant public health concern, yet they are often overlooked in national programs. This study aimed to identify the factors associated with the nutritional status of adolescent school children in the Kathmandu Valley.

Methods: An analytical cross-sectional study was conducted among 391 adolescent students (10-19 years) selected via simple random sampling from schools in the Kathmandu Valley. Data were collected using a semi-structured questionnaire covering socio-demographic characteristics, and anthropometric measurements were taken to determine nutritional status (underweight or normal weight). Data were analyzed using SPSS version 23.0, with statistical significance set at a p-value < 0.05.

Results: The study included 64.5% male and 35.5% female students. The majority (95.4%) were Hindu. A statistically significant association was found between the adolescents' weight status and their age, as well as their mother's age. Underweight was significantly more prevalent in older adolescents (15-20 years) at 20.0% compared to younger adolescents (10-14 years) at 4.1% (p=0.001). Adolescents whose mothers were in the 30-40 year age group had a higher rate of underweight (15.1%) compared to those with mothers aged 41-50 years (5.6%) (p=0.007). No significant association was observed between nutritional status and family size, ethnicity, religion, or parental education and occupation.

Conclusion: Age of the adolescent and maternal age are significant factors associated with nutritional status among school children in the Kathmandu Valley. The higher prevalence of underweight in older adolescents highlights a critical window for intervention. Nutritional programs in Nepal should be expanded to specifically target this demographic to prevent long-term health consequences and improve academic performance.

Keywords: Adolescent, Nutritional Status, Socio-demographic Factors, Underweight

Declaration: There is no conflict of interest and ethical requirements during the research.

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Introduction

Adolescence, the period from 10 to 19 years, is characterized by a rapid growth spurt, second only to infancy, which increases the demand for calories and essential nutrients [1]. In Nepal, adolescents constitute a significant portion of the population, at nearly 24% [2]. Malnutrition during this formative stage can have severe and lasting consequences, including poor adult health outcomes, diminished academic performance, and intergenerational effects such as low birth weight in future offspring [3, 4, 5]. National nutritional programs have traditionally focused on young children and pregnant women, leaving a critical gap in adolescent health and nutrition surveillance [7]. This oversight persists even in recent national surveys, which have often excluded this demographic. Malnutrition remains a major public health challenge in the South East Asia Region (SEAR), and understanding its prevalence and determinants among Nepalese adolescents is crucial for developing effective public health strategies. This study was, therefore, designed to fill this research gap by identifying the factors associated with the nutritional status of adolescent school children in the Kathmandu Valley, an urban setting undergoing significant socio-demographic transitions. The findings aim to provide evidence for policy development and targeted health interventions.

Methodology

In this analytical cross-sectional study, data were collected from adolescent students aged 10–19 years across various secondary schools in the Kathmandu Valley, Nepal. The schools—Durbar High School, Bhanu Sanskrit Mavi, LRI School, and R.R. Laxmi School—were selected through simple random sampling to ensure a representative and unbiased sample. The sample size was calculated using the single population proportion formula, referencing a previous study that reported an underweight prevalence of 27.6%. With a 95% confidence level ($Z = 1.96$) and a 5% margin of error, the required sample size was determined to be 391 students. Eligible participants were selected randomly from school registers. Students who were present on the day of data collection, aged between 10 and 19 years, and who provided informed consent were included. Those outside the age range or unwilling to participate were excluded. Ethical approval was obtained from the Department of Public Health at Little Buddha College of Health Science, and all necessary ethical principles, including informed consent, confidentiality, and anonymity, were strictly maintained.

Data collection was conducted through face-to-face interviews using a pre-tested, semi-structured questionnaire written in Nepali to ensure cultural and linguistic appropriateness. The questionnaire gathered detailed socio-demographic and economic information. Additionally, anthropometric measurements, specifically height and weight, were obtained using standardized equipment and techniques to accurately assess nutritional status. Nutritional status was classified based on BMI-for-age percentiles, categorizing participants as underweight or normal. The independent variables included socio-demographic factors (age, gender, religion, family type, and family size) and socio-economic factors (parental age, education, occupation, and family income). The collected data were carefully cleaned, coded, and entered into SPSS version 23.0 for analysis. Descriptive statistics such as frequencies and percentages were calculated to summarize participant characteristics. The Chi-square test was applied to examine

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associations between independent variables and nutritional status, with statistical significance set at $p < 0.05$

Results

Socio-demographic Characteristics of Respondents A total of 391 adolescent students participated in the study. The sample was nearly evenly split by age group, with 50.1% aged 10-14 years and 49.9% aged 15-20 years. Males constituted 64.5% of the sample, while females were 35.5%. The vast majority of respondents were Hindu (95.4%). Most participants (80.8%) belonged to families with 1-5 members. The most common monthly family income bracket was NPR 10,000–25,000 (58.1%), followed by less than NPR 10,000 (30.2%). A summary of the socio-demographic characteristics is presented in Table 1.

