

THE ASSOCIATION BETWEEN KNOWLEDGE AND SAFE SNACK FOOD SELECTION AMONG STUDENTS OF SMK SMF INDONESIA

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Abstract

Snack food consumption among adolescents is a common behavior influenced by various internal and external factors, while unsafe food choices remain a public health concern due to the potential presence of hazardous substances. This study aimed to analyze the relationship between knowledge and safe snack food selection among students at SMK SMF Indonesia. A quantitative study with a cross-sectional design was conducted involving 72 students selected using purposive sampling. Data were collected using a structured questionnaire covering knowledge, attitudes, snack food selection behavior, breakfast habits, pocket money, and the influence of advertisements. Data were analyzed using univariate and bivariate analyses with the Chi-square test. The results showed that most students had good snack food selection behavior (63.9%), moderate knowledge (65.3%), and positive attitudes (55.6%). Bivariate analysis indicated that knowledge, gender, pocket money, breakfast habits, attitudes, and advertisement influence were significantly associated with snack food selection behavior ($p = 0.000$). Students with higher knowledge and positive attitudes tended to choose safer snack foods, while exposure to advertisements was associated with poorer selection behavior. In conclusion, knowledge and several supporting factors significantly influence adolescents' snack food selection behavior. Strengthening nutrition education in schools is recommended to improve students' awareness and promote safer snack consumption practices.

Keywords: Snack Food Selection, Adolescent Knowledge, Food Safety, School Students

Introduction

Adolescence is a developmental period characterized by rapid physical growth, psychological changes, and increasing independence in lifestyle and dietary choices (Hargreaves et al., 2022). Adolescents aged 10–24 years tend to have diverse eating behaviors influenced by personal preferences, social environments, and cultural backgrounds (Jayasinghe et al., 2025). Food selection behavior is a process of choosing foods for consumption that is shaped by the interaction of various reinforcing, predisposing, and environmental factors (Chen & Antonelli, 2020). During this stage, adolescents are more likely to consume snack foods due to convenience, affordability, accessibility, and the wide variety of products available around schools and public places (Ashari et al., 2022; Gangrade et al., 2022).

Snack consumption has become a common daily habit among school-aged adolescents. Most snack foods are categorized as fast food because they are quickly prepared and easily obtained (Hastuti et al., 2022). Adolescents require adequate nutritional intake from staple foods, snacks, fruits, vegetables, and ready-to-eat meals to support growth and daily activities. However, concerns regarding food safety remain significant because some snack foods still contain hazardous substances

such as formaldehyde, borax, rhodamine B, and methanyl yellow (Suryani et al., 2020; Suyitno et al., 2024). These substances are often misused by food vendors to improve food texture, extend shelf life, or enhance product appearance without considering the associated health risks (Suryani et al., 2021). The increasing circulation of unsafe snack foods may negatively affect adolescent health and nutritional status.

Human behavior is generally influenced by predisposing factors such as knowledge, attitudes, beliefs, and values, as well as enabling and reinforcing factors that arise from environmental conditions and social influences (A. Akintunde, 2017). Food selection behavior reflects an individual's understanding, attitudes, and practices related to nutrition, food processing, and food safety. Adolescents with better nutritional knowledge are more likely to make healthier food choices and avoid foods that may endanger their health.

Several previous studies have demonstrated the relationship between knowledge and food selection behavior among adolescents. A significant association between the level of nutritional knowledge among high school students in Yogyakarta and their food choices was reported, where students with better knowledge tended to consume healthier foods such as fruits and vegetables (Valeri et al., 2025). Knowledge, attitudes, access to information, and cultural background were found to influence food selection behavior among female adolescents in Malang City (Hadi et al., 2025). Higher levels of knowledge were associated with healthier eating attitudes and behaviors (Jiang et al., 2024). Furthermore, appropriate nutrition education was shown to significantly improve students' knowledge and positive attitudes toward healthy snacks (Adeoya et al., 2023).

