



High-Sugar Foods Consumption Determinants and Their Association with Dental Health Behavior and Status Among Students

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ABSTRACT

High-sugar food consumption is a major risk factor for oral diseases, particularly dental caries. Identifying its determinants is essential for developing effective prevention strategies. This study aimed to analyze the determinants of high-sugar food consumption behavior and its association with dental health behavior and dental health status among students. A cross-sectional survey was conducted among 380 students of Politeknik Kesehatan Kemenkes Jakarta I who participated in a Free Health Check-up program at Klinik Pratama Polkesjasa in November 2025. Participants were selected using total sampling. Data were collected using a validated and reliable questionnaire and analyzed using descriptive statistics and the Chi-square test. The findings revealed that knowledge and psychological factors, as predisposing factors, were significantly associated with high-sugar food consumption behavior. Among enabling factors, availability and environmental factors showed significant associations. Social environment, as a reinforcing factor, was also significantly associated with high-sugar food consumption behavior ($p < 0.005$). In contrast, gender and attitude were not significantly associated with this behavior. Furthermore, no significant associations were found between high-sugar food consumption behavior and either dental health behavior or dental health status. In conclusion, knowledge, psychological factors, availability, environmental factors, and social environment are important determinants of high-sugar food consumption among students. These findings may support the development of targeted oral health promotion programs aimed at reducing high-sugar food consumption.

INTRODUCTION

Dental and oral diseases remain a problem and are suffered by a large part of the Indonesian population and also the world. Based on the results of the 2023 Indonesian Health Survey, the prevalence of dental caries reached 82.8%, and only 6.2% brushed their teeth at the correct times (Kementerian Kesehatan Republik Indonesia, 2023). Brushing teeth at the right time plays an important role in maintaining oral hygiene, and if not done correctly, it will lead to the emergence of dental and oral diseases. According to the World Health Organization (2025), the prevalence of dental and oral diseases continues to increase globally, one of the causes being the high consumption of sugary foods and beverages. The availability, affordability, ease of access, and marketing of sugary foods and beverages lead to increased consumption and contribute to dental and oral diseases.

Excessive consumption of high-sugar foods and beverages is closely related to the occurrence of dental caries. High sugar consumption behavior triggers the activity of cariogenic bacteria in the mouth to produce acid and cause demineralization of tooth enamel. Additionally, the consumption of high-sugar foods not accompanied by adequate dental and oral hygiene maintenance can trigger plaque formation and lead to the onset of periodontal disease.

The behavior of the community in consuming high-sugar foods can be influenced by various factors. Based on the behavioral theory proposed by Green and Kreuter, an individual's behavior change is influenced by factors classified into three categories: predisposing factors related to factors that precede behavior change and provide motivation for the behavior performed, enabling factors related to factors that enable the behavior to be realized, and reinforcing factors, which are rewards or ongoing support to maintain the behavior (Sharma, 2022). Therefore, a comprehensive analysis is needed to examine the determinants related to the behavior of consuming high-sugar foods and their connection to dental and oral diseases.

The Ministry of Health organizes the Free Health Check (CKG) program as a promotive and preventive effort by conducting early detection on birthdays. This program is carried out to raise public awareness and make birthdays a reminder to conduct early detection so that diseases do not develop into serious conditions (Kementerian Kesehatan Republik Indonesia, 2025). Various types of examinations are conducted by healthcare facilities for different age groups, which not only serve as health services but also as a strategy for behavioral change approaches. One type of examination in CKG is a dental check-up as an effort to detect dental issues to prevent dental and oral diseases.

The age group targeted by CKG includes adults, particularly those in their productive years. Students fall into the category of productive adults and need to undergo CKG because they are experiencing a transitional period with risks of unhealthy behaviors, are in a phase of lifestyle changes, and many diseases appear without symptoms at a young age, often going unnoticed. Unhealthy behaviors that often appear in students include frequently consuming fast food and high-sugar foods, irregular sleep patterns, and experiencing academic stress. The consumption of foods and beverages high in sugar can trigger various diseases, one of which is dental caries and oral diseases, if not supported by good dental and oral hygiene.

