ORIGINAL ARTICLE

Correlation of knowledge, dietary, and caries prevention behavior with dental caries experience among adolescents: a cross-sectional study

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ABSTRACT

Introduction: Adolescents are a high-risk group for dental caries, influenced by changes in dietary patterns and inadequate oral hygiene practices. Most interventions focus solely on improving knowledge; empirical evidence linking knowledge about cariogenic foods to actual behaviors related to caries experiences in adolescents is still limited in Indonesia. This study aims to analyze the correlation between knowledge of cariogenic foods, dietary behavior, and caries prevention behavior and dental caries experience in adolescents. **Methods**: This study used a cross-sectional analytical method with a correlational approach, involving 149 students aged 15-18 years from Senior High School of Jatinangor, Sumedang, West Java, Indonesia. The sample was selected through simple random sampling. Data were collected using a newly developed questionnaire that had been tested for validity and reliability. The questionnaire consisted of 11 items each on knowledge of cariogenic foods and dietary behavior, and 13 items on caries prevention behavior (oral hygiene behavior index). Dental caries experience was measured using the DMF-T index. Data were analyzed using the Spearman Correlation test. **Results**: Regarding knowledge of cariogenic foods, the majority of adolescents, 73 (48.99%), were categorized as having good knowledge. For dietary behavior, 103 (69.13%) adolescents were in the moderate category, and for caries prevention behavior, 99 (66.44%) adolescents were also in the moderate category. The average DMF-T index score was 8.11. The analysis showed no significant relationship between knowledge of cariogenic foods and dental caries experience ($p = 0.264$, $r = 0.179$). However, there was a significant relationship between dietary behavior ($p = 0.000$, $r = 0.696$) and caries prevention behavior ($p = 0.000$, $r = 0.582$) with dental caries experience. **Conclusion**: Dietary and caries prevention behaviors correlate with caries experience. However, knowledge about cariogenic foods does not correlate with caries experience.

KEYWORDS

Dental caries, knowledge of cariogenic foods, dietary behavior, caries prevention behavior, adolescents

INTRODUCTION

Dental caries is one of the most common oral health problems worldwide and has a negative impact on individuals' quality of life.[1] According to data from the World Health Organization (WHO) in 2019, dental caries affects more than 45% of the global population and is among the most prevalent chronic diseases across various age groups.[2] The WHO also states that adolescents represent one of the populations most vulnerable to dental caries. Adolescents aged between 10 and 19 years have an average DMF-T index of 6.1.[3–5]

In Indonesia, the Indonesia Health Survey (2023) reported a caries prevalence of 82.8%.[6] Furthermore, the 2018 Basic Health Research report revealed that the prevalence of dental caries among Indonesian adolescents aged 15 to 24 years was 75.3%.[7] The study by Puda et al. showed a markedly poorer condition among adolescent respondents in the Republic of Croatia, where the DMFT value for individuals aged 14–18 years was recorded at 5.19 ± 3.71.[8] Meanwhile, research by Drachev et al. indicated that 18-year-olds in Russia also had a high DMF (Decayed, Missing, Filled Teeth) index (7.58 ± 0.61).[9] These prevalence rates indicate a high burden of caries among adolescents. Therefore, promotive and preventive efforts are needed to increase public awareness and knowledge about oral health, as well as to encourage disease prevention practices.

West Java Province, which has the largest population in Indonesia, reports a dental caries prevalence of 45.66% among adolescents.[7] One of the sub-districts in West Java that serves as the focus of this study is Jatinangor Sub-district, located in Sumedang Regency.[10] Dental caries is a common problem among adolescents in this area, particularly among students at Public Senior High School of Jatinangor. According to interview data from a dentist at the Jatinangor Public Health Center, the ratio of dental fillings to tooth extractions is 0.21, indicating limited efforts in both prevention and treatment of dental caries. Public Senior High School of Jatinangor is under the supervision of the Jatinangor Health Center; however, dental caries among adolescents remains inadequately addressed. Given this situation, an in-depth investigation is needed to explore the factors contributing to the high prevalence of dental caries among adolescents in this region.

Several factors may contribute to the high prevalence of dental caries among adolescents, including knowledge of cariogenic foods, dietary behaviors, and caries prevention practices.[3,11-13] Dental caries is a multifactorial and dynamic disease influenced by biofilm, triggered by the consumption of cariogenic foods and poor oral hygiene habits, which lead to alternating processes of demineralization and remineralization of the tooth's hard tissues.[14] Studies by Tudoroniu et al. indicate that adequate knowledge of cariogenic foods promotes healthier dietary behavior, which may help reduce the risk of dental caries.[15]

A diet high in sugar and fermentable carbohydrates, low in fiber, and deficient in vitamins such as D, B6, and K also contributes to an increased risk of dental caries.[16,17] A study by Vano et al. reported higher DMF-T index scores among individuals with poor oral hygiene habits.[18] Well-integrated dietary and caries prevention behaviors can effectively minimize the risk of dental caries.[3,12]

Most studies on the factors influencing dental caries have been conducted; however, they have generally been limited to separate aspects, such as knowledge, cariogenic foods, dietary patterns, preventive behaviors, and the relationship between knowledge of cariogenic foods, and caries experience.[18–19] However, during adolescence, oral health behaviors are complex and interconnected, and having good oral health knowledge does not necessarily translate into good oral health practices.[20]

This study adopts a novel approach by simultaneously examining the relationship between knowledge about cariogenic foods, dietary behavior, and caries prevention behavior with dental caries experience among adolescents. Existing studies have largely focused on examining each of these factors separately, resulting in a limited understanding of how knowledge translates into behavior and clinical outcomes. This study integrates these behavioral dimensions specifically within a local Indonesian adolescent population. The results will highlight the persistence of the knowledge-behavior gap and provide evidence for more behavioral-oriented oral health promotion strategies. Based on the explanation above, this study aims to analyze the correlation between knowledge of cariogenic foods, dietary behavior, and caries prevention behavior and dental caries experience in adolescents.

