JOURNAL OF HEALTH PROMOTION
Volume 12, 2024, **pp:** 43-54
ISSN: 2631-2441 (Print)
ISSN: 2822-1591 (Online)

Original Research Article

Midday Meal Consumption Practice Among Basic School Children: A Cross-Sectional Study in Kathmandu

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Abstract

The present study aimed to examine the midday meal (MDM) consumption practice among the upper-basic level school children from grades 6–8. A cross-sectional quantitative study was conducted among 323 students selected from two community schools in Budhanilkantha Municipality, Kathmandu. Data were collected using a self-administered questionnaire consisting of closed-ended items. Data were collected face-to-face in students' classrooms after obtaining permission from the school authorities and obtaining written consent and assent from students and parents. The data were analysed using SPSS version 25, applying descriptive analysis such as frequency percentages, central tendency, and measure of dispersion, as well as bivariate analysis such as the chi-square test. The findings of the study revealed that though more than three-fourths (78.2%) of the students consumed MDM regularly, nearly two-thirds (60%) of them consumed junk food as part of their MDM at school. The results also demonstrated that students' socio-demographic factors such as sex, grade, and father's occupation are significantly associated with MDM consumption practices. The results of the study underscore the need to extend the MDM program to upper-basic schools and implement school-based health intervention(s) aimed at fostering healthy dietary behaviors among basic school children in their formative stage of life.

Article History

OPEN ACCESS

Received: 31 August 2024

Accepted: 24 October 2024

Published: December 2024

DOI:

https://doi.org/10.3126/jhp.v12i1.72696

Keywords

Basic school children; community school; homemade food; junk food; midday meal (MDM)

Introduction

The mid-day meal (MDM) program introduced by a faith-based organization 'Food for Life Nepal' in 2015 aims at improving nutrition and education for children with poor socio-economic status despite facing challenges such as rising costs and unemployment (CBS, 2022). The Constitution of Nepal 2015 and the Right to Food Act, 2015 have laid opportunities to advance food security and the Sustainable Development Goals (SDGs) by addressing the issues of persistent malnutrition identified in the zero-hunger strategic review (WFP, 2022). The Government of Nepal (GoN) initiated a MDM program for all students in the lower basic community schools across the country in 2020 (Acharya et al., 2024). Recent studies provide strong evidence of the positive impact of school feeding program on children's nutritional status and overall health and well-being (Cohen et al., 2021; Shrestha et al., 2016; Upreti, 2024; Wang et al., 2021). The MDM program, an important initiative to improve the nutritional status and

educational outcomes of school children, especially in the developing countries including Nepal (Center for Education Human Resource Development, 2020), started to fight against malnutrition and low school attendance rates (Tripathi, 2024). The program implemented in community schools addresses hunger and education by providing healthy meals to the basic school students (GoN, 2023). The MDM program combats hunger and malnutrition globally by offering nutritious food to school children and improves educational outcomes (FAO, 2021).

The effectiveness of the MDM program relies on strategic menu planning and adherence to nutritional guidelines, accommodating regional and cultural preferences (WFP, 2022). It is argued that MDM program plays an important role in educational outcomes and health status by using local resources and community participation to make implementation more effective. Upreti et al. (2022) underscore the need for balanced and nutritious meals, highlighting the fact that junk food consumption is influenced by different factors, including taste preference, peer pressure, and availability in school canteens. The GoN offers nutritious school meals to 3.3 million children every day at 29,000 public schools across the country, starting from pre-school (Early Child Development) to the fifth grade. This program has fully covered all the 77 districts, and the world food program (WFP) also gives additional support in the resources constrained areas (Sharma, 2023).