Based on the above description, there are various factors that can trigger the consumption of high-sugar foods, which can lead to the emergence of dental and oral disease risks. The CGK program can serve as a momentum to conduct screening and identify the relationship between sweet food consumption behavior and dental health conditions as a basis for further promotive and preventive intervention efforts. This study is important due to the high prevalence of dental caries. University students are a vulnerable group that frequently consumes high-sugar foods and beverages and has greater autonomy in choosing dietary patterns. Therefore, this population is important to investigate. The novelty of this study lies in its focus on evaluating high-sugar food consumption behavior among students with a health-related educational background, a population that has received limited attention in previous research. Therefore, this study aims to analyze the determinants of high-sugar foods consumption behavior and examine the relationship between high-sugar foods consumption behavior and dental health behavior and dental health status among students.

METHOD

This study employed a cross-sectional survey design and was conducted in November 2025. The study population consisted of students from Politeknik Kesehatan Kemenkes Jakarta I who participated in the Free Health Check-up (CKG) program at Klinik Pratama Polkesjasa between November 22 and 28, 2025. A total sampling technique was applied, whereby all eligible students who participated in the program during the study period were included as research subjects.

Data were collected using a structured questionnaire consisting of 21 ordinal-scale items. The questionnaire was designed to assess the determinants of high-sugar food consumption behavior, including predisposing factors, enabling factors, and reinforcing factors, as well as high-sugar food consumption behavior, dental health behavior, and dental health status. Several potential confounding variables, such as age, educational level, and academic program, were not assessed in this study.

Prior to data collection, the questionnaire was tested for validity and reliability using responses from 30 participants. Construct validity was evaluated using Spearman's rho correlation test. Two items were found to be invalid and subsequently removed from the instrument. The correlation coefficients of the remaining items ranged from 0.501 to 0.876, exceeding the critical value of 0.361. Reliability was assessed using Cronbach's alpha coefficient, yielding a value of 0.950, indicating excellent internal consistency.

Questionnaire data were collected electronically through a web-based link distributed to students participating in the Free Health Check-up program. High-sugar food consumption behavior and dental health behavior were categorized into three levels (low, moderate, and high) based on questionnaire scores. The categories were determined using equal intervals derived from the range between the minimum and maximum possible scores. Dental health status was classified according to the number of self-reported decayed teeth (DT) into five categories: very low (0–1 tooth), low (2 teeth), moderate (3 teeth), high (4 teeth), and very high (≥ 5 teeth).

The study utilized secondary data, including questionnaire responses obtained from Klinik Pratama Polkesjasa. Data were analyzed using descriptive (univariate) and inferential (bivariate) statistics. The Chi-square test was employed to examine the relationships between determinant factors and high-sugar food consumption behavior, as well as the associations between high-sugar food consumption behavior, dental health behavior, and dental health status. Statistical significance was determined at $p < 0.05$.

RESULTS AND DISCUSSION

Based on the research conducted on 380 research subjects, the only characteristic of the research subjects that was examined was gender. Age and education were not studied, because the subjects' ages were almost the same, between 18-21 years, and all had graduated from high school or equivalent. Univariate analysis was conducted on the gender characteristic and can be illustrated in the following graph.

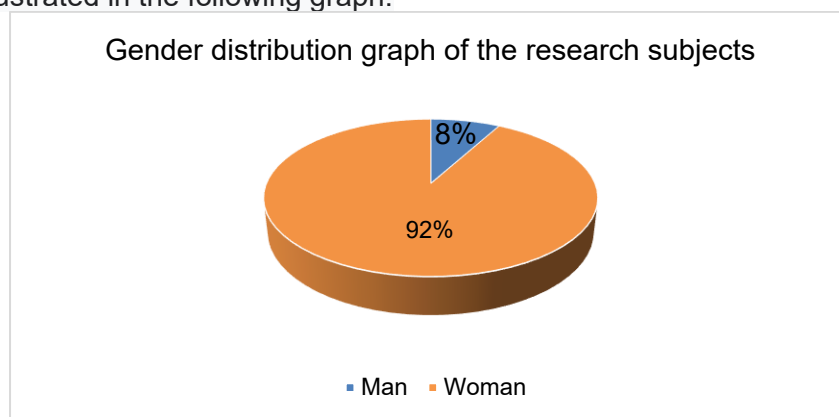


Figure 1. Graph of research subjects' characteristics based on gender.

