



SNACK CONSUMPTION PATTERNS AMONG RURAL AND URBAN ELEMENTARY STUDENTS IN LHOKSEUMAWE

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ABSTRACT

Snack consumption is common among elementary school children and may either support nutrient intake or increase exposure to foods high in sugar, salt, and fat. This study compared snack consumption behaviour among elementary school children in rural and urban areas of Lhokseumawe and analysed its association with snacking motivation, snack characteristics, social environment, and snack availability. An observational analytic cross-sectional study was conducted among 141 fourth- and fifth-grade students selected by simple random sampling from SDN 1 Blang Mangat and SDN 1 Banda Sakti. Data were collected using a structured questionnaire that had undergone validity and reliability testing and were analysed using chi-square or Fisher exact tests, odds ratios, and 95% confidence intervals. Poor snack consumption behaviour was more common among rural students (52.8%), whereas good behaviour was more common among urban students (56.5%). In rural areas, no studied variable was significantly associated with snack consumption behaviour. In urban areas, motivation, snack characteristics, social environment, and snack availability were all significantly associated with snack consumption behaviour. Snack consumption behaviour differed between rural and urban students, indicating that school nutrition promotion should be adapted to local food environments.

Keywords: child health; food environment; rural; school health; snacking; urban

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INTRODUCTION

Snack consumption is a routine part of the daily diet of school-aged children. It may contribute to energy and nutrient intake when available foods are safe and nutritionally adequate, but it may also increase exposure to foods and beverages high in sugar, salt, and fat. This issue is important because elementary school children are in a period of growth and habit formation while beginning to have more autonomy in choosing food. Recent studies show that children's snack behaviour is shaped by school food availability, snack safety, breakfast and snack regularity, and multidimensional snack preferences such as taste, nutrient claims, purchase location, and social influence (Alcaire et al., 2021; Hosseinzadegan et al., 2023; Khomsan et al., 2023; Li et al., 2026).

Children's snack choices are not only individual decisions. Children may buy snacks because they are hungry, attracted by taste, colour, texture, packaging, or character-based marketing, influenced by friends, or because food is affordable and easy to obtain near school. Recent evidence on children's food packaging and ultra-processed snack marketing shows that visual and marketing elements on packages can shape children's preferences and food choices, while Indonesian experimental evidence demonstrates that peer influence may strongly affect children's snack choice (Arraztio-Cordoba et al., 2022; Mecheva et al., 2021; Sato et al., 2022). Rural and urban settings may create different snack consumption patterns, but this comparison must be interpreted carefully because local school conditions, family socioeconomic characteristics, and food access can overlap with area classification. Urban environments generally provide wider access to packaged foods, sugar-sweetened beverages, fast food, small shops, and vendors, whereas rural settings may have more limited food options and stronger household routines. Studies on school food environments in

Indonesia, Kenya, Tanzania, and Nigeria indicate that food availability in and around schools, vendor practices, canteen management, and neighbourhood food outlets can influence children's food access and consumption patterns (Gewa et al., 2021; Hadi et al., 2022; Makori et al., 2025; Otinwa et al., 2023).

Snack consumption behaviour is influenced by biological, psychological, social, and environmental factors. Biologically, children may buy snacks because they need energy between main meals. Psychologically, they often choose foods based on sweet taste, colour, aroma, texture, packaging, and pleasure. Socially, children may imitate friends or follow group norms. Environmentally, children are more likely to choose foods that are visible, available, affordable, and easy to access. Recent studies of snack preferences, packaging elements, peer influence, and school food environments support the need to analyse individual motivation together with the surrounding food environment (Arraztio-Cordoba et al., 2022; Li et al., 2026; Makori et al., 2025; Mecheva et al., 2021; Sato et al., 2022). The social environment also plays an important role. Families influence food choice through meal preparation, pocket money, breakfast habits, and supervision. Peers influence children through imitation, sharing food, and group purchasing behaviour. Teachers, schools, and vendors influence children through canteen rules, nutrition education, and the types of foods available during school time. Recent studies from Indonesia, Ghana, and Thailand describe the roles of peers, parents, teachers, school vendors, and school-based health promotion in shaping children's snack-related decisions (Mecheva et al., 2021; Nguyen et al., 2026; Pudsa et al., 2026; Tandoh et al., 2025).

Lhokseumawe City has areas with rural and urban characteristics, making it possible to examine whether elementary school children's snack consumption behaviour differs by setting. This information is useful for schools, health centres, education offices, and parents because snack-related interventions cannot always be implemented uniformly. Evidence from nutrition policy reviews and school-based interventions indicates that education is more effective when accompanied by supportive canteen management, healthier food availability, and school food environment improvements (Cohen, Hecht, Hager, et al., 2021; Grigsby-Duffy et al., 2022; Teo et al., 2021). This study aimed to compare snack consumption behaviour among elementary school children in rural and urban areas of Lhokseumawe and to analyse the association of snacking motivation, snack characteristics, social environment, and snack availability with snack consumption behaviour in each setting.