METHODS

This study used a cross-sectional analytical design with a correlational approach. The study population consisted of students aged 15–18 years, who were senior high school students in grades X, XI, and XII in the 2024/2025 academic year. Each grade level consisted of 12 classes, with a total population of 1,256 students. The study was conducted from January to February 2025 at Jatinangor Senior High School, Sumedang, West Java, Indonesia. The study involved students aged 15–18 years from grades X and XI at a Senior High School in Jatinangor. Grade XII students were excluded because they were preparing for final examinations and permission to include them was not granted by the school.

The sample was selected using a simple random sampling technique. The sample size was calculated using the formula for analytical correlational studies, based on a correlation coefficient (r) with a 5% margin of error. The minimum required sample size was determined to be 144 respondents. Simple random sampling was carried out by randomly selecting two classes from grade X through a paper-drawing method.

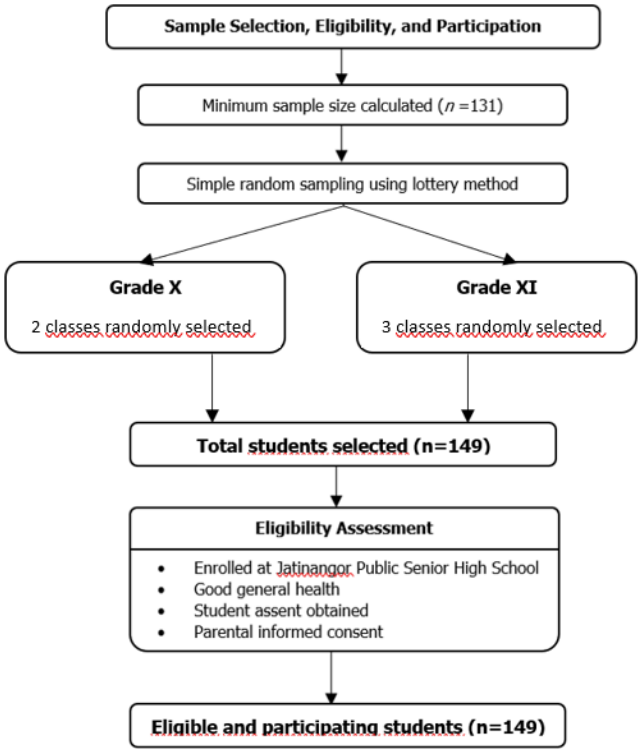

Diagram 1. Flow diagram of sample selection, eligibility, and participation rates

Subsequently, three classes from grade XI were selected using the same method. Based on this procedure, the total number of samples obtained was 149 students. The number of samples met the minimum required sample size, and there were no dropouts. The inclusion criteria were students who were actively enrolled at Public Senior High School of Jatinangor during the study period, were in good general health, and were willing to participate as respondents by providing assent and obtaining parental consent. The exclusion criteria included students wearing fixed orthodontic appliances, those who did not participate in or complete the dental caries experience assessment (DMF-T), and those who failed to complete the questionnaire in full.

This study utilized primary data to assess knowledge of cariogenic foods, dietary behavior, and caries prevention behavior. Data were collected using a

structured questionnaire administered via Google Forms and distributed offline to the research subjects. The questionnaire was completed online using the Google Forms platform. During the completion process, respondents were directly assisted by the researcher (guided questionnaire) to ensure that participants correctly understood each question and completed the questionnaire independently and based on their actual conditions. Prior to use, the questionnaire underwent validity and reliability testing, as it was newly developed.

The research questionnaire consisted of five sections. The first section provided information regarding the purpose of the study and included informed consent. The second section contained sociodemographic information, including the respondent's identity. The third section consisted of 11 questions assessing knowledge of cariogenic foods. The fourth section contained 11 questions on dietary behavior. The fifth section comprised 13 questions assessing caries prevention behavior.

Contributions to the questionnaire development were as follows: SN and SJJ designed and compiled the questionnaire; SN, SSA, SAA, and A assessed content validity; and SN and SJJ conducted face validity. Content validity was evaluated using the Content Validity Index (CVI). Specifically, the Item-Level Content Validity Index (I-CVI), which represents the proportion of experts rating each item as relevant, was calculated to determine whether each questionnaire item met the criteria for measuring the intended constructs.[21] The average I-CVI score for knowledge of cariogenic foods items was 0.93, for dietary behavior items was 0.975, and for caries prevention behavior items was 0.98. These results indicate strong content validity (I-CVI > 0.79). Subsequently, face validity testing was conducted with five respondents to evaluate each questionnaire item in terms of readability, clarity of intent, and relevance to the construct being measured.[22]

Following this, validity testing was carried out with 30 respondents using the Pearson Product Moment correlation test. The resulting item-total correlation coefficients ranged from 0.365 to 0.636 with a significance level of 0.00. Reliability testing was conducted by calculating the Cronbach's alpha coefficient to assess the internal consistency of the instrument.[23] The Cronbach's alpha for the questionnaire on knowledge of cariogenic foods was 0.794. The alpha value for dietary behavior was 0.809. The alpha value for caries prevention behavior was 0.818 with a p-value<0.001. These results demonstrate adequate internal consistency among items within each construct, indicating that the instrument possesses an adequate level of reliability.

The validated and reliable questionnaires were used to collect research data comprising instruments assessing knowledge of cariogenic foods, dietary behavior, and caries prevention practices. The questionnaires on knowledge of cariogenic foods and dietary behavior were newly developed and presented in multiple-choice questions, with correct answers scored as 1 and incorrect answers scored as 0, yielding a total possible score of 11. Both the knowledge of cariogenic foods questionnaire and the dietary behavior questionnaire were categorized into three levels, namely poor (0–3.6), moderate (3.7–7.3), and good (7.4–11). The cutoff values were determined using the score categorization method from Bloom's original cutoff point.[24,25]

The knowledge of cariogenic foods questionnaire included items assessing understanding of cariogenic foods, types of cariogenic foods and beverages (those with a high risk of causing caries), types of foods and beverages with low caries risk, types of sugary foods, the characteristics and forms of cariogenic foods, and beverages that increase the risk of dental caries. The dietary behavior questionnaire included items related to the types of foods consumed, frequency of snacking, frequency of consuming sweet foods and beverages, the consumption of acidic foods, sticky foods, consumption of vegetables and fruits, as well as foods most frequently consumed by the respondents.