Based on gender characteristics, the majority of students are female, accounting for 92%, while male students make up 8%. Politeknik Kesehatan Jakarta I is a higher education institution in health sciences where the student body is predominantly female, and one of its programs, midwifery, consists entirely of female students.

Bivariate analysis was conducted using Chi-Square to determine the relationship between predisposing, enabling, and reinforcing factors and sweet food consumption behavior. Sweet food consumption behavior is related to high-sugar foods eaten at breakfast, snacks, drinks, and sweet eating patterns on weekends.

Table 1. Results of the Chi-Square analysis of Predisposing Factors and their relationship with sweet food consumption behavior.

Variable		Behavior of consuming high-sugar foods			Total	p-value
		Low	Medium	High		
Gender	Man	17	9	3	29	0.176
	Woman	175	160	16	351	
	Total	192	169	19	380	
Knowledge	Low	47	19	0	66	0.001
	Medium	75	58	2	135	
	High	70	92	17	179	
	Total	192	169	19	380	
Attitude	Low	73	59	3	135	0.329
	Medium	86	77	10	173	
	High	33	33	6	72	
	Total	192	169	19	380	
Psychological	Low	124	42	0	166	0.001
	Medium	68	109	8	185	
	High	0	18	11	29	
	Total	192	169	19	380	

Based on the data presented in Table 1 related to predisposing factors, most of the research subjects were female, and the behavior of sweet food consumption based on gender showed that both males and females mostly consumed high-sugar foods at a low intensity. Additionally, the gender variable did not have a significant relationship with sweet food consumption behavior, with a p-value > 0.05.

Most of the research subjects have knowledge about the need to reduce high-sugar foods at a high level and exhibit low-level behavior in consuming high-sugar foods. Knowledge and behavior regarding sweet food consumption have a significant relationship with a p-value of 0.001.

Attitude variable, most research subjects have a moderate attitude category related to sweet food consumption, meaning neutral, sometimes like it, and inconsistent. The behavior of sweet food consumption is mostly at a low level, and attitude does not have a significant relationship with sweet food consumption behavior (p value 0.329).

Psychological variables have a significant relationship with sweet food consumption behavior with a p-value of 0.001. The psychological questionnaire is related to the mood when consuming high-sugar foods, such as experiencing cravings, being stressed, celebrating, emotions, and easily rejecting high-sugar foods (negative statements). Most subjects are psychologically in the moderate category and have low sweet food consumption behavior.

Table 2. Results of the Chi-Square analysis of Enabling Factors determinants and their relationship with sweet food consumption behavior.

Variable		Behavior of consuming high-sugar foods			Total	p-value
		Low	Medium	High		
Availability	Low	149	40	0	189	

Environment	Medium	41	103	4	148	0.001
	High	2	26	15	43	
	Total	192	169	19	380	
	Low	173	67	1	241	0.001
	Medium	18	97	7	122	
	High	1	5	11	17	
	Total	192	169	19	380	

The data in Table 2 shows that the enabling factors determinant, namely the availability variable (availability of high-sugar foods, portion size, and ease of access), has a significant relationship with sweet food consumption behavior with a p-value of 0.001 ($p < 0.05$). The cross-tabulation results indicate that respondents with low availability of high-sugar foods have low sweet food consumption behavior.

The second enabling factor is the environmental variable related to family eating patterns and meal timing, which has a significant relationship with sweet food consumption behavior with a p-value of 0.001 ($p < 0.005$). The cross-tabulation results show that families with regular eating patterns and who are not accustomed to consuming sweet desserts have low sweet food consumption behavior.

Table 3. Results of the Chi-Square analysis of Reinforcing Factors determinants and their relationship with sweet food consumption behavior.

Variable		Behavior of consuming high-sugar foods			Total	p-value
		Low	Medium	High		
Social environment	Low	163	68	0	231	0.001
	Medium	26	91	7	124	
	High	3	10	12	25	
	Total	192	169	19	380	

According to the data in Table 3, which shows that Reinforcing Factors, namely the social environment, have a significant relationship with sweet food consumption behavior with a p-value < 0.005 . The social environment is related to high-sugar foods offered by others and exposure to advertisements. The cross-tabulation results indicate that the impact of the social environment is in the low category and sweet food consumption behavior is also low.