In recent years, information regarding snack foods has become increasingly accessible through television advertisements and social media platforms. Exposure to food advertising significantly affects adolescents' purchasing decisions, where repeated exposure increases the likelihood of purchasing advertised products (Tsochantaridou et al., 2023). Parental parenting style and gender differences also contribute to snack selection behavior. Female students tend to be more careful and obedient in selecting healthier snacks compared to male students (Ehondor et al., 2024). Meanwhile, male adolescents generally require greater energy intake due to higher physical activity levels, whereas female adolescents may consume snacks for social or lifestyle-related reasons.

Food poisoning remains a major public health concern in the Special Region of Yogyakarta. During the last four years, food poisoning incidents ranked first among extraordinary health events in the region. Although the number of cases decreased in 2020, this decline was likely associated with the COVID-19 pandemic and improved public hygiene practices, including regular handwashing behavior (DIY Province Health Office, 2024). These findings indicate that unsafe food consumption among adolescents remains an important issue requiring preventive efforts through education and behavioral improvement.

Vocational high school students generally spend approximately 7–10 hours daily at school, making food intake during school hours essential for supporting learning activities and maintaining health, especially since nutritional needs are not always adequately fulfilled at home, leading students to frequently purchase snacks from school canteens or nearby food vendors. Preliminary observations at SMK SMF Indonesia involving 15 students indicated that knowledge regarding safe snack foods was relatively low, with most students selecting snacks based on taste, color, and low price rather than packaging quality, cleanliness, or preparation methods; additionally, seven students rarely consumed breakfast, while variations in daily pocket money appeared to influence snack purchasing behavior, suggesting limited awareness of safe snack selection practices. Although previous studies have explored adolescent food selection behavior, most have focused on general nutrition, healthy eating patterns, or obesity-related issues, while limited research has specifically examined the relationship between knowledge and safe snack food selection among vocational high school students, particularly at SMK SMF Indonesia, and the influence of contextual factors such as breakfast habits, pocket

money, media exposure, and school environment remains insufficiently investigated, indicating a clear research gap regarding determinants of safe snack food selection in this population.

Based on these considerations, this study aims to analyze the relationship between students' knowledge and the selection of safe snack foods among students at SMK SMF Indonesia. The findings of this study are expected to contribute to the development of school-based health promotion strategies and nutrition education programs to improve adolescents' awareness and behavior regarding safe snack consumption.

Method

This study employed a quantitative research method using a cross-sectional design. In this design, data collection for both independent and dependent variables was conducted simultaneously at a single point in time. Cross-sectional studies are commonly used to assess the relationship between exposure variables and outcomes within a specific population (Aggarwal & Ranganathan, 2019). The variables examined in this study included factors influencing students' behavior in selecting safe snack foods. The study was conducted at SMK SMF Indonesia, located in Pandeyan, Umbulharjo District, Yogyakarta City, Special Region of Yogyakarta, Indonesia. Data collection was scheduled to take place in October 2025.

The target population of this study consisted of all students enrolled at SMK SMF Indonesia Yogyakarta. The total study population included 258 students from grades X, XI, and XII. The sample was selected using a purposive sampling technique based on specific considerations determined by the researcher (Notoatmodjo, 2018). The sample size was calculated using the Slovin formula with a 10% margin of error. Based on the calculation, the minimum required sample size was 72 respondents. The number of participants from each class was proportionally determined using the sampling fraction per cluster formula. The final sample consisted of students from grades X, XI, and XII representing all study programs within the school.

The research instrument used in this study was a self-administered questionnaire developed by the researcher based on references from the Indonesian Food and Drug Authority (BPOM, 2014; 2021). The questionnaire consisted of several sections, including respondent characteristics, knowledge of snack food selection, attitudes toward snack food selection, snack food selection behavior, and the influence of advertising on snack food selection. Respondent characteristics included initials, age, gender, daily pocket money, and breakfast habits.

The knowledge questionnaire initially consisted of 20 items measured using the Guttman scale with "true" and "false" response options. Correct answers were scored 1 and incorrect answers were scored 0 for favorable statements, while the scoring system was reversed for unfavorable statements. After validity testing, 16 valid items were retained for the final questionnaire. The attitude questionnaire initially consisted of 20 statements measured using a Likert scale ranging from strongly agree to strongly disagree. Favorable statements were scored from 4 to 1, while unfavorable statements used reverse scoring. Following validity testing, 18 valid items were retained. The behavior questionnaire consisted of 15 valid statements measured using a Likert scale with response categories of always, rarely, and never. In addition, the advertising influence questionnaire consisted of 10 valid statements measured using a Likert scale.