The third questionnaire assessed caries prevention behavior and included a modified version of the oral hygiene behavior (OHB) index questionnaire, which

was adapted from the study by Suryanti *et al.* [26] This questionnaire included items on toothbrushing behavior such as timing and duration of brushing, brushing technique, type of toothpaste used, use of auxiliary cleaning tools other than a toothbrush including dental floss and interdental brushes, as well as tongue cleaning.

Additional items were incorporated into the OHB index to assess other oral hygiene behaviors such as rinsing with mouthwash, rinsing with plain water after consuming sweet foods or beverages, as well as help-seeking behavior related to oral health care. The total score for caries prevention behavior was 14 and was categorized into three levels namely poor (0–4.6), moderate (4.7–9.3), and good (9.4–14). Dental caries experience was assessed by dental students who had been previously trained in interpreting clinical findings and recording them according to the DMF-T standard. Following the training, a calibration test was conducted to evaluate their understanding and consistency in examining the DMF-T index. The kappa value obtained was 0.83 which indicates a high level of agreement.[25]

Potential bias was minimized by using validated and reliable questionnaires, supported by content and face validity testing as well as satisfactory internal consistency. To reduce response bias, questionnaires were administered using a guided approach with standardized instructions. Measurement bias in dental caries assessment was controlled through prior training and calibration of examiners, with a high inter-examiner agreement (kappa = 0.83). Selection bias was minimized by applying simple random sampling and clearly defined inclusion and exclusion criteria, with no participant dropout during the study. No missing data were observed in this study, as all selected participants completed the questionnaires and dental examinations in full. Therefore, all collected data were included in the analysis.

Bivariate analysis was conducted to analyze the correlation between knowledge of cariogenic foods, dietary behavior, and caries prevention behavior with dental caries experience using the Spearman correlation test. This non-parametric test was applied because the data were not normally distributed.

RESULTS

The results of the study regarding the demographic characteristics of 149 respondents from grade X and XI at Senior High School of Jatinangor, based on gender, age, and grade level, are presented in Table 1. The majority of respondents were 16 years old, totaling 79 individuals (53%). Most respondents were female, totalling 93 individuals (62.4%), and the majority were from grade XI, totaling 87 individuals (58.4%).

Table 1. Distribution of respondents based on characteristics (n=149)

Variable	n	%
Gender		
Female	93	62.4
Male	56	37.6
Age (years)		
15	25	16.8
16	79	53.0
17	44	29.5
18	1	0.7
Grade level		
X	62	41.6
XI	87	58.4

Table 2. Frequency distribution of respondents' answers regarding knowledge of cariogenic foods and category scores (n=149)

Items	Respondents' answers			
	Correct (n)		Incorrect (n)	
	n	%	n	%
Definition of cariogenic food	136	91.3	13	8.7
Frequency of cariogenic food consumption and risk of dental caries	138	92.6	11	7.4
Types of sugar with high risk of dental caries	46	30.9	103	69.1
Characteristics of food with high risk of dental caries	127	85.2	22	14.8
Type of foods with high potential to cause dental caries	141	94.6	8	5.4
Types of beverages with low risk of causing dental caries	87	58.4	62	41.6
Characteristics of cariogenic foods	132	88.6	17	11.4
Characteristics of cariogenic foods (candy category) with low potential to cause caries	67	45.0	82	55.0
Types of foods with low risk of causing dental caries	77	51.7	72	48.3
Types of foods or drinks with low risk of causing dental caries	110	73.8	39	26.2
Type of food that, if consumed routinely, has low risk of dental caries	30	20.1	119	79.9

Category of knowledge on cariogenic foods		
	n(%)	Mean ± SD
Good	73(48.99)	7.34 ±1.85 (Moderate)
Moderate	69(46.31)	
Poor	7(4.7)	

Table 2 shows the distribution of respondents based on their knowledge of cariogenic foods. Several items with a high percentage of correct answers include items 1, 2, 4, 5, 7, and 10. Meanwhile, items with a high percentage of incorrect responses were items 3, 6, 8, 9, and 11. All perception-based questionnaire responses were first transformed into numerical scores prior to analysis. The width of each class interval (i) was calculated using the formula i = (maximum score − minimum score) / number of categories. These interval widths were subsequently used to establish cut-off boundaries for classifying scores into poor, moderate, and good categories.[25] The majority of respondents, totaling 73 students (48.99%), had good knowledge of cariogenic foods.

Table 3 shows the distribution of respondents based on dietary behavior. Some items with a high rate of correct responses include item 6. In contrast, several items with a high rate of incorrect responses include items 1, 2, 3, 4, 5, 7, 8, 9, 10, and 11. The majority of respondents, totaling 103 individuals (69.13%), demonstrated a moderate level of dietary behavior.

Table 4 shows the distribution of respondents based on their caries prevention behavior. Several items with a high percentage of correct answers include items 1, 10, and 11. Meanwhile, several items with a high percentage of incorrect answers include items 2, 3, 4, 5, 6, 7, 8, 9, 12, and 13. The majority, totaling 99 respondents (66.44%), demonstrated a moderate level of caries prevention behavior.

Table 3. Distribution of respondents' answers regarding dietary behavior and category scores (n=149)

Items	Respondents answers			
	Correct (n)		Incorrect (n)	
	n	%	n	%
Habit of having breakfast before starting daily activities	92	61.7	57	38.3
Favorite snack types	4	2.7	145	97.3
Frequency of consuming snacks in one day	79	53	70	47
Types of beverages other than water	55	36.9	94	63.1
Frequency of consuming sweet beverages in one day	12	8.1	137	91.9
Frequency of consuming sweet snacks before bedtime	127	85.2	22	14.8
Frequency of consuming highly acidic foods	64	43	85	57
Frequency of consuming sticky foods	71	47.7	78	52.3
Frequency of consuming vegetables and fruits	99	66.4	50	33.6
Types of food frequently consumed	20	13.4	129	86.6
Habit of maintaining a low-sugar diet	54	36.2	95	63.8
Dietary behavior category				
	n (%)		Mean ± SD	
Good	21(14.09)		5.23±1.88 (Moderate)	
Moderate	103(69.13)			
Poor	25(16.78)			