In Nepal, the school MDM program is a key government strategy to combat malnutrition, as outlined in the School Sector Development Plan (2016–2022) and the National School Health and Nutrition Strategy (Shrestha et al., 2020). Studies have shown that every dollar invested in this program generates an economic value of USD 4.1–5.2 over the lifetime of a beneficiary child (World Food Program, 2018). The Ministry of Education, Science, and Technology (MOEST, 2021) reported that school MDM consumption practices improve school attendance, students' concentration in the study, and academic outcomes. A study conducted in community schools in Nepal found that an overwhelming number of students (89%) regularly consumed MDM, while more than half of them consumed unhealthy school meals. The study identified multi-level factors that can influence unhealthy eating behavior among students (Upreti et al., 2021). Studies conducted in various parts of the country also revealed that most students were having unhealthy meals at school (Bohara et al., 2021; Pahari & Baral, 2020; Sapkota and Neupane, 2017; Singh et al., 2020). Research on MDM practices among school children has given limited attention to the consumption behavior of mainly upper basic school children. Given the context, the present study aimed to examine the MDM consumption practices among upper basic school students and determine their association with socio-demographic and lifestyle-related factors of the students.

Methods and Materials

Study Design

The study employed a quantitative survey design to assess the existing MDM practice among the children of upper basic level in community schools.

Population and Sampling

The study's target population included all the upper basic level community school students from grades 6-8 of Budhanilkantha Municipality. According to the EMIS records, there were 19 community schools in Budhanilkantha Municipality, including seven basic and 12 secondary schools. The sample size obtained 323, calculated using the formula (Getnet, 2021):

$n=Z^2 pq/d^2$

Where,

n = desired number of sample size.

z = Z score with the level of significance at 95% confidence interval.

d= degree of freedom

Now, p= 30%=30/100=0.3

This 30% (p=0.3) was based on prior information or preliminary estimates of proportion and is a standard value for similar studies when actual data are unavailable (George and Mallory, 2018). Grade 6-8 students were selected as the study population since most of the previous studies were limited to exploring MDM practices among grade 1-5 students since the Government of Nepal has provided free MDM up to grade five. But MDM consumption practice acquired during the upper basic classes heavily influence on physical growth and mental development of the children in the future (Acharya et al., 2024). The inclusion criteria developed for the selection of the respondents were considered as: students who were currently studying in grades 6-8, attended school on the day of survey, and showed willingness to take part in the study.

Data Collection Tools

A structured set of questionnaire was adapted from the second author after obtaining permission, which was originally developed for PhD study (Upreti, 2024). The questionnaire was pre-tested and edited as necessary before it was applied for data collection. The questionnaire consisted of three sections: the first section ('socio-demographic information of students') consisted of age, sex, grade, religion, caste, family's primary source of income, educational qualifications of parents, family structure, parental education, occupation, and living conditions. The second section ('lifestyle-related information') consisted of transportation options to school, participation in school clubs, involvement in physical activities, and the time spent on screens. The third section focused on MDM consumption practices, including food choices for MDM, reasons for skipping meals, preferences for homemade food, pocket money spent on school meals, and junk food consumption practices at school.

Data Collection Procedures

After completing all official procedures, data were collected using a self-administrated questionnaire. Permission and consent were taken from the participants and school administration. The data were collected in the second and third weeks of September 2023.

Operationalization of the Variables

The study utilized socio-demographic information such as age, sex, grade, primary source of family income, and parental educational qualifications and lifestyle-related aspects such as transportation options, school club participation, physical activity, and use of electronic devices. These were the independent variables, whilst MDM practice was considered as outcome variable. The MDM practices included food choices, reasons for skipping meals, preferences for homemade foods, pocket money spending for snacks, and junk food consumption.

Data Analysis

The data collected for this study were analysed using SPSS version 25 (George & Mallery, 2018). The initial steps included data cleaning and validation to ensure the accuracy of the data. Descriptive statistics, such as frequencies and percentages, were used to summarize the demographic characteristics of the students and key variables related to MDM practices. a Chi-square test (p-value) was performed to determine the association between socio-demographic,

lifestyle-related information, and MDM consumption practices of students. Moreover, a p-value less than 0.05 has been considered as statistically significant to this study (Andrade, 2019).

Ethical Considerations

To undertake this study, approval was sought from the Department of Health and Population Education (HPE) under the University Campus of Tribhuvan University. Ethical guidelines for health related research were followed throughout the study (Nepal Health Research Council [NHRC], 2022). Anonymity, privacy, and confidentiality were maintained.