Table 1: Socio-demographic Characteristics of Participants (n=391)

Variable	Category	Frequency	Percentage (%)
Age of Child (Years)	10-14	196	50.1
	15-20	195	49.9
Gender	Male	252	64.5
	Female	139	35.5
Religion	Hindu	373	95.4
	Muslim	5	1.3
	Christian	11	2.8
	Others	2	0.5
Mother's Age (Years)	30-40	265	67.8
	41-50	126	32.2
Father's Education	Bachelor & Above	39	10.0
	Intermediate	43	11.0
	SLC	167	42.7
	Read & Write Only	142	36.3
Mother's Occupation	Housewife	141	36.1
	Government Service	154	39.4
	Business	96	24.6
Family Income (NPR)	< 10,000	118	30.2
	10,000 - 25,000	227	58.1
	25,000 - 50,000	32	8.2
	> 50,000	14	3.6
Family Members	1-5	316	80.8
	6-8	75	19.2

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Association between Socio-demographic Factors and Nutritional Status: The analysis revealed a statistically significant association between the nutritional status (weight) of adolescents and both the adolescents' age and their mother's age. The prevalence of underweight was significantly higher among older adolescents (15-20 years) at 20.0%, compared to 4.1% in the younger (10-14 years) group (p=0.001). Furthermore, the age of the mother was significantly associated with the adolescent's weight status (p=0.007). Adolescents whose mothers were in the 30-40 age bracket had a higher prevalence of underweight (15.1%) compared to those whose mothers were aged 41-50 years (5.6%). There was no statistically significant association found between adolescent weight and other factors, including the father's age, number of family members, parental occupation, parental education, or religion (all p>0.05). These findings are detailed in Table 2.

Table 2: Association between Socio-demographic Factors and Weight of Adolescents

Socio-demographic Factor	Category	Underweight n(%)	Normal n(%)	p-value
Age of Child (Years)	10-14	8 (4.1%)	188 (95.9%)	**0.001***
	15-20	39 (20.0%)	156 (80.0%)	
Age of Mother (Years)	30-40	40 (15.1%)	225 (84.9%)	**0.007***
	41-50	7 (5.6%)	119 (94.4%)	
Age of Father (Years)	39-44	35 (11.8%)	262 (88.2%)	0.799
	45-50	12 (12.8%)	82 (87.2%)	
Family Members	1-5	41 (13.0%)	275 (87.0%)	0.234
	6-8	6 (8.0%)	69 (92.0%)	
Father's Occupation	Govt. Service	1 (9.1%)	10 (90.9%)	0.801
	Business	21 (11.1%)	168 (88.9%)	
	Other	25 (13.1%)	166 (86.9%)	
Mother's Occupation	Housewife	12 (8.5%)	129 (91.5%)	0.235
	Business	23 (14.9%)	131 (85.1%)	
	Other	12 (12.5%)	84 (87.5%)	

Statistically significant ($p < 0.05$)

Discussion

This study identified significant factors associated with the nutritional status of school-going adolescents in Kathmandu Valley. The key finding is the strong association between being underweight and both the adolescent's age and their mother's age. The prevalence of underweight was found to be nearly five times higher in the 15–20 age group than in the 10–14 age group. This may be attributed to the intense metabolic demands during the late-pubertal growth spurt, combined with shifting dietary habits, greater autonomy over food choices, and potential academic and psychosocial stressors that could influence eating behaviors.

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The observation that adolescents of younger mothers (30–40 years) were more likely to be underweight than those of older mothers (41–50 years) is particularly noteworthy and warrants further investigation. This finding may reflect unmeasured factors such as maternal experience, nutritional knowledge, or prioritization of adolescent health within younger households. Additionally, younger mothers may still be managing multiple child-rearing responsibilities or economic pressures, potentially affecting the allocation of resources and attention to adolescent nutrition.

Unlike findings from several previous studies that have established a correlation between parental education, family income, and adolescent nutritional status, our study did not find these variables to be significantly associated with underweight prevalence [1]. This suggests that in an increasingly urbanized environment like Kathmandu, other determinants such as food quality, availability of processed and convenience foods, sedentary lifestyles, and limited physical activity may have a greater influence on adolescent nutrition than traditional socioeconomic indicators. Furthermore, the observed gender imbalance—with a higher proportion of male participants due to sampling from government schools—may have limited the generalizability of the findings, particularly for adolescent girls who may experience different nutritional challenges, such as iron-deficiency anemia, menstrual-related nutritional demands, and cultural practices that influence food allocation within households.

The persistence of adolescent malnutrition remains a major public health concern, as demonstrated by similar findings in other low- and middle-income countries. For instance, studies conducted in Ethiopia also identified age as a significant predictor of underweight among adolescents [9]. This highlights a broader regional pattern where adolescents remain an underserved population in nutrition-related interventions. The lack of focused national health programs targeting this age group in Nepal represents a missed opportunity to intervene at a critical stage of growth and development, potentially perpetuating the intergenerational cycle of malnutrition. In addition, psychosocial factors such as body image concerns, peer pressure, exposure to social media, and changing perceptions of ideal body weight may also contribute to unhealthy eating patterns among adolescents. Nutritional education programs targeting both adolescents and their caregivers, alongside school-based interventions promoting healthy eating behaviors and physical activity, may play a crucial role in addressing these challenges. Future studies should explore these complex and evolving factors to develop more comprehensive and culturally sensitive interventions aimed at improving adolescent nutritional status.

Conclusion

The nutritional status of adolescent school children in the Kathmandu Valley is significantly influenced by the adolescents' age and their mothers' age. The marked increase in underweight prevalence in older adolescents is a major public health concern that demands immediate attention. These findings underscore the urgent need to integrate adolescent-focused services into Nepal's existing nutritional programs. Health and education initiatives should be developed to promote healthy eating habits and address the specific nutritional needs of adolescents to support their growth, academic success, and long-term well-being.

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