Table 4. Distribution of respondents' answers regarding caries prevention behavior and category scores (n=149)

Items	Respondents Answers			
	Correct (n)		Incorrect (n)	
	n	%	n	%
Frequency of teeth brushing per day	133	89.3	16	10.7
Duration of brushing teeth	68	45.6	81	54.4
Time of brushing teeth	52	31.5	97	65.1
Type of toothpaste used	42	28.2	107	71.8
Habit of brushing or cleaning the tongue	61	40.9	88	59.1
Daily brushing technique	21	14.1	128	85.9
Habit of using other oral hygiene tools besides toothbrush (e.g., floss)	11	7.4	138	92.6
Habit of using other oral hygiene tools, such as interdental brushes	14	9.4	135	90.6
Habit of using antiseptic mouthwash	11	7.4	138	92.6
Habit of rinsing with water after consuming sugary foods/drinks	104	69.8	45	30.2
Place visited when experiencing toothache	118	79.2	31	20.8
Actions taken when experiencing toothache	58	38.9	91	61.1
Frequency of dental visits	17	11.4	132	89.6
Caries prevention behavior category				
	n (%)		Mean ± SD	
Good	10 (6.71)		5.67±1.93 (Moderate)	
Moderate	99 (66.44)			
Poor	40 (26.85)			

Table 5 presents the distribution of respondents based on dental caries experience using the DMF-T index. Out of a total of 149 respondents, the components were as follows: 1,187 decayed teeth, 16 missing teeth, and 5 filled teeth. The DMF-T index value was 8.11, indicating that, on average, each respondent had 8 teeth that were decayed, filled, or missing due to caries. This value falls into the very high category according to the WHO classification.

Table 5. Distribution of respondents' answers regarding caries prevention behavior and category scores (n=149)

Respondent (people)	Components of DMF-T Index			DMF-T Index
	Decay	Missing	Filling	
149	1187	16	5	8.11
DMF-T Index Category	n (people)			Total percentage (%)
Very low (0-1.1)	0			0
Low (1.2-2.6)	2			1.34
Moderate (2.7-4.4)	19			12.75
High (4.5-6.5)	26			17.45
Very high (> 6.5)	102			68.46

Table 6. Correlation between knowledge of cariogenic foods, dietary behavior,and caries prevention behavior with dental caries experience in adolescents

Variable	Coefficient correlation (r)	p-value	Result
Knowledge of cariogenic foods – DMFT index	0.179	0.264	Not significant
Dietary behavior – DMFT index	0.696	<0.001	Significant
Dental caries prevention behavior – DMFT index	0.582	0.000	Significant

Table 6 shows that the relationship between knowledge of cariogenic foods and dental caries experience is very weak and not statistically significant. In contrast, the relationship between dietary behavior and dental caries experience demonstrates a strong and significant correlation. Similarly, the correlation between caries prevention behavior and dental caries experience indicates a moderately strong relationship, which is also statistically significant.

DISCUSSION

The study involved 149 adolescents with the majority being female and predominantly aged 16 years. Adolescence is a critical period for the development of oral and dental health, including the onset of dental caries.[27] This finding is consistent with research by Rahman and Alshahrani et al. on respondents aged 15 to 17 years, which states that adolescence is a crucial period for the development of dietary habits and oral health behaviors that can significantly impact long-term oral health outcomes.[28,29] During this period, adolescents are more vulnerable to environmental influences and unhealthy eating habits, such as the frequent consumption of sugary and carbohydrate-rich foods, which may increase the risk of dental caries.[29] Adolescent eating patterns are characterized by increased caloric demands for activity and growth, a tendency to try new food trends, greater freedom from parental control, and easy access to sugary foods, all of which contribute to a heightened risk of dental caries.[30,31] The findings related to caries experience revealed an average DMF-T index score of 8.11, which falls into the very high category according to the WHO classification (Table 5).

The findings related to the level of knowledge about cariogenic foods, as presented in Table 2, show that the majority of respondents possessed good knowledge regarding cariogenic foods, with most respondents answering each question item correctly. The highest level of knowledge was found in the aspect concerning the types of foods that have a high potential to cause dental caries. This indicates that most respondents already understand that certain foods, particularly those that are high in sugar and sticky in texture, can trigger the development of dental caries. This finding is consistent with the study by Al-Darwish et al. among adolescents aged 12–14 years in Qatar, which showed a high level of adolescent knowledge regarding the role of diet in causing dental caries.[32]

The items that were most frequently answered incorrectly involved the types of sugars with a high risk of dental caries, types of beverages with low risk of causing dental caries, and types of foods that, if consumed routinely, have a low risk of dental caries. The lowest level of knowledge was found in the aspect concerning the types of sugars with a high risk of dental caries. These findings are consistent with the study by Sheiham and James et al., who stated that sugar consumption, especially sucrose, is a primary factor in the development of dental caries, and that limited public awareness of high-risk sugar types presents a major barrier to caries prevention.[33,34] Furthermore, Moynihan and Kelly et al. also emphasized that public knowledge about the different types of sugars remains limited, even though people are generally aware that sugar has a negative impact on dental health.[35]

Good knowledge about cariogenic foods can help adolescents make healthier dietary choices and reduce the risk of dental caries. However, as shown in Table 6, although the majority of respondents had good knowledge, the analysis results did not indicate a significant correlation between knowledge of cariogenic foods and caries experience ($p = 0.264$). Similar findings also suggest that knowledge about cariogenic foods is not significantly associated with caries experience among adolescents.[36,37]

The results of the study show that although adolescents possess good knowledge about foods that can cause dental caries, they may not always apply that knowledge in their daily lives. Despite respondents demonstrating good knowledge about cariogenic foods, the findings did not show a direct impact on reducing the incidence of dental caries among adolescents (Table 5). Therefore, increasing knowledge alone is not sufficient; it must be accompanied by actual behavioral changes. Thus, it is important not only to improve adolescents' knowledge of cariogenic foods, but also to encourage the adoption of healthy dietary habits and oral hygiene practices to maintain good dental health.[36]

The results of the study on adolescents' dietary behavior (Table 3) showed that the majority of respondents were categorized as having moderate behavior. The frequency distribution of responses regarding dietary behavior indicated that a higher percentage of respondents gave incorrect answers to most of the question items. Based on these results, many adolescents still frequently consume their favorite snacks and sugary soft drinks. The frequency of consuming soft drinks and foods that are highly acidic and sticky remains high. The most commonly consumed types of food include chocolate, chips, and biscuits.