METHOD

This observational analytic study used a cross-sectional design. The study compared snack consumption behaviour among elementary school children in rural and urban areas of Lhokseumawe City, Aceh Province. The rural area was represented by Blang Mangat District and the urban area was represented by Banda Sakti District. The study was conducted from January to June 2026 at SDN 1 Blang Mangat in Gampong Keude Punteuet and SDN 1 Banda Sakti in Gampong Jawa Lama. The study population consisted of fourth- and fifth-grade students who were considered able to communicate and complete the questionnaire. The sample size was determined by considering the population of both schools using the Slovin formula at a 95% confidence level. The population of SDN 1 Banda Sakti was 83 students, and 69 students were selected. The population of SDN 1 Blang Mangat was 88 students, and 72 students were selected. Therefore, the total sample was 141 students. The samples were selected using simple random sampling from grades IV and V in each school.

The dependent variable was snack consumption behaviour, which included the type, frequency, and timing of snack consumption. The independent variables were snacking motivation, snack characteristics, social environment, and snack availability. Data were collected using a structured questionnaire developed for the study variables. The questionnaire covered respondent

characteristics, snack consumption behaviour, snacking motivation, snack characteristics, social environment, and snack availability. Content validity was reviewed before field use, and item validity and internal consistency reliability were tested before the final questionnaire was used for data collection. Variable scores were grouped into good or poor behaviour, strong or weak motivation, healthy or unhealthy snack characteristics, supportive or not supportive social environment, and healthy or unhealthy snack availability according to the scoring results of the instrument. Ethical approval was obtained from the Research Ethics Committee of the Health Polytechnic of the Ministry of Health, Aceh (Komisi Etik Penelitian Kesehatan Poltekkes Kemenkes Aceh) with approval number DP.04.03/12.7/246/2026. Because the respondents were elementary school children, parental or guardian consent and school permission were obtained before data collection.

Data were analysed descriptively and analytically. Univariate analysis was used to describe respondent characteristics and the distribution of study variables. Bivariate analysis was conducted using the chi-square test or Fisher exact test when appropriate. The level of significance was set at 5% with a 95% confidence interval. Odds ratios were calculated to estimate the strength of association between each independent variable and snack consumption behaviour. Because this study used one school to represent each area and analysed associations separately by area, the findings were interpreted as setting-specific exploratory patterns rather than as a formal test of rural-urban effect modification.

RESULT

A total of 141 elementary school students participated in this study, consisting of 72 students from the rural school and 69 students from the urban school. Respondent characteristics are presented in Table 1. Most rural students were 11 years old (48.6%), male (51.4%), and in grade IV (54.2%). In the urban school, most students were 11 years old (43.5%), female (56.5%), and in grade IV (58.0%). Parental socioeconomic characteristics differed between settings, with higher proportions of higher family income and civil servant, military, or police parental occupation in the urban group.

Table 1.
Respondent characteristics by study area

Characteristic	Rural f	Rural %	Urban f	Urban %
Age				
9 years	1	1.4	12	17.4
10 years	31	43.1	25	36.2
11 years	35	48.6	30	43.5
12 years	5	6.9	2	2.9
Gender				
Male	37	51.4	30	43.5
Female	35	48.6	39	56.5
Class				
Grade IV	39	54.2	40	58.0
Grade V	33	45.8	29	42.0
Parental education				
Elementary school	10	13.9	7	10.1
Junior high school	4	5.6	12	17.4
Senior high school	30	41.7	25	36.2
Higher education	28	38.9	25	36.2
Parental occupation				
Civil servant/military/police	25	34.7	35	50.7
Farmer/trader	21	29.2	12	17.4
Others	26	36.1	22	31.9
Family income				
< IDR 2 million	22	30.6	8	11.6
IDR 2-4 million	28	38.9	22	31.9
> IDR 4 million	22	30.6	39	56.5

Table 2 shows the distribution of snack consumption behaviour and related factors in the rural school. Poor snack consumption behaviour was found in 52.8% of rural students. Most rural students had weak motivation for healthy snacking (65.3%), an unsupportive social environment (66.7%), and unhealthy snack availability around the school (70.8%).

Table 2.

Distribution of snack consumption variables in the rural area (n=72)

Variable	Category	f	%
Snack consumption behaviour	Good	34	47.2
	Poor	38	52.8
Snacking motivation	Strong	25	34.7
	Weak	47	65.3
Snack characteristics	Healthy	48	66.7
	Unhealthy	24	33.3
Social environment	Supportive	24	33.3
	Not supportive	48	66.7
Snack availability	Healthy	21	29.2
	Unhealthy	51	70.8

The urban group showed a different distribution (Table 3). Good snack consumption behaviour was found in 56.5% of urban students. Most urban students had strong motivation for choosing healthy snacks (55.1%), consumed snacks with healthy characteristics (66.7%), had a supportive social environment (65.2%), and had healthy snack availability around school (66.7%).

