

Evaluating the Nutritional Status of Elementary School Food Environments in Ilam, Iran: A Cross-Sectional Study

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Article Info	ABSTRACT
Article type: Original article	Introduction: School environments are key in shaping children's dietary habits and countering the global shift toward unhealthy foods. Given the lack of comprehensive data on primary school canteens in Ilam, this study was conducted to assess their nutritional status and inform targeted interventions.
Article History: Received: April. 08, 2026 Revised: May. 09, 2026 Accepted: June. 18, 2026 Published Online: June. 27, 2026	Materials & Methods: A descriptive-analytical cross-sectional study was conducted during the 2025–2026 academic year on all public elementary schools in Ilam city, western Iran (N=54). Because the entire target population was accessible, a census was conducted, and all eligible schools were included in the study. Data were collected using a researcher made checklist, comprising four domains: physical space, equipment, food items offered and vendor qualifications. Data were analyzed using SPSS software (version 18) (p<0.05).
 Correspondence to: Roghayeh Chenary Department of Public Health, Faculty of Health, Ilam University of Medical Sciences, Ilam, Iran	Results: Evaluation of 54 primary school canteens in Ilam City showed vendor qualifications had the highest favorability (72.3%), while equipment was the weakest domain desirability (48.15 %). No significant correlation was found with school population size (r=0.161, P=0.245) or gender (P=0.162). Health caregiver and committee variables were uniform across all schools and could not be analyzed.
Email: Chenaryr@yahoo.com	Conclusion: This study revealed significant inequalities in school canteen nutritional quality, with equipment as the most critical domain (48.15% desirability). The lack of correlation with school size and gender suggests resource allocation should prioritize qualitative needs and equity. Longitudinal and qualitative research is recommended to evaluate interventions and identify implementation barriers.
	Keywords: Nutritional Status, Schools, Food Environment, Ilam

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Introduction

Many countries around the world are experiencing a nutritional transition toward dietary patterns characterized by increased consumption of meat, high-fat foods, and refined sugars, along with a concurrent decline in physical activity—shifts that directly affect children's nutritional status and health. Poor dietary practices during childhood constitute a major risk factor for a range of adverse outcomes, including stunting and wasting, overweight and obesity, cognitive deficits, poor school performance, and chronic non-communicable diseases in later life. These conditions, in turn, are associated with reduced adult earning capacity and, consequently exert a negative impact on gross national product and gross domestic product. It is widely recognized that obesity, in both children and adults, arises from an imbalance between energy intake and energy expenditure (1). Although recommendations for healthy nutrition (e.g., consuming fruits and vegetables five times per week) have been advocated in recent decades, evidence indicates that the consumption of energy-dense, nutrient-poor foods (e.g., snacks high in added sugars or saturated fats) is on the rise among primary school-aged children (2).

Food preferences and dietary habits are generally established at an early age and are likely to persist into adulthood, thereby influencing our food choices in later life (3–4). Research has demonstrated that the surrounding environment, early-life behaviors and decisions, and the encouragement provided to children regarding food choices have significant long-term consequences (5). As children grow older, their intrinsic capacity for self-regulation diminishes, and their ability to self-regulate food choices becomes increasingly influenced by external environmental factors (6). The school setting is regarded as a primary environment for shaping children's dietary behavior, accounting for approximately 20% of their daily dietary intake (7, 8). The United Nations Sustainable Development Goal, which calls for an end to all forms of malnutrition by 2030, cannot be achieved without

specifically targeting school-aged children and adolescents (9). Children's understanding of and resistance to persuasive marketing messages are context-dependent. Both corporations and consumers may benefit from taking these factors into account—both when making choices that affect children and when allowing children to make their own choices (10). In order to create a supportive environment for children's health, school canteens should provide healthier food options for children (11).

The environment in which food is provided influences students' food preferences. Schools serve as an appropriate setting—both in terms of place and time—for promoting healthy dietary habits, as they constitute the second social environment for children (12). During childhood, proper dietary habits are critical for optimal growth, development, health and well-being, as well as for disease prevention. Therefore, schools should establish a supportive environment to protect and promote adequate nutrition for children, their families and communities, since appropriate school meals offer numerous and multifaceted benefits—including enhanced individual and social functioning in the short, medium and long term (13). In Iranian schools, main meals are not provided to students; instead, snacks are either brought from home or sold through school canteens (14).

Domestic studies have shown that although children's nutritional knowledge is relatively favorable, there is a significant gap between their knowledge and practical skills in food choices (15) and multifaceted educational interventions have been shown to improve nutrition knowledge, physical activity and weight status among primary school students (16, 17). Assessments of the environmental health status of schools in various Iranian cities have yielded inconsistent results, ranging from unfavorable (18) to relatively favorable conditions (19, 20). At the international level, a considerable prevalence of the double burden of malnutrition (undernutrition alongside overweight/obesity) among children has

been confirmed (21) and the determining role of school-based education, family environment, and school canteens in shaping sustainable dietary habits and achieving sustainable development goals has been emphasized (22–23). Nevertheless, a review of the literature indicates that no comprehensive study has specifically evaluated the status of school food environments (canteens and cafeterias) at the primary education level, particularly in the context of Ilam city, and this research gap justifies the necessity of the present study. Accordingly, the present study aims to determine the status of nutritional environments (canteens) in elementary schools in Ilam city, as such efforts are crucial for reducing morbidity and mortality associated with malnutrition and for promoting healthier food choices within the community.