The lowest scoring dietary behavior observed in this study was related to favorite snack types. This finding is consistent with a study by Lendrawati et al. in Indonesia, which also found high consumption of sugar-rich snacks among junior high school students.[38] Another study also found that free sugar consumption >50 g/day in adolescents was associated with a higher risk of caries, with the following Odds Ratio and Confidence Interval values (OR: 1.446; 95% CI: 1.138–1.839), compared to those who consumed lower amounts of sugar.[39] Healthy dietary behavior among adolescents still needs to be improved, considering that adolescence begins with the final phase of primary tooth replacement by permanent teeth and ends when the full set of permanent teeth has erupted. During this period, increased caloric needs, greater freedom in food choices without parental supervision, and the tendency to try trendy foods contribute to dietary patterns that carry a high risk of causing dental caries.[29]

The results presented in Table 6 indicate a significant relationship between dietary behavior and dental caries experience ($p < 0.001$). These findings are consistent with the study by Wang X et al. which reported a significant correlation between dietary behavior and dental caries experience. Specifically, the higher the frequency of sweet food consumption, the greater the risk of caries development.[40] Similarly, research by Hassan HI et al. among adolescents also found that poor dietary behavior was associated with an increased risk of dental caries.[41] The findings of this study indicate that poor dietary behavior among

respondents was correlated with dental caries experience. In other words, respondents with poor dietary habits were more likely to have a higher experience of dental caries or poorer oral health conditions. Therefore, it is important for adolescents not only to possess good knowledge about cariogenic foods but also to adopt healthy dietary behavior, such as reducing the consumption of high-sugar foods and increasing the intake of fiber-rich and nutritious foods.[42]

The research findings on respondents' behavior regarding the prevention of dental caries (Table 4) show that the majority of respondents demonstrated a moderate level of preventive behavior. A greater percentage of respondents gave incorrect answers compared to correct ones. The most commonly incorrect responses were related to the duration of toothbrushing, with most brushing for only one minute, and the appropriate time to brush, as many respondents had not yet adopted the habit of brushing their teeth twice a day, specifically in the morning after breakfast and at night before going to bed. Many respondents were also unaware of fluoride-containing toothpaste, and tongue cleaning was not commonly practiced. In addition, toothbrushing techniques were often incorrect, and many respondents had not used additional oral hygiene aids such as dental floss and interdental brushes.

The habit of rinsing with antiseptic mouthwash was also not widely practiced. Regarding actions taken when experiencing toothache, many respondents only visited the dentist when the pain had already occurred. Moreover, they had not established a routine of visiting the dentist every six months for regular check-ups. The findings indicate that many aspects of toothbrushing behavior, especially those related to effective plaque removal, have not been carried out optimally. However, items that were frequently answered correctly included the recommended brushing frequency of twice a day, the habit of rinsing with plain water after consuming sweet foods or beverages, and the appropriate place to seek treatment when experiencing a toothache.

Good dental caries preventive behavior was observed in the aspect of daily tooth brushing frequency, which is consistent with the findings of Brusius et al. among 12-year-old adolescents in Brazil, and Milona et al. among adolescents in Poland.[43,44] These findings are further supported by studies conducted by Vano et al and Khan et al., which showed that individuals who brush their teeth twice daily are less likely to experience plaque accumulation and dental caries compared to those who brush once a day or less frequently.[18,45]

However, the study results indicate that although the majority of respondents correctly answered the question regarding the frequency of toothbrushing, which is twice a day, they have not yet applied the proper timing of brushing, namely in the morning after breakfast and at night before going to bed. In fact, dental caries prevention behavior, particularly toothbrushing, must be carried out optimally to thoroughly remove plaque, which is the main contributing factor to dental caries. Optimal toothbrushing should be performed twice a day, after breakfast and before bedtime, with a minimum duration of two minutes. If this is not properly practiced, the risk of dental caries increases significantly.[46,47]

In addition to toothbrushing, the prevention of dental caries also involves the habit of rinsing with antiseptic mouthwash. However, based on this study, the practice of using antiseptic mouthwash among adolescents is still low. This finding contradicts the statement by Milona et al., who reported that the majority of adolescents in Poland regularly use antiseptic mouthwash.[44] This finding is supported by Ballini et al., who found that the use of antiseptic mouthwash containing xylitol and sea salt in adolescents can reduce the risk of dental caries by lowering plaque-causing bacteria and maintaining the pH balance of the oral cavity. [48]

The results in Table 6 showed a significant relationship between caries prevention behavior and dental caries experience (p = 0.000). This indicates that the better the caries prevention behavior among adolescents, the lower their likelihood of experiencing dental caries. This finding is consistent with the study

by Walsh et al., which found that good preventive behaviors, such as regular tooth brushing and the use of fluoride toothpaste, can significantly reduce the risk of dental caries.[49] Brushing teeth twice daily with fluoride toothpaste is one of the most effective methods for preventing dental caries. In addition, the use of dental floss and rinsing with antiseptic mouthwash can also help reduce plaque and cariogenic bacteria.[50]

Based on the research findings, lower levels of caries preventive behavior were associated with higher caries experience, suggesting an inverse relationship between these variables. This is supported by the results in Table 5, which show that the majority of respondents fell into the very high category in terms of dental caries experience. The high score in the Decay component reflects that the prevalence of dental caries remains significantly high. A study conducted by Milona et al. in Poland reported that the DMF-T index among 15-year-old adolescents was categorized as high, with a DMF-T score of 5.65, indicating a relatively high level of dental caries in adolescents.[44] Therefore, more intensive efforts are needed to improve dietary and preventive behaviors in order to reduce the prevalence of dental caries. Key factors, including access to dental health services, tooth brushing habits, and healthy dietary consumption should be prioritized to reduce the risk of dental caries.[51]

Based on the results of this study, dietary and dental caries prevention behavior were still not optimal. In terms of dietary behavior, aspects that remained inadequate and needed to be addressed include the frequent consumption of foods high in sugar and carbohydrates, which can increase the risk of dental caries, particularly when they are not accompanied by proper oral hygiene practices. Similarly, in caries prevention behavior, aspects that remained inadequate and needed to be addressed include the duration and timing of tooth brushing, the type of toothpaste used, tongue cleaning habits, tooth brushing techniques, the use of interdental aids such as dental floss and interdental brushes, the use of antiseptic mouthwash, appropriate responses to toothache, and the frequency of dental visits.