Table 3.

Distribution of snack consumption variables in the urban area (n=69)

Variable	Category	f	%
Snack consumption behaviour	Good	39	56.5
	Poor	30	43.5
Snacking motivation	Strong	38	55.1
	Weak	31	44.9
Snack characteristics	Healthy	46	66.7
	Unhealthy	23	33.3
Social environment	Supportive	45	65.2
	Not supportive	24	34.8
Snack availability	Healthy	46	66.7
	Unhealthy	23	33.3

The bivariate analysis for the rural area is shown in Table 4. None of the studied variables were significantly associated with snack consumption behaviour among rural students. Snacking motivation had $p=0.554$ and $OR=1.341$ (95% CI: 0.507-3.548), snack characteristics had $p=0.095$ and $OR=2.364$ (95% CI: 0.851-6.562), social environment had $p=0.404$ and $OR=1.519$ (95% CI: 0.568-4.068), and snack availability had $p=0.109$ and $OR=2.321$ (95% CI: 0.819-6.584). The confidence intervals were wide and crossed 1.0; therefore, the rural estimates should be interpreted with caution.

Table 4.

Association between study variables and snack consumption behaviour in the rural area (n=72)

Variable	Category	Good n (%)	Poor n (%)	Total n (%)	p-value	OR (95% CI)
Motivation	Strong	13 (18.1)	12 (16.7)	25 (34.8)	0.554	1.341 (0.507-3.548)
	Weak	21 (29.1)	26 (36.1)	47 (65.2)		
Snack characteristics	Healthy	26 (36.1)	22 (30.6)	48 (66.7)	0.095	2.364 (0.851-6.562)
	Unhealthy	8 (11.1)	16 (22.2)	24 (33.3)		
Social environment	Supportive	13 (18.1)	11 (15.3)	24 (33.3)	0.404	1.519 (0.568-4.068)
	Not supportive	21 (29.2)	27 (37.5)	48 (66.7)		
Snack availability	Healthy	13 (18.1)	8 (11.1)	21 (29.2)	0.109	2.321 (0.819-6.584)
	Unhealthy	21 (29.2)	30 (41.6)	51 (70.8)		

In contrast, all studied variables were significantly associated with snack consumption behaviour in the urban area (Table 5). Students with strong snacking motivation had higher odds of good snack consumption behaviour (OR=6.767; 95% CI: 2.341-19.557; $p<0.001$). Healthy snack characteristics, supportive social environment, and healthy snack availability were also associated with good snack consumption behaviour, with OR values of 3.846, 2.943, and 4.875, respectively. Because the analysis was stratified by area, these findings describe the pattern within the urban school rather than a direct statistical comparison of association strength between rural and urban areas.

Table 5.

Association between study variables and snack consumption behaviour in the urban area (n=69)

Variable	Category	Good n (%)	Poor n (%)	Total n (%)	p-value	OR (95% CI)
Motivation	Strong	29 (42.0)	9 (13.1)	38 (55.1)	<0.001	6.767 (2.341-19.557)
	Weak	10 (14.5)	21 (30.4)	31 (44.9)		
Snack characteristics	Healthy	38 (55.1)	8 (11.6)	46 (66.7)	0.025	3.846 (1.618-55.321)
	Unhealthy	1 (1.4)	22 (31.9)	23 (33.3)		
Social environment	Supportive	30 (43.5)	15 (21.7)	45 (65.2)	0.042	2.943 (1.430-3.592)
	Not supportive	9 (13.0)	15 (21.7)	24 (34.8)		
Snack availability	Healthy	31 (44.9)	15 (21.7)	46 (66.7)	0.010	4.875 (1.347-11.146)
	Unhealthy	8 (11.6)	15 (21.8)	23 (33.3)		

DISCUSSION

This study found different snack consumption patterns among elementary school children in the two study settings in Lhokseumawe. Rural students showed a higher proportion of poor snack consumption behaviour, while urban students showed a higher proportion of good behaviour. This difference may reflect different school food environments, socioeconomic characteristics, and local food access. However, because each setting was represented by one school, school-level characteristics cannot be fully separated from the rural or urban classification. Studies on school food environments show that canteen management, food vendors, food outlet density, and the types of foods available around schools can shape children's food choices (Gewa et al., 2021; Hadi et al., 2022; Makori et al., 2025).