Instrument testing was conducted on 30 respondents at SMK Insan Mulia prior to the main study. Validity testing used a significance level of 5% with an *r*-table value of 0.361. Questionnaire items with *r*-count values greater than or equal to the *r*-table value were considered valid. Reliability testing was performed using Cronbach's Alpha coefficient. The reliability results showed that all instruments were reliable, with alpha values of 0.739 for knowledge, 0.750 for attitudes, 0.759 for behavior, and 0.781 for advertising influence, indicating good internal consistency.

The independent variables in this study included knowledge regarding snack food selection, attitudes toward snack food selection, breakfast habits, pocket money, gender, and the influence of advertising. The dependent variable was safe snack food selection behavior among students. Potential confounding variables included school regulations, teacher involvement, and parental roles.

Primary data were collected directly from respondents using questionnaires distributed during classroom activities. Before data collection, the researcher explained the purpose and procedures of the study and obtained informed consent from all participants. Secondary data were obtained from school records and institutional reports related to the research setting, including information on student demographics, school facilities, and human resources.

Data analysis consisted of univariate, bivariate, and multivariate analyses. Univariate analysis was used to describe the characteristics of each research variable through frequency distribution tables. Bivariate analysis was conducted using the Chi-square test to determine the relationship between independent variables and the dependent variable. Statistical significance was determined using a p-value of less than 0.05. Variables with significant associations were further analyzed using multiple logistic regression to identify the dominant factors influencing safe snack food selection behavior among students.

This study considered several ethical principles involving human participants. Informed consent was obtained voluntarily from all respondents before participation. Participant anonymity was maintained by replacing names with respondent codes during data processing and reporting. All research data were kept confidential and were only used for research purposes. Ethical approval for this study was obtained from the Research Ethics Committee of Universitas Ahmad Dahlan (Komite Etik Penelitian/KEP UAD) with Ethical Approval Number: REC-UAD/01/01/10-2025/406 prior to data collection.

Results

Table 1 presents the distribution of respondents' characteristics and the frequency distribution of the research variables. Of the 72 respondents, most students were aged 16 years (41.7%), while female students constituted the majority of the sample (68.1%). Most respondents had a high daily allowance (86.1%) and reported rarely having breakfast before school activities (77.8%). Regarding snack food selection behavior, the majority of respondents demonstrated good behavior in selecting snack foods (63.9%). In terms of knowledge, most students had a moderate level of knowledge regarding snack foods (65.3%), while 25.0% had good knowledge and 9.7% had poor knowledge. More than half of the respondents showed positive attitudes toward snack foods (55.6%). Furthermore, most respondents stated that advertisements did not influence their snack food choices (62.5%).

Table 1. Distribution of Respondent Characteristics and Research Variables (n = 72)

Variables	Frequency (f)	Percentage (%)
Age		
15 years	6	8.3
16 years	30	41.7
17 years	17	23.6
18 years	19	26.4
Gender		
Male	23	31.9

Variables	Frequency (f)	Percentage (%)
Female	49	68.1
Pocket Money		
Low	10	13.9
High	62	86.1
Breakfast Habits		
Always	16	22.2
Rarely	56	77.8
Snack Food Selection Behavior		
Good	46	63.9
Poor	26	36.1
Knowledge of Snack Foods		
Good	18	25.0
Moderate	47	65.3
Poor	7	9.7
Attitude Toward Snack Foods		
Positive	40	55.6
Negative	32	44.4
Role of Advertisement		
Influenced	27	37.5
Not influenced	45	62.5