Overall, the findings of this study indicate that knowledge of cariogenic foods is not significantly associated with dental caries experience. However, both dietary and caries prevention behavior showed a significant relationship with caries experience. This suggests that knowledge alone is insufficient to prevent dental caries unless it is supported by proper oral health behaviors.[3,12] The study reported that toothbrushing habits and preventive behaviors had a greater influence on the risk of dental caries than knowledge alone.[43] Therefore, it is essential for adolescents not only to possess adequate knowledge about cariogenic foods but also to adopt healthy dietary and caries prevention behaviors.[40]

Based on the findings of this study, it can be concluded that although the majority of adolescents possessed adequate knowledge regarding cariogenic foods, the level of dental caries experience among them remained very high. Interviews with several teachers at the school revealed that students had never received education or counseling related to oral and dental health. This lack of exposure contributes to limited awareness among adolescents regarding oral health, indicating the need for repeated interventions in the form of education and behavioral reinforcement. [52]

Changes in knowledge do not always lead to changes in attitudes and behaviors. Individuals require continuous education, which involves repeated exposure to build awareness, motivation, and positive habits in maintaining oral hygiene. Without consistent reinforcement, individuals may return to their old habits.[49,53] Continuous education is important because it must also be tailored to the individual's developmental stage, where the risks and appropriate approaches differ across various age groups.[52] Therefore, the results of this study offer a holistic approach to analyze the relationship between knowledge of cariogenic foods, dietary patterns, and caries prevention behaviors and caries experience among adolescents. This study does not only combine one or two contributing

factors associated with caries, but provides a comprehensive picture of the interaction among these three factors within the context of adolescents in a specific region.

Collaborative efforts in implementing preventive and promotive programs in schools are essential, considering that schools serve as a key community setting where adolescents gather. Schools can collaborate with dental health professionals to provide regular oral health education and dental check-ups for students.[54,55] These programs should also incorporate more participatory and practical approaches, such as simulations, role-playing, and training in healthy lifestyle habits. Since adolescence is a transitional stage between childhood and adulthood, parental oversight of adolescents' oral health remains an important factor.[56] Sree et al. reported that adolescents whose parents were involved and provided oversight regarding their oral health experienced a significantly lower progression of dental caries compared to their peers who lacked parental engagement.[57]

This may be due to reduced parental supervision, as many parents perceive their children to have reached adolescence or early adulthood. A study by Cruz et al. found that many parents begin to reduce their involvement in their adolescent children's dental care, assuming that adolescents are mature enough to manage independently. However, adolescents still require support in maintaining their oral health. [58,59] Environmental interventions, such as limiting the availability of sugary drinks and implementing a no-sugary policy within the school environment, can reduce the consumption of cariogenic foods and reinforce positive oral health behaviors. Such structural approaches can create supportive environments that facilitate healthier choices. These environmental strategies align with the social ecological model, which emphasizes the interaction between individual behavior and the broader environmental context in shaping health outcomes.[60]

Therefore, the findings of this study, which provide a comprehensive overview of the three contributing factors to the occurrence of dental caries, can serve as a foundation for designing more effective promotive and preventive oral health programs targeted at adolescents, particularly within school settings. This study also contributes valuable input for community-based promotive and preventive efforts for caries prevention, especially within the framework of the School Dental Health Program, which is under the supervision of the Jatinangor Community Health Center.

A limitation of this study is the use of a cross-sectional analytical design, which only assesses conditions at a single point in time. This design indicates that the observed relationships represent associations and not causal effects. This limits the ability to measure changes in students' knowledge, behavior, or experiences of dental caries over time. Future research could be conducted using a longitudinal design that allows for the measurement of behavioral and oral health condition changes in respondents, as well as tracking whether knowledge increases, decreases, or remains stable over time. Longitudinal studies can also evaluate respondents' behavior after interventions to determine whether their mindset changes consistently.

In terms of external validity, generalizability refers to the extent to which the research findings can be applied to adolescents with similar demographic and educational backgrounds to the respondents in this study. The application of these research results needs to consider differences in cultural and socioeconomic contexts, where dietary patterns, oral health behaviors, and access to dental care may differ.

In this study, oral health issues among adolescents were limited to dental caries. Future research should expand to include other important aspects of oral health in adolescence, particularly gingival health. This is crucial, as adolescence is a period of puberty marked by hormonal changes that can increase gum sensitivity to plaque accumulation.[57] Such conditions make adolescents more susceptible to gingival inflammation, which, if left untreated, may progress to

periodontal disease.[57,58] The results of this study are expected to provide a more comprehensive understanding of the factors associated with the high incidence of dental caries among adolescents and serve as a foundation for formulating more effective promotive and preventive interventions within the school environment.

Another limitation of this study was the difficulty in organizing and maintaining students' attention during questionnaire completion. Distractions from peers and strong environmental influences often led adolescents to provide answers that appeared more favorable or aligned with social expectations. This condition potentially resulted in social desirability bias. Therefore, future research is recommended to employ direct interview methods to minimize this type of bias. This study was also limited to being conducted in only one school, thus its findings have limited generalizability to the wider adolescent population. Demographic characteristics of adolescents and their families should also be included in future research, as these are closely related to adolescent oral health behaviors. Longitudinal and multivariate studies are strongly recommended to obtain more comprehensive results.