In the rural group, motivation, snack characteristics, social environment, and snack availability were not significantly associated with snack consumption behaviour. This result should not be interpreted as evidence that these factors are unimportant. The odds ratios for snack characteristics and snack availability were above two, but the confidence intervals were wide and included 1.0, indicating statistical uncertainty. The nonsignificant results may be related to the small sample size, limited exposure variation within the rural school, unmeasured household factors, or school-specific conditions. Rural school studies have also shown that policy implementation, family routines, and school-level resources can influence how food environment factors operate in practice (Aussenhus et al., 2023; Grigsby-Duffy et al., 2022; Hadi et al., 2022).

In the urban group, all studied variables were significantly associated with snack consumption behaviour. Snacking motivation showed the strongest association. This finding is consistent with recent evidence that children's snack choices are shaped by taste, nutrient claims, purchase location, family consumption habits, and social influence. In settings where more food options are available, children may have more opportunity to translate motivation and preference into actual purchasing behaviour. Evidence from Indonesia also shows that peer influence can strongly affect children's snack choices, while urban Indonesian data suggest that school-aged children commonly buy snacks from multiple sources, including canteens, street vendors, and food stalls (Li et al., 2026; Mecheva

et al., 2021; Sartika et al., 2025).

Snack characteristics were also associated with behaviour in the urban area. Sensory attributes such as taste, colour, texture, aroma, and packaging can strongly attract school-aged children. Products high in sugar, salt, and fat are often designed to be appealing, affordable, and easy to consume. Recent systematic and empirical evidence indicates that packaging elements, character-based marketing, and other visual features can influence children's food choices and preferences. Indonesian evidence also highlights that popular school snacks need attention not only for frequency of consumption but also for food safety and nutritional quality (Arraztio-Cordoba et al., 2022; Khomsan et al., 2023; Sato et al., 2022).

The significant role of social environment in the urban area supports the view that children's food choices are formed through social interaction. Peer influence can encourage children to buy the same food as their friends, while teachers, parents, and vendors can support or weaken healthier choices through rules, modelling, and food availability. Recent studies in Indonesia, Ghana, and Thailand indicate that peers, parents, school vendors, and school practices are important in children's snack-related decisions and in the persistence of unhealthy snack consumption around schools (Mecheva et al., 2021; Pudsa et al., 2026; Tandoh et al., 2025).

Snack availability was significantly related to behaviour in the urban area. This finding is consistent with the food environment concept: children are more likely to consume foods that are visible, cheap, and accessible. When healthy snacks are available and attractive, children have a better chance of making healthier choices. Conversely, if foods high in sugar, salt, and fat dominate the school surroundings, unhealthy behaviour becomes easier. Reviews and field studies on school food environments support the importance of regulating food availability, improving canteen practices, and increasing access to healthier foods within and around schools (de França et al., 2022; Gewa et al., 2021; Gonçalves et al., 2021; Makori et al., 2025; Nguyen et al., 2026). The findings have practical implications for school health promotion. Uniform nutrition promotion may not be sufficient because school food environments, vendor access, and family context can differ between settings. Rural schools may need strategies that improve the availability of safe and healthy snacks while strengthening family involvement and routine monitoring. Urban schools may require stronger vendor regulation, canteen improvement, peer-based education, and behavioural strategies to reduce the appeal of unhealthy foods. School-based nutrition interventions are more likely to be useful when nutrition education is combined with supportive school canteen environments, school meal strategies, and policy-based improvements in food availability (Cohen, Hecht, Hager, et al., 2021; Cohen, Hecht, McLoughlin, et al., 2021; Grigsby-Duffy et al., 2022; Teo et al., 2021).

This study has limitations. The cross-sectional design cannot establish causal relationships. Data were collected using questionnaires, so responses may be affected by recall and reporting bias. The study involved only two schools, one representing a rural area and one representing an urban area, so school-level characteristics may be inseparable from area classification and the findings may not be generalisable to all schools in Lhokseumawe. The analysis used separate within-area tests and did not include a pooled interaction model; therefore, the results should not be interpreted as formal evidence that associations statistically differ between rural and urban areas. Several potentially relevant factors, such as pocket money, parental feeding practices, school canteen policy, actual nutrient intake, and direct observation of food vendors, were not measured. Future studies should include more schools, measure the school food environment directly, and use multivariable models to control for socioeconomic and school-level confounding.

CONCLUSION

Snack consumption behaviour among elementary school children differed between the rural and urban schools included in this study. Poor behaviour was more common among rural students,

whereas good behaviour was more common among urban students. In the rural school, motivation, snack characteristics, social environment, and snack availability were not significantly associated with snack consumption behaviour, although the estimates were imprecise. In the urban school, all four variables were significantly associated with behaviour, with snacking motivation showing the strongest relationship. These findings contribute to school health promotion by suggesting that healthy snack interventions should consider the local food environment, school context, and social influences rather than being applied uniformly across all schools.

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