Table 4. Results of the Chi Square test on sweet food consumption behavior and its relationship with dental health behavior.

Variable		Dental Health Behavior			Total	p-value
		Low	Medium	High		
Behavior of consuming high-sugar foods	Low	90	58	44	192	0.624
	Medium	85	56	28	169	
	High	9	7	3	19	
	Total	184	121	75	380	

Based on the data presented in Table 4, it shows that the variable of sweet food consumption behavior does not have a significant relationship with good dental health behavior with a p-value of 0.624 (> 0.005). The cross-tabulation results indicate that the sweet food consumption behavior of students is in the low category, and the dental health behavior related to the habit of having dental check-ups every 6 months and the habit of regularly cleaning tartar is also low, meaning it is not done routinely.

Table 5. Results of the Chi-Square test on sweet food consumption behavior and its relationship with dental health status.

Variable		Dental Health Status					Total	p-value
		Very Low	Low	Medium	High	Very High		
Behavior of consuming high-sugar foods	Low	116	41	20	9	6	192	0.563
	Medium	96	37	22	9	5	169	
	High	7	5	4	1	2	19	
	Total	219	83	46	19	13	380	

The results of the Chi-Square analysis presented in Table 5 show that the behavior of sweet food consumption in this study does not have a significant relationship with dental health status, with a p-value of 0.563 (> 0.005). The dental health status referred to is the number of decayed teeth possessed by the research subjects and the presence or absence of dental calculus. The cross-tabulation results show that the majority of the research subjects have low consumption behavior of high-sugar foods and very low dental health status, which means that most students' dental health status is in good condition because the number of decayed teeth is ≤ 1 and there is no dental calculus.

The behavior of consuming high-sugar foods is influenced by many factors. Various determinant factors of behavior, categorized into predisposing, enabling, and reinforcing by Green, interact to shape health behaviors, including the habit of consuming high-sugar foods that can trigger the risk of dental and oral diseases if not followed by good dental and oral hygiene maintenance. Identification of various factors related to sweet food consumption behavior among students who undergo Free Health Check-ups is conducted as an effort to understand how such behavior occurs and as a basis for information in designing promotive and preventive intervention programs in the field of dental health.

Based on the research findings, the characteristics of Politeknik Kesehatan students are dominated by women. This occurs because the Health Polytechnic is a higher education institution that produces health workforce graduates, which are associated with professions that care for and serve people in need of health services. This condition is caused by the gender perception that caregiving, empathy, and patience are socially viewed as traits possessed by women, leading to a predominance of female interest in entering health workforce education. This is supported by Prosen (2022), who states that gender stereotypes influence individuals to choose nursing as a profession. According to the research conducted by Chan et al., (2014), both genders, male and female, show similar academic, clinical, and psychological performance, although male students experience negative experiences when practicing in the field of obstetrics. To address gender misconceptions in the healthcare profession, it is necessary to raise public awareness to promote diversity, create an inclusive healthcare workforce with strategies during recruitment to ensure gender diversity in healthcare teams, and provide opportunities for men to lead healthcare teams as a representation of gender equality.

The results of the analysis of predisposing behavior determinants, namely gender and its relationship with sweet food consumption behavior, show no significant relationship. The gender of male and female students mostly shows low sweet eating behavior. According to research conducted by Guarneri et al. (2025), the quality of a person's diet and the increase in sugar intake are more influenced by the preference for sweet taste compared to eating behavior. This is also supported by research conducted by Bärebring et al. (2020), which found that there is no significant difference in sugar consumption behavior based on gender. Gender differences are more evident in the perception of food choices; women tend to have a more negative and worried view of healthy food, while men are more permissive. This results in women more frequently avoiding certain foods because they are considered unhealthy.

Students have a high level of knowledge regarding sweet food consumption and exhibit low levels of sweet food consumption behavior. Knowledge has a significant relationship with sweet food consumption behavior. Students with a background in health education understand the dangers of excessive sugar consumption and its impact on health, thereby encouraging

behavior to control their sugar intake. The results of this study are supported by Gupta et al. (2018), who found that sugar consumption behavior is influenced by knowledge. Health students study nutrition and diseases, understand the mechanisms and impacts of diseases that can arise from excessive sugar consumption, and have the ability to comprehend the nutritional content listed on food labels, thereby encouraging changes toward a healthier lifestyle.