Materials and methods

Setting and Participants

This descriptive analytical cross-sectional study was conducted on all elementary schools in Ilam city, western Iran, the study population consisted of all government elementary schools in Ilam (N = 54).

Sampling

Since the aim of this study was to assess the status of school canteens and all schools were equipped with minimum canteen facilities, no specific inclusion or exclusion criteria were applied. Given the manageable size and full accessibility of the target population, all eligible primary schools in Ilam City were included through complete enumeration.

Data collection tools

Demographic tool

The demographic variables included in this study consisted of school shift (single-shift or double-shift), presence or absence of a health care provider, presence or absence of student health committees, total number of students, and student gender (boys' or girls' school).

School Nutrition Canteen Assessment Checklist

A school nutrition canteen assessment checklist was based on the following national guidelines and standard instruments: 1. The Healthy Nutrition Canteen Regulations

2. The Health Inspection Checklist for Food Supply Canteens (Code: 134/920218)

3. The Health Inspection Checklist for Schools (Code: 140/920318)

4. The health-Promoting School Checklists (Codes: 1001 and 1002)

The checklist consisted of four main domains: The checklist comprised four domains: physical space (21 items), equipment (23 items), food items offered (19 items) and vendor qualifications (11 items). All items were scored using a Yes/No dichotomous format, following the scoring method of the health Promoting School checklists. A score of [1] was assigned to "Yes" responses and [0] to "No" responses. The total score for each domain, as well as the overall canteen status score, was calculated by summing the item scores.

Ethical considerations

This study was approved by the Ethics Committee of Ilam University of Medical Sciences (IR.MEDILAM.REC.1403.272). Official permissions were obtained from the Education Department of Ilam province and the principals of the selected primary schools. Data were collected solely through direct observation and checklist completion, with no interviews or direct contact with students. All school information was anonymized and kept confidential.

Statistical and Data analysis

Data were analyzed using IBM SPSS Statistics version 18. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize the data. Pearson's

correlation coefficient was used to assess the relationship between school population size and canteen assessment scores, while an appropriate comparative test was used to compare scores by gender. Statistical significance was set at $p < 0.05$.

Results

Regarding the status of nutrition canteens in the studied, 66.5% of schools had favorable physical space, while 33.5% had unfavorable physical space. In terms of equipment, 48.15% of schools possessed favorable equipment, whereas 51.85% had

unfavorable equipment. 72.3% of schools had qualified vendors meeting the required standards and 27.7% had unqualified vendors. With respect to the food items offered, 65.4% of schools offered favorable food items, while 34.6% offered unfavorable food items. While physical space and food items were relatively adequate, equipment status was the weakest domain, with more than half of the school's requiring improvement. Vendor qualifications showed the highest favorable rate among the indicators (Table 1).

Table 1. Status of nutrition canteens in the studied schools (N=54)

Indicator	Favorable (%)	Unfavorable (%)
Physical space	66.5	33.5
Equipment	48.15	51.85
Vendor qualifications	72.3	27.7
Food items offered	65.4	34.6

To investigate the association between healthy nutritional status with gender and student population size in elementary schools of Ilam City, the normality of the variables was first assessed using the Kolmogorov–Smirnov test. The results indicated that the data were normally distributed ($P > 0.05$). Given the normal distribution of the healthy nutritional status variable and the number of students, Pearson's correlation coefficient was employed to examine

their relationship. The analysis revealed a weak and non-significant correlation between the two variables ($r = 0.161$, $P = 0.245$). The relationship between healthy nutritional status and gender was evaluated using an independent samples t-test. The findings demonstrated no statistically significant difference between genders ($P = 0.162$), indicating that the mean healthy nutritional status scores were comparable across male and female students (Table 2).

Table 2. Descriptive statistics and inferential analyses of healthy nutritional status by gender and school population size.

Variable	Category / Group	Mean $\pm$ SD	Test statistic	P-value
Healthy nutritional status	Male	14.2 $\pm$ 3.1	t = 1.42	0.162
	Female	13.8 $\pm$ 2.9		
School population size	Continuous (N)	-	r = 0.161	0.245

Regarding the variables of "presence of a health caregiver" and "existence of health committees," all schools uniformly possessed these features; thus, these variables showed no variation. Consequently, it was not possible to examine their association with healthy nutritional status.

Discussion

The findings of the present study revealed that the status of primary school canteens was relatively favorable in terms of the qualifications of food sales operators. This relative desirability is consistent with the findings of Flure et. al (24) in the United States, which demonstrated that professional development of school nutrition personnel is a critical factor for the successful implementation of meal standards.

Furthermore, the educational intervention study by Carmichael et. al (25) indicated that hands-on culinary training can significantly enhance the technical skills of canteen staff. It can be concluded that sustaining and improving the quality of school nutrition services necessitates the design of targeted, practical, and job-specific training programs for canteen operators.