Results

Socio-Demographic Information

This sub-section focuses on the demographic characteristics of students and their family information, such as age, sex, grade, religion, caste, and the primary source of income in the family, mother's and father's educational qualification, family structure, parental occupation, and living conditions. Table 1 demonstrates the students' demographic and family-related information.

Table 1

Socio-Demographic and Family-related Information of Students

Description	Category	Frequencies	Percentage
Age group ($\bar{x}$ = 13.56±1.66)	10-12	79	24.5
	13-15	206	63.8
	16-17	38	11.8
Sex	Boy	165	51.1
	Girl	158	48.9
Grade	Six	91	28.2
	Seven	93	28.8
	Eight	139	43.0
Ethnicity/Caste	Chhetri	62	19.2
	Brahman	28	8.7
	Janajati	171	52.9
	Adibasi	2	0.6
	Dalit	33	10.2
	Madheshi	24	7.4
	Muslim	3	0.9
Religion	Hindu	215	66.6
	Buddhist	75	23.2
	Christian	19	5.9
	Islam	8	2.5
	Kirat	6	1.9
Family structure	Single	168	52.0
	Joint	155	48.0
Living arrangement	With parents	269	83.3
	With relatives	153	47.4
Father's education	Can not read and write	24	7.4
	Just read and write (Literate only)	135	41.8
	School level education	130	40.2
	Bachelor's degree or above	34	10.5
Mother's education	Can not read and write	69	21.4
	Just read and write (Literate only)	131	40.6
	School level education	110	34.1
	Bachelor's degree or above	13	4.0

	Agriculture	57	17.6
	Business	62	19.2
Father's primary	Job/Service	110	34.1
occupation	Paid labor	40	12.4
	Foreign employment	43	13.3
	Currently unemployed	11	3.4
	Agriculture	110	34.1
	Business	54	16.7
Mother's primary	Job/Service	52	16.1
occupation	Paid labor	22	6.8
	Foreign employment	22	6.8
	Housemaker (currently no job)	63	19.5

Table 1 shows the details of socio-demographic and family-related information of students. Nearly two-thirds (63.8%) of students were in the age of 13-15 years, followed by those of 10-12 years (24.5%) and others were of 16-17 years. The mean age was 13.56±1.66 years. In terms of sex, it shares an almost equal distribution of boys (51.1%) and girls (48.9%). Grade-wise, 43.0% of the respondents were from eighth grade and the rest were from sixth and seventh grades respectively. Similarly, more than half of the participants belonged to *Janajati* (52.9%). Regarding the religion, two-thirds (66.6%) of them were Hindu, followed by Buddhist, Christian, Islam, and Kirat.

The family-related information of students shows that more than half (52.0%) of the students were from a nuclear family. Four-fifths of them (83.3%) lived with their parents. In terms of the educational background of the parents, 41.8% of fathers and 40.6 % of mothers were just literate who could read and write. Altogether 40.2 % of fathers and mothers completed school-level education, while 10.5% of fathers and 4% of mothers had attained higher education. Regarding parental occupation, 17.6% fathers and 34.1% mothers were engaged in agriculture, while 19.2% fathers and 16.7% mothers were engaged in business. Furthermore, 13.3% of fathers and 6.8 % mothers were foreign employees.

Lifestyle-Related Information

This sub-section presents data on the transportation options to school, school club participation, and involvement in physical activity as well as the time spent on screen among students. The data highlights various aspects of students' daily routines and extracurricular engagement (Table 2).

The table demonstrates that almost all students (95.3%) preferred walking to school, followed by public buses, bicycles, or motorcycles. More than one-fourth (27.7%) of them participated in school clubs. Regarding physical activities, nearly one-third (30.1%) of them were involved regularly. Similarly, more than two-thirds (67.5%) of them spent less than one hour on the screen, while nearly one in ten (8.7%) spent more than four hours per day.