Table 2 shows the relationships between independent variables and snack food selection behavior among students at SMK SMF Indonesia. Gender was significantly associated with snack food selection behavior ($p = 0.000$), where female students were more likely to demonstrate good snack selection behavior compared to male students. Pocket money also showed a significant relationship with snack food selection behavior ($p = 0.000$), indicating that students with higher daily allowances tended to exhibit better snack selection practices. Breakfast habits were significantly related to snack food selection behavior ($p = 0.000$); students who regularly consumed breakfast had a greater likelihood of selecting healthier snack foods. In addition, knowledge regarding snack foods demonstrated a strong association with snack food selection behavior ($p = 0.000$), suggesting that students with better knowledge were more likely to choose safe and healthy snacks. A positive attitude toward snack foods was also significantly associated with good snack selection behavior ($p = 0.000$). Furthermore, the influence of advertisements showed a significant relationship with snack food selection behavior ($p = 0.000$), where students affected by advertisements were less likely to demonstrate good snack food selection behavior.

Table 2. Relationship Between Independent Variables and Snack Food Selection Behavior

Variables	Poor Behavior n (%)	Good Behavior n (%)	OR (95% CI)	p-value
Gender				
Male	16 (69.6)	7 (30.4)	0.112 (0.036–0.346)	0.000
Female	10 (20.4)	39 (79.6)	Reference	
Pocket Money				
Low	9 (90.0)	1 (10.0)	0.042 (0.005–0.357)	0.000
High	17 (27.4)	45 (72.6)	Reference	
Breakfast Habits				
Rarely	25 (44.6)	31 (55.4)	Reference	0.000
Always	1 (6.3)	15 (93.8)	12.907 (1.494–97.966)	
Knowledge of Snack Foods				
Poor Knowledge	20 (71.4)	8 (28.6)	Reference	0.000
Good Knowledge	6 (13.6)	38 (86.4)	15.833 (4.822–51.991)	
Attitude Toward Snack Foods				
Negative	21 (65.6)	11 (34.4)	Reference	0.000
Positive	5 (12.5)	35 (87.5)	13.364 (4.076–43.818)	
Role of Advertisement				
Influenced	25 (92.6)	2 (7.4)	0.002 (0.000–0.021)	0.000
Not Influenced	1 (2.2)	44 (97.8)	Reference	

Discussion

The findings of this study indicate that knowledge, gender, pocket money, breakfast habits, attitudes, and the role of advertisements were significantly associated with snack food selection behavior among students at SMK SMF Indonesia. These results suggest that both internal factors, such as knowledge and attitudes, and external factors, such as media exposure and economic conditions, contribute to adolescents' decisions in selecting snack foods.

This study found a significant relationship between knowledge regarding snack foods and students' snack food selection behavior. Students with better knowledge were more likely to choose safe and healthy snack foods compared to those with lower levels of knowledge. Knowledge plays an important role in shaping health behavior because individuals who understand food safety, nutritional content, packaging, and food additives are more capable of making appropriate food choices. According to health behavior theory, knowledge is a predisposing factor that influences the formation of behavior (Glanz et al., 2008). Adolescents with sufficient understanding of healthy snacks are more aware of the risks associated with unsafe foods containing hazardous substances such as formalin, borax, and artificial dyes. The findings of this study are consistent with previous studies which reported that higher nutritional knowledge was associated with healthier food selection behavior among adolescents (Thakur & Mathur, 2022). The nutrition education improved students' knowledge and attitudes toward healthy snack consumption (Suryani et al., 2021). These findings emphasize the importance of school-based nutrition education programs to improve adolescents' awareness regarding safe snack foods.

The present study also demonstrated a significant relationship between attitudes toward snack foods and snack food selection behavior. Students with positive attitudes were more likely to exhibit good snack selection practices. Attitudes reflect an individual's tendency to respond positively or

negatively toward an object or behavior and are influenced by personal experience, social interaction, and exposure to information (Liao, 2023). Positive attitudes toward healthy eating may encourage students to avoid unsafe snacks and prioritize food hygiene, packaging quality, and nutritional value. This result supports the theory that attitudes contribute to behavioral formation and are closely linked to health-related decision-making. The findings are also consistent with previous studies showing that adolescents with positive attitudes toward nutrition are more likely to adopt healthier eating behaviors.