However, the results of the present study also identified significant shortcomings in physical space, food quality, and particularly equipment. Moreover, no significant association was found between the overall status of canteens and either student enrollment or gender. This finding is consistent with the results of Babashahi et. Al (26), who examined healthy canteen policies in Iranian schools. Their study revealed that over 54% of food items offered in Tehran's primary school canteens did not comply with national guidelines and identified inadequate physical and economic infrastructure, as well as the absence of scientific criteria for food categorization, as major barriers to full policy implementation. Similarly, they reported no significant relationship between canteen status and school size or gender, suggesting that there is no meaningful difference between girls' and boys' schools in the target population regarding adherence to nutritional standards.

In contrast, Islam et. Al (27), in their investigation of the association between gender and the school food environment in Canada, found that gender-based differences exist in food consumption patterns within the school setting. This discrepancy in findings may reflect cultural and dietary differences between the two study populations, highlighting the importance of contextual factors in shaping school nutrition environments.

The finding of the present study indicating that physical space was suboptimal in one-third of schools in Ilam city is a matter of concern. Babashahi et. al (26) in Iran explicitly identified "lack of adequate physical and economic infrastructure for establishing standard canteens" as one of the primary reasons for

the incomplete implementation of healthy school canteen policies. At the international level, Marcotrigiano et. al (28) in Italy demonstrated that during school health inspections, the majority of issued warnings pertained to the "structure and physical organization of school cafeterias." Additionally, Moore et. al (29) in Northern Ireland reported that in 67% of schools, the physical dining space for students required improvement. Given the pivotal role of the physical environment in shaping children's dietary behaviors, the implications of these deficiencies extend beyond mere sanitary concerns and may exert long-term effects on public health and students' consumption patterns.

The 65.4% desirability of food items offered in school canteens suggests that a considerable proportion of schools in the study population adhere to restrictive guidelines limiting high-fat, high-sugar, and processed foods. However, this rate remains suboptimal when compared to the findings of Ronto et. al (30), who reported that only 33% of schools had canteen menus fully compliant with national dietary guidelines. Nevertheless, the fact that over one-third of students remain exposed to unhealthy and suboptimal food items represents a missed opportunity for nutrition education and the promotion of healthy eating habits. Babashahi et. al (26) in their study identified factors such as the lack of scientific criteria for food categorization, the high cost of healthy food items and stakeholder conflicts of interest as major barriers to the full implementation of healthy canteen policies, which may help explain the relatively low desirability rate observed in the present study.

A key finding of the present study was the absence of a statistically significant relationship between the healthy nutritional status of school canteens and both student enrollment and gender. The weak and non-significant correlation with student enrollment challenges the assumption that larger schools, by virtue of greater resources, may provide superior canteen services. This finding is consistent with the results of a study conducted in Victoria, Australia

(31), which found no difference in the quality of school canteen menus based on students' socioeconomic status. This suggests that, within the study population, the quality of school food services is not contingent on school size and may be influenced by other factors that warrant further investigation.

Similarly, the lack of gender-based differences in canteen status scores indicates that canteen quality is experienced uniformly across all students, which may reflect the absence of systematic gender discrimination in the provision of food services. Babashahi et. al (26) in their study demonstrated that gender-based differences exist in food choices at the individual level. However, the present study examined the school-level context, whereas the aforementioned study focused on the individual level, thereby addressing different units of analysis.

Limitations of the study

A significant limitation of the present study was the lack of variability in the variables of "presence of a health monitor" and "existence of health committees," as 100% of the schools possessed these attributes. Although this limitation may be regarded as a strength of the schools within the target population, it precluded the examination of the association between these two variables and the nutritional status of the canteens. In addition, the cross-sectional, school-level design of the study limited the examination of individual and contextual factors influencing food choices, as well as causal relationships. Nevertheless, the use of a census method and standard checklists provided a comprehensive and reliable picture of primary school canteens in Ilam, offering a valuable foundation for targeted interventions and future research.

Conclusion

In conclusion, this study reveals significant inequalities in the quality of school nutrition canteens, with canteen equipment identified as the most critical domain requiring urgent intervention. Furthermore, the relatively low desirability of food

items offered and the considerable proportion of schools with inadequate physical space and equipment pose serious public health challenges. The absence of correlation with school size and gender, coupled with equality in service provision, underscores the necessity of prioritizing equity-oriented health service delivery to schools, with support resources being strategically allocated to higher-priority schools based on qualitative indicators such as canteen equipment and physical space. Future longitudinal studies are recommended to evaluate the impact of improving school canteen conditions on students' health outcomes. Qualitative research is also suggested to identify barriers to the implementation of school nutrition policies.

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Conflict of interest

The authors declare that they have no competing interests.

Authors' contributions

RCh contributed to conceptualization, methodology and writing of the original draft. MA and ZR were responsible for data collection. KhN performed data analysis. MS contributed to resources, review and editing of the manuscript. All authors reviewed and approved the final version of the manuscript.

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