Table 2

Lifestyle-related Information

Description	Responses	Frequencies (N)	Percentage (%)
	Walking	305	95.3
Means of transport	Cycling / Motorbike	2	0.6
to school (n=320)	By Bus	13	4.1
Belonging to	No	225	72.3

school club (n=311)	Yes	86	27.7
	Regularly	93	30.1
	Usually (4-5 days a week)	40	12.9
Involvement in physical activity (n=309)	Sometimes (3-4 days a week)	74	23.9
	Minimal (1-2 days a week)	68	22.0
	Never ever	34	11.0
	1 hour or less daily	210	67.5
Time spent on screen (n=311)	2-3 hours daily	67	21.5
	3-4 hours daily	7	2.3
	Over 4 hours daily	27	8.7

School Mid-day Meal Practice

This sub-section presents students' school meal consumption practices. The school meal consumption practices include food choices for MDM, reasons for skipping meals, preferences for homemade food, pocket money spent on school meals, and junk food consumption practices at school (Table 3).

Table 3 shows that more than three-fourths (78.2%) of students consumed MDM daily at school. More than one-third (35.3 %) of them obtained free MDM managed by the school, while one-fourth of them brought meals from home (24.5%), and the remaining students bought from the canteen (25.4%) using their pocket money on the survey day. Though more than half of them were willing to bring homemade food items at school, only one in five (19.6%) brought homemade food regularly, whilst one-third (34%) of them never did. Three-fourths of them brought cooked rice and curry and/or chapati and curry, followed by fruit and vegetables as the homemade foods. The students who did not prefer to bring homemade food at school reported that they regularly buy their snacks at school's canteen, followed by not having enough food at home and not having parents' time for preparing the meals. Almost all (95.1 %) students got less than Rs 50 as the pocket money for school meal. On average, they spent Rs 40.23 (minimum Rs 10 and maximum Rs 500) for MDM at school. Nearly two-thirds of them (60 %) reported that they consumed junk food at school.

Table 3

MDM Practice Among Basic School Students

Description	Responses	Frequencies (N)	Percentage (%)
MDM consumption (Daily) (n=308)	No	67	21.8
	Yes	241	78.2
Food items consumed for MDM at school (n=294)	Foods brought from home	79	24.5
	Bought at the school canteen	114	35.3
	Free MDM served at the canteen	82	25.4
	Junk food consumption	19	5.9
Reasons for not consuming MDM regularly (n=67)	Felt too lazy to bring MDM	7	10.3
	Feeling shy	3	5.1
	Not having money	15	21.8
	Not feeling hungry	42	62.8
Frequency of bringing Home-made food at school (n=321)	Regularly (all day in a week)	63	19.6
	4-5 days a week	29	9.0
	3-4 days a week	19	5.9
	1-2 days a week	101	31.5
	Never	109	34.0
Types of homemade	Cooked rice/Roti and Tarkari	164	84.1

food* (n=219)	Fruit and Salad	33	16.9
	Boiled egg/ Cooked meat	8	4.1
	Junk food	14	7.2
Willingness to bring homemade food (n=293)	Yes	171	58.4
	No	122	41.6
Reasons for not bringing homemade food (n=142)	No sufficient food at home	35	24.6
	Feeling shy	16	11.3
	No place to eat in class	3	2.1
	Parents don't manage it	16	11.3
	Homemade food is not delicious	3	2.1
	Because I purchase snacks at school	69	48.6
Daily pocket money spent (n=283)	Below Rs. 50	269	95.1
	Above Rs. 50	14	4.9
Junk food consumption at school (n=313)	Daily	22	7.0
	4-5 days a week	24	7.7
	3-4 days a week	35	11.2
	1-2 days a week	107	34.2
	Rarely or never	125	39.9

* Multiple responses

Association Between Socio-Demographic and Lifestyle-Related Information with MDM Consumption Practice

This sub-section shows the statistical relationship between students' MDM consumption practice and socio-demographic and lifestyle-related information (Table 4).

The results indicate a statistically significant relationship between students' MDM consumption practice and their socio-demographic variables, including grade (p=0.004), sex (p=0.013), and fathers' occupation (p = 0.045). No significant associations were found between students' MDM consumption practices and their religion, caste/ethnicity, family type, living arrangement, mother education, mother occupation, involvement in physical exercise, and frequency of junk food consumption at school.