CONCLUSION

The results of the study conducted on adolescents showed that dietary behavior and caries prevention behavior were correlated with caries experience. However, knowledge about cariogenic foods was not correlated with caries experience. This finding highlights that preventive behaviors and dietary practices are strongly associated with caries experience, while knowledge alone may not always lead to optimal oral health practices.

The implications of this study are that oral health interventions should prioritize strengthening comprehensive and ongoing oral health education during adolescence, particularly regarding knowledge of cariogenic foods, dietary behaviors, and caries prevention. These findings also imply that oral health promotion programs should move beyond knowledge-based approaches and emphasize behavioral reinforcement and supportive environments, particularly in the school setting, to enhance the effectiveness of caries prevention strategies.

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REFERENCES

1. Singh S, Talmale P. Impact of dental caries and nutritional status on oral health related quality of life in young Indian adolescents. J Oral Biol Craniofac Res. 2023;13(4):506. https://doi.org/10.1016/j.jobcr.2023.05.002
2. Costa LR, Vettore MV, Quadros LN, Vieira JMR, de Queiroz Herkrath APC, de Queiroz AC, et al. Socio-economic status, psychosocial factors, health behaviours and incidence of dental caries in 12-year-old children living in deprived communities in Manaus, Brazil. J Dent. 2023;133:104504. https://doi.org/10.1016/j.jdent.2023.104504
3. Garg N, Garg A, editors. Textbook of operative dentistry. 4th ed. New Delhi: Jaypee Brothers Medical Publishers; 2020. p. 40.
4. Ahirwar SS, Gupta M, Snehi SK. Dental caries and lactobacillus: role and ecology in the oral cavity. Int J Pharm Sci Res.

2019;11:4823.
5. World Health Organization. Review of the dental and oral health service system and the updating the national action plan for dental and oral health. Geneva: WHO; 2022. https://www.who.int/news-room/fact-sheets/detail/oral-health
6. Health Development Policy Agency, 2024. Indonesian Health Survey (SKI) 2023. Ministry of Health, Republic of Indonesia.https://www.badankebijakan.kemkes.go.id/en/hasil-ski-2023/
7. National Institute of Health Research and Development. Basic Health Research (Riskesdas) 2018 Report. Jakarta: Ministry of Health RI; 2018. https://layanandata.kemkes.go.id/katalog-data/riskesdas/ketersediaan-data/riskesdas-2018
8. Klarić Puđa I, Goršeta K, Jurić H, Soldo M, Marks LA, Majstorović M. A cohort study on the impact of oral health on the quality of life of adolescents and young adults. Clin Pract. 2025;15(4):76. https://doi.org/10.3390/clinpract15040076
9. Drachev SN, Brenn T, Trovik TA. Dental caries experience and determinants in young adults of the Northern State Medical University, Arkhangelsk, Russia. BMC Oral Health. 2017;17(1):136. https://doi.org/10.1186/s12903-017-0426-x
10. Sumedang Regency in Figures 2024. Jatinangor Sub-district in figures 2023. Sumedang: BPS; 2023. https://sumedangkab.bps.go.id
11. Afolabi AO, Ehizele AO, Nnawuihe UC, et al. Dental caries prevalence, preventive behaviour and related factors among adolescents in Nigeria: a systematic review and meta-analysis. BMC Oral Health. 2025;25(1):1138. https://doi.org/10.1186/s12903-025-06504-2
12. Utami U, Agustanti A, Rachmawati YL, Setiawati F, Yavuz Y, Cavalcanti AL, et al. Food consumption frequency and dental caries status among adolescents in Jakarta. J Int Dent Med Res. 2020;13(3):1057.
13. Methuen M, Kukkonen VF, Anttonen V, et al. Dietary factors and dental caries among adolescents: eight-year follow-up study. JDR Clin Transl Res. 2026;11(1):40–52. https://doi.org/10.1177/23800844251314856
14. Spatafora G, Li Y, He X, Cowan A, Tanner ACR. The evolving microbiome of dental caries. Microorganisms. 2024;12(1):121. https://doi.org/10.3390/microorganisms12010121
15. Tudoroniu C, Popa M, Iacob SM, Pop AL, Năsui BA. Correlation of caries prevalence, oral health behavior and sweets nutritional habits among Romanian adolescents. Int J Environ Res Public Health. 2020;17(18):6923. https://doi.org/10.3390/ijerph17186923
16. Punitha V, Amudhan A, Sivaprakasam P, Rathanaprabu V. Role of dietary habits and diet in caries occurrence and severity among urban adolescents. J Pharm Bioallied Sci. 2015;7(Suppl 1):S297. https://doi.org/10.4103/0975-7406.155963
17. Tungare S, Paranjpe AG. Diet and nutrition to prevent dental problems. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.https://www.ncbi.nlm.nih.gov/books/NBK534248/
18. Vano M, Gennai S, Karapetsa D, Miceli M, Giuca MR, Gabriele M, et al. Influence of educational level and oral hygiene behaviours on DMFT and CPITN index. Int J Dent Hyg. 2015;13(2):153. https://doi.org/10.1111/idh.12098
19. Theresia TT, Goenawan G, Nurifai FH. Relationship of instant food and energy drink consumption with caries prevalence. J Kesehat Gigi. 2023;10(1):5.
20. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases. Bull World Health Organ. 2020;98(7):481–492.
21. Polit DF, Beck CT. Content validity index: critique and recommendations. Res Nurs Health. 2017;41(1):114–120. https://doi.org/10.1002/nur.21827
22. DeVellis RF. Scale development: theory and applications. 4th ed. Thousand Oaks: SAGE Publications; 2016.
23. Maudi T, Suryanti N, Setiawan AS. Relationship between mother's oral health literacy and oral hygiene behavior. Padjadjaran J Dent. 2023;35(1):41. https://doi.org/10.24198/pjd.vol35no1.35411
24. Syahniar, R., Farsida, F., Kosasih, A. N. N., Mardhia, M., Bekti, H. S., Marpaung, N. L. E., ... & Amany, H. A. (2024). Knowledge and attitudes towards antibiotic resistance among health profession students in Indonesia. International J of Public Health Science (IJPHS), 13(1), 404-412. http://doi.org/10.11591/ijphs.v13i1.23139
25. Taherdoost H. Validity and reliability of research instruments. Int J Acad Res Manag. 2016;5:29.
26. Suryanti N, Bahar A, Rahardjo A, Seniati ANL, Maharani DA. Validity and reliability of Indonesian oral hygiene behavior index. J Int Dent Med Res. 2019;12(2):633–639.
27. Bethesda (MD): National Institute of Dental and Craniofacial Research(US); 2021 Dec. Section 2B, Oral Health Across the Lifespan: Adolescents. Available from: https://www.ncbi.nlm.nih.gov/books/NBK578291/
28. Rahman M. Oral health inequalities in adolescents and young adults in Ontario. London (ON): Western University; 2023. https://doi.org/10.71858/123456
29. Ibrahim Alshahrani, Shreyas Tikare, Zakirulla Meer, Abdelbagi Mustafa, Mohammed Abdulwahab, Syed Sadatullah, Prevalence of dental caries among male students aged 15–17 years in southern Asir, Saudi Arabia, The Saudi Dental J, Volume 30, Issue 3, 2018, Pages 214-218, ISSN 1013-9052, https://doi.org/10.1016/j.sdentj.2018.03.003.
30. Wang X, Chen H, Hou R, Yang T, Liu J, Li J, Shi X, Zhao B, Liu J. Effect of dietary patterns on dental caries among 12-15 years-old adolescents: a cross-sectional survey. BMC Oral Health. 2023 Nov 9;23(1):845. https://doi.org/10.1186/s12903-023-03566-y.
31. Alhabdan YA, Albeshr AG, Yenugadhati N, Jradi H. Prevalence of dental caries and associated factors among primary school children: a population-based cross-sectional study in Riyadh, Saudi Arabia. Environ Health Prev Med. 2018 Nov 30;23(1):60. https://doi.org/10.1186/s12199-018-0750-z.
32. Al-Darwish MS. Oral health knowledge, behaviour and practices among school children in Qatar. Dent Res J. 2016;13(4):342–353. https://doi.org/10.4103/1735-3327.187885
33. Sheiham A, James WPT. Relationship between sugars, dental caries and fluoride. Public Health Nutr. 2014;17(10):2176–2184. https://doi.org/10.1017/S136898001400113X
34. World Health Organization. Sugars and dental caries: technical note. Geneva: WHO; 2025. Available from: https://www.who.int/publications/i/item/B09443
35. Moynihan PJ, Kelly SA. Effect of restricting sugars intake on caries. J Dent Res. 2014;93(1):8–18. https://doi.org/10.1177/0022034513508954
36. Wu H, Gao X, Yu H, Lo EC, McGrath C. Oral health knowledge and behaviour: systematic review. Int J Paediatr Dent. 2019;29(3):251–268. https://doi.org/10.1111/ipd.12475