Students' attitudes toward sweet food consumption behavior are in the moderate category, while the actual sweet food consumption behavior is in the low category. The results of this study indicate that although attitudes toward sugar consumption are not entirely positive, individuals can still control themselves to avoid excessive sugar consumption because behavior is related to various other factors, one of which is high knowledge related to health. According to Kural Enc et al., (2024), individual attitudes and intentions play an important role in influencing consumption levels. Their research results show that intentions have a positive influence on the consumption of high-sugar foods, while attitudes do not have a significant impact. A person's attitude is also influenced by their experiences, perceptions of low autonomy, negative attitudes, and apathy, which can affect an individual's attitude toward consuming high-sugar foods. This is also supported by Gupta et al. (2018), that attitudes do not always have a consistent relationship with sweet food consumption behavior because they are also influenced by individual, environmental, and social factors.

Psychological variables have a significant relationship with sweet food consumption behavior. The predisposing psychological factor determinants among students fall into the moderate category, and the sweet food consumption behavior is low. Psychological variables have a significant relationship with sweet food consumption behavior because there is a very strong desire to eat high-sugar foods, stress conditions, and emotions of happiness due to celebrating something enjoyable. This situation is reinforced by the research conducted by Arjmand et al. (2023), which states that psychological distress or mental or emotional pressure experienced by someone when there is something disturbing their well-being can lead to unhealthy eating behaviors. According to Ulhaq et al., (2023), academic stress can trigger students to eat more, consume fast food, and skip dinner. High sugar consumption and emotional eating behaviors can increase when stress levels rise and gradually decrease as stress levels decrease.

The second behavioral determinant is Enabling Factors, specifically the availability variable, which has a significant relationship with sweet food consumption behavior. This variable measures the availability of sweet food at home, portion sizes, and ease of access, indicating that the research subjects have low availability of sweet food and exhibit low sweet food consumption behavior. Research conducted by Pechey et al., (2021), indicates that reducing the availability of unhealthy food options can decrease unhealthy eating patterns, while increasing the availability of unhealthy food options has the potential to increase unhealthy eating behaviors. Students with low availability of high-sugar foods have a positive impact on low consumption of high-sugar foods. This condition limits the ease of access to food, because there is a tendency that when it is available, there will be a desire to take and eat without considering the impact on health.

The determinants of enabling factors of the environmental variable have a significant relationship with sweet food consumption behavior among students. Students have low exposure to sweet food environments and low sweet food consumption behavior. The family environment of students is related to family eating patterns and meal timing regularity. The environmental variable has a positive influence in this study, meaning that the lower or less exposure to high-sugar foods around students, the lower their sweet food consumption behavior. The results of this study are supported by Gomes et al. (2022), who state that the living environment and socio-economic status contribute to unhealthy food consumption. Socio-economic status is also relevant to the low consumption of high-sugar foods among students, as they do not yet have their own income and still depend on the allowance given by their parents. This situation affects purchasing power, and students prioritize buying staple foods over sweet snacks.

The social environment is a determinant of reinforcing factors of behavior that have a significant relationship with sweet food consumption behavior. The relationship between the social environment and students' consumption of high-sugar foods is categorized as low. The social environment is related to others offering high-sugar foods and exposure to advertisements. The social environment is a driving or reinforcing factor of a behavior. Peers are a social environment that has a significant influence on consumption patterns. Students at the Health Polytechnic are in a social environment with classmates who consume low-sugar high-sugar foods, thus tending to consume them in small amounts. Social media also shapes preferences and consumption behavior of high-sugar foods thru exposure to advertisements, promotion of high-sugar products, and food trends, which can increase the desire and frequency of consumption. However, low exposure to social and media environments has a positive impact, causing students to remain consistent in maintaining a low-sugar consumption pattern. On the other hand, the sophistication of technology and smartphones always at hand can facilitate access to information related to high-sugar foods, but self-control and specific diet goals can curb excessive consumption. This is also supported by research conducted by Kemps et al., (2016), which found that exposure to food can increase desire, but does not always increase consumption due to internal factors such as self-control and specific health goals.