Table 4

Relationship Between Socio-Demographic and Lifestyle-related Information with MDM Consumption Practice

Description	Responses	MDM consumption practice		P-value
		No (%)	Yes (%)	
Age group	10-12 years	11.3	88.7	0.050
	13-15 years	25.1	74.9	
	16 years above	23.7	76.3	
Sex	Boy	27.3	72.7	0.013*
	Girl	15.6	84.4	
Grade	Sixth	9.5	90.5	0.004**
	Seventh	23.3	76.7	
	Eighth	28.3	71.7	
Religion	Hindu	23.9	76.1	0.197
	Non-Hindu	17.5	82.5	
Caste/ethnicity	Brahmin/Chhetri	23.7	76.3	0.510
	Other castes	19.8	80.2	
Family type	Nuclear	20.6	79.4	0.618
	Joint	23.0	77.0	

Living arrangements	With parents	22.4	77.6	0.576
	With relatives	18.9	81.1	
Fathers' education	Cannot read and write	29.2	70.8	0.578
	Just read and write (Literate only)	22.5	77.5	
	School and higher education	20	80	
Mothers' education	Cannot read and write	23.5	76.5	0.908
	Just read and write (Literate only)	20.8	79.2	
	School and higher education	21.7	78.3	
Fathers' occupation	Agriculture	32.1	67.9	0.045*
	Non-agriculture	19.6	80.4	
Mothers' occupation	Agriculture	23.6	76.4	0.572
	Non-agriculture	20.8	79.2	
Engaged in physical activity	Regularly (all day in a week)	17.4	82.6	0.287
	Usually (4-5 days a week)	21.1	78.9	
	Sometimes (3-4 days)	18.6	81.4	
	Minimal (1-2 days)	30.9	69.1	
	Never	26.5	73.5	
Daily pocket money spent for school meals	Up to 50	22.0	78.0	0.265
	Above 50	36.4	63.6	

Note: chi-square test significant at *p<0.05, **p<0.01

Discussion

The present study demonstrated that more than three-fourths (78.2%) of students consume MDM daily. Similar to this result, a study conducted in Pokhara demonstrates that an overwhelming number of students consumed MDM at school, though they often prefer unhealthy snacks as part of the MDM (Tripathi, 2023). Another study conducted among basic school children in Chitwan reveals that almost all (90%) students consumed MDM at school, however, they consume unhealthy snacks which are either commercially prepared junk foods from the nearby vending shops and grocery stores, or deep-fried snacks from the canteen (Upreti et al., 2020). Similarly, another pilot program study conducted in Nepal indicates a significant number of basic school children consuming MDM at school (Shrestha et al., 2020).

The finding of the present study also revealed that nearly two-thirds of students (60%) consumed junk food at school. Studies conducted in various regions of Nepal also demonstrate that a higher proportion of junk food consumption was noted among school children (Pahari & Baral, 2020; Pokhrel, et al., 2024; Poudel et al., 2018; Poudel, 2018; Sapkota & Neupane, 2017; Subedi & Bhusal, 2021; Upreti et al., 2021). A study from Pokhara also demonstrates that nearly two-thirds (60.3%) of students consume junk food as their school meals (Bohara et al., 2021). The results indicate that junk food consumption has become a common snacking behavior among school children. However, junk food consumption habits among school-going children has resulted in various poor health outcomes including increased prevalence of obesity and diet-related syndromes (Datar & Nicosia, 2012).

The present study found that though more than half (58.4%) of the students preferred consuming homemade food, only one-fourth of them brought homemade foods for school meals. A study conducted in Pokhara reveals that 80.9% of the students from institutional schools and one-fourth (24.1%) from community schools brought homemade foods for their school meals (Tripathi, 2023). Children in community schools appear to bring less homemade food compared to those in institutional schools, likely due to the provision of Mid-Day Meals (MDM) for basic school children in community schools since 2020 (Acharya et al., 2024).