Gender was significantly associated with snack food selection behavior in this study. Female students were more likely to demonstrate good snack selection behavior compared to male students. This finding may be related to differences in health awareness and dietary concerns between genders. Female adolescents generally tend to pay greater attention to food quality, hygiene, and body health, whereas male adolescents are more likely to prioritize taste, convenience, and satiety. This finding is in line with the study that female students were more careful in selecting healthy snacks compared to males (Lambert et al., 2020). Differences in energy requirements and lifestyle factors may also contribute to variations in food selection behavior between male and female adolescents.

Pocket money was another factor significantly related to snack food selection behavior. Students with higher daily allowances tended to demonstrate better snack food selection behavior compared to those with lower allowances. Adequate pocket money may allow students to purchase healthier and safer food products, whereas limited financial resources may encourage students to select cheaper foods without considering nutritional value or food safety. However, this finding differs from some previous studies suggesting that higher pocket money may increase the risk of excessive unhealthy snack consumption and obesity (Kansra et al., 2021; Lister et al., 2023; Ma et al., 2020). The difference may be explained by variations in environmental conditions, food availability, and students' nutritional awareness. In the present study, students with better financial resources may also have had greater access to healthier food options.

Breakfast habits were significantly associated with snack food selection behavior. Students who regularly consumed breakfast were more likely to choose healthy snacks compared to those who rarely had breakfast. Breakfast provides sufficient energy and reduces excessive hunger during school hours, thereby decreasing the tendency to purchase unhealthy snacks impulsively. This finding supports previous research which highlighted the importance of breakfast in maintaining adequate nutritional intake and healthy eating behavior among adolescents (Halder et al., 2024). Students who skip breakfast may experience increased hunger, making them more susceptible to purchasing fast foods or inexpensive snacks with poor nutritional quality. Therefore, promoting regular breakfast habits among adolescents may contribute to healthier food selection behavior.

The role of advertisements was also found to have a significant relationship with snack food selection behavior. Students influenced by food advertisements were less likely to demonstrate good snack selection behavior. Food advertisements, particularly those delivered through television and social media, often emphasize attractive packaging, taste, and popularity rather than nutritional value or food safety. Adolescents are highly vulnerable to persuasive marketing strategies because they are in a developmental stage characterized by curiosity and susceptibility to social influence. This finding is consistent with studies which showed that repeated exposure to food advertisements significantly affected adolescents' purchasing decisions (Tsochantaridou et al., 2023). The strong influence of advertisements indicates the need for media literacy education to help adolescents critically evaluate food marketing messages.

The findings of this study support the theoretical framework proposed by Green and Notoatmodjo, which explains that health behavior is influenced by predisposing, enabling, and reinforcing factors. Knowledge and attitudes represent predisposing factors, while pocket money and breakfast habits function as enabling factors that facilitate behavior. Meanwhile, advertisements act as

reinforcing factors that shape adolescents' food preferences and consumption patterns. The interaction between these factors ultimately determines students' snack food selection behavior. This study provides important implications for schools, parents, and health authorities. Schools should strengthen nutrition education programs and improve supervision of food vendors around the school environment. Parents should encourage healthy breakfast habits and provide guidance regarding safe snack selection. In addition, stricter monitoring of snack food advertisements targeting adolescents may help reduce the consumption of unsafe or unhealthy foods. Through collaborative efforts among schools, families, and public health institutions, adolescents' awareness and behavior regarding safe snack food selection can be improved.

Conclusion

This study concluded that knowledge regarding snack foods was significantly associated with snack food selection behavior among students at SMK SMF Indonesia. Students with better knowledge tended to demonstrate healthier and safer snack food selection behavior compared to those with lower levels of knowledge. In addition, gender, pocket money, breakfast habits, attitudes toward snack foods, and the role of advertisements were also significantly related to students' snack food selection behavior. These findings indicate that both internal factors, such as knowledge and attitudes, and external factors, such as media influence and socioeconomic conditions, contribute to adolescents' decisions in selecting snack foods. Therefore, improving students' knowledge through nutrition education and health promotion programs may help encourage healthier and safer snack food selection behavior among adolescents. Schools and parents are encouraged to collaborate in providing nutrition education, promoting regular breakfast habits, and increasing students' awareness regarding safe snack foods and the influence of food advertisements.

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