The results of the analysis regarding the relationship between sweet food consumption behavior and dental health behavior do not show a significant correlation. The dental health behavior referred to in this study is the behavior of having dental check-ups every 6 months and periodic tartar cleaning. The research results show that low sugar consumption behavior is not followed by good dental health behavior, which periodically conducts early detection and prevention of periodontal disease by performing tartar cleaning. This is likely caused by behavior influenced by various factors. It is possible that students do not conduct regular early detection because they feel they do not have dental health issues, do not experience any symptoms, and therefore are not motivated to perform early detection. Early detection also falls under preventive behavior, which requires more effort such as visiting healthcare facilities, having time and money, and being motivated.

There are various reasons why students do not conduct regular early detection. According to research conducted by (Altaş et al., 2025), dental and oral health literacy has a positive correlation with the pursuit of health services. The higher the dental health literacy, the greater the likelihood that individuals will seek dental health services. Barriers to early detection of dental health issues also include a lack of awareness, cost, anxiety, and/or fear of undergoing dental treatment (Kemps et al., 2016). Most people also visit dental clinics when their condition is already severe and requires treatment (Rambabu & Koneru, 2018).

The relationship between sweet food consumption behavior and dental health status is not significant. The sweet food consumption behavior of students falls into the low category, and the dental health status, indicated by a history of cavities, falls into the very low category. This finding may be attributed to the multifactorial nature of dental health status, which is influenced not only by dietary habits but also by other factors, including oral hygiene practices (such as toothbrushing frequency and dental floss use), salivary composition and flow rate, socioeconomic status, and other factors that were not assessed in the present study. Students of the Health Polytechnic are educated to become healthcare professionals. The knowledge and skills in health maintenance that they possess will first be implemented on themselves. Therefore, health students have better knowledge and understanding compared to students from other fields. This is supported by research conducted by Wang et al. (2025), which found that health students have higher oral health literacy compared to non-health students.

Excessive consumption of high-sugar foods can lead to the occurrence of cavities. Health Polytechnic students with a dental health status categorized as moderate to very high have cavities that need treatment to prevent further damage. Students understand that having cavities and knowing that they need treatment, but they tend to postpone the treatment. The delay in dental treatment is also observed among health students at the University of Norway due to anxiety about dental procedures, low self-efficacy, and the cost of dental care (Steinvik

et al., 2023). The issue of relatively high dental care costs, students can take advantage of the national health insurance provided by the government. This is also supported by Abodunrin et al, (2025), who found that respondents tend to use health insurance when experiencing dental health issues.

The behavior of sweet food consumption is influenced by various predisposing, enabling, and reinforcing factors. Some variables have a significant relationship, while others do not have a significant relationship. All determinant variables contribute to the sweet food consumption behavior of students. This consumption behavior subsequently contributes to health behavior and dental health status, although dental health maintenance behavior is not yet optimal, as behavior is related to various factors. In addition to controlling sugar consumption behavior, another effort that must be considered is the enhancement of promotional activities to raise student awareness in maintaining dental health, conducting early detection of dental and oral diseases, and following up on early detection results with necessary preventive and curative actions to improve the quality of students' dental and oral health.

The limitations of this study include the predominance of female respondents, which may limit the generalizability of the findings, and the use of self-reported data to assess dental health status, which may be subject to reporting bias compared with direct clinical examination.

CONCLUSION

The determinants of predisposing, enabling, and reinforcing behaviors that have a significant relationship with students' consumption of high-sugar foods are the variables of knowledge, psychological factors, availability, environment, and social environment. The variables that do not have a significant relationship are the gender and attitude variables. The behavior of consuming high-sugar foods does not have a significant relationship with dental health behavior and the dental health status of students. Oral health promotion programs are recommended to focus not only on improving knowledge but also on addressing psychological, environmental, and social factors that may influence high-sugar food consumption among university students. Peer-based behavior change education and the provision of supportive environments with healthier food choices may help reduce high-sugar food consumption and, consequently, contribute to lowering the risk of dental caries.

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