Similarly, the present study shows that 14.7% of basic school children consume home-made foods at school. A home-grown school feeding program implemented in Nepal reported that home-grown school feeding is an effective approach in which local communities are given greater control over the school meals program with improved quality of meal, which strengthens the local food production and economy of the people (Shrestha et al., 2020). Upreti (2024) argued that homemade food is the best strategy for the sustainability of the school MDM program for basic school children, which reduces the daily demand of pocket money for children and ensures the healthy school meal consumption habit among school-going children. But when the Federal Government in collaboration with local government started MDM program for basic school children (up to grades 5), most of the community schools started offering school MDM through either catering or school-managed modalities. The present study revealed that nearly half (48.6%) of the students opted to receive pocket money instead of carrying homemade food from their home, and more than three-fourths (78%) spent up to Rs. 50 daily for school meals. It indicates that both parents feel comfortable with the practice of providing pocket money to school-going children as they feel no burden of preparing homemade food items; and children also find easy ways to get meals at school.

The present study also indicates that there is a significant association between students' socio-demographic profile including grade (p=0.004) and sex (p=0.013) with MDM consumption practice at school. The results further elaborate that family-related factors such as parents, particularly the father's occupation (p = 0.045), significantly influence students' MDM consumption behaviors. A couple of studies also indicate that socio-demographic characteristics play a significant role in the dietary behaviors of school children. A study conducted in Pokhara discusses the students' predisposition factors such as gender and grades influence school meals selection and consumption behavior (Pahari & Baral, 2020). Another study conducted in Chitwan also indicates that sociodemographic variables including gender, knowledge and attitude towards food choice, peer influence, pocket money, family income, family occupation, family education level, and marketing strategy influence students' dietary behavior (Subedi & Bhusal, 2021). Similarly, another study conducted in Chitwan indicates that students' grade and parents' occupation heavily influence the snacking behaviors of basic school children (Upreti et al., 2021). Similarly, a systematic review study indicates that though the dietary behavior of school-going children is influenced by multi-level factors ranging from personal to policy related ones, the influence of socio-demographic factors is greatest amongst all (Upreti et al., 2022).

Besides the socio-demographic factors, we argue that parental and community involvement are crucial for the success of MDM programs at school, particularly in the context of community school in Nepal. Ratala et al. (2023) discuss that school with active parental participation in MDM programs reduce financial burdens and improve students' educational outcomes. Our findings on family structure, parental education, and occupation underscore the need of involvement of parents in the MDM program to ensure its sustainability and effectiveness. Upreti et al. (2023) also emphasize that parental and community involvement is a crucial strategy for long-term sustainability of the MDM program in community schools of Nepal. Ghimire (2024) also highlights the positive impact of community support on MDM program to bring changes in educational outcomes, particularly in improving educational outcomes and reducing dropout rates among school going children.

Strengths and Limitations

This study is worth examining the MDM consumption practice among basic school children, focusing on an adequate sample of students from a community school in Budhanilkantha, Kathmandu. However, there are a few limitations to consider. The study is constrained by the variables included, providing only a snapshot of the data. Additionally, the results relied on self-reported data, which may have introduced social desirability bias. Finally, as a cross-sectional study, it could not establish causal relationships, underscoring the need for future interventional studies.

Conclusion

This study assessed MDM consumption practices among basic school children in Budhanilkantha Municipality, Kathmandu. The findings revealed that over three-fourths of the students consumed MDM at school regularly; however, nearly two-thirds of them consumed junk food at school. The study highlights students' socio-demographic factors, such as sex, grade, and father's occupation, significantly influence students' MDM consumption practices. These results emphasize the need for school health interventions to foster healthy dietary behaviours among school going children. Future research should focus on longitudinal studies to evaluate the long-term impact of MDM programs on children's health, academic performance, and the overall well-being, thereby providing evidence-based policy recommendations to enhance the school nutrition initiatives in Nepal. Moreover, policy makers could take these findings into account during policy planning and program interventions as well.

Acknowledgements

We extend our heartfelt appreciation to all the participants for their generous involvement in this study. We would also like to thank all the anonymous reviewers for their invaluable comments and suggestions to make this manuscript publishable.

Funding

No funding was received for research and publication.

Conflict of Interest

The authors declare no conflict of interest regarding the authorship and publication of this manuscript.

Authors' Contribution

DR conducted the study as part of her master's degree dissertation. MP developed the manuscript and edited it. YRU and DA critically reviewed and rigorously edited the manuscript for the final production. All the authors read, finalized and approved the manuscript for authorship and publication.

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