37. Folayan MO, Kolawole KA, Oyedele T, Chukwumah NM, Onyejaka N, Agbaje H, Oziegbe EO, Oshomoji OV. Association between knowledge of caries preventive practices, preventive oral health habits of parents and children and caries experience in children resident in sub-urban Nigeria. BMC Oral Health. 2014 Dec 16;14:156. https://doi.org/10.1186/1472-6831-14-156.
38. Lendrawati L, Pintauli S, Rahardjo A, Bachtiar A, Maharani DA. Risk factors of dental caries among Indonesian adolescents. Pesqui Bras Odontopediatria Clin Integr. 2019;19:e4488. https://doi.org/10.4034/PBOCI.2019.191.42
39. Zhang R, Yang Q, Tang Q, et al. Adolescents' free sugar intake and parental influence. Nutrients. 2022;14(22):4741. https://doi.org/10.3390/nu14224741
40. Wang, X., Chen, H., Hou, R. et al. Effect of dietary patterns on dental caries among 12–15 years-old adolescents: a cross-sectional survey. BMC Oral Health 23, 845 (2023). https://doi.org/10.1186/s12903-023-03566-y
41. Hassan HI Sr, Othman SM. Sugar-sweetened beverages and dental caries in Iraqi adolescents. Cureus. 2024;16(4):e58471. https://doi.org/10.7759/cureus.58471
42. Hung, M., Blazejewski, A., Lee, S., Lu, J., Soto, A., Schwartz, C., & Mohajeri, A. (2024). Nutritional Deficiencies and Associated Oral Health in Adolescents: A Comprehensive Scoping Review. Children, 11(7), 869. https://doi.org/10.3390/children11070869
43. Brusius CD, Alves LS, Maltz M. Toothbrushing frequency and dental caries. Braz Oral Res. 2023;37:e127. https://doi.org/10.1590/1807-3107bor-2023.vol37.0127
44. Milona M, Janiszewska-Olszowska J, Szmidt M, et al. Oral health behaviours and DMFT in teenagers. Int J Environ Res Public Health. 2021;18(5):2333. https://doi.org/10.3390/ijerph18052333
45. Khan IM, Mani SA, Doss JG, Danaee M, Kong LYL. Tooth brushing behaviour in preschoolers. BMC Oral Health. 2021;21(1):283. https://doi.org/10.1186/s12903-021-01643-8
46. Baghlaf K, Muirhead V, Moynihan P, Weston-Price S, Pine C. Free sugars around bedtime and dental caries. JDR Clin Transl Res. 2018;3(2):118–129. https://doi.org/10.1177/2380084417752833
47. American Dental Association. Home oral care recommendations. Chicago: ADA; 2024. https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/home-care
48. Ballini A, Cantore S, Signorini L, et al. Sea salt-based mouthwash and xylitol in adolescents. Int J Environ Res Public Health. 2021;18(1):44. https://doi.org/10.3390/ijerph18010044
49. Walsh T, Worthington HV, Glenny AM, Marinho VC, Jeroncic A. Fluoride toothpastes for preventing dental caries. Cochrane Database Syst Rev. 2019;(3):CD007868. https://doi.org/10.1002/14651858.CD007868.pub3
50. Kitsaras G, Goodwin M, Kelly MP, Pretty IA. Bedtime oral hygiene behaviours and dental health. Children (Basel). 2021;8(5):416. https://doi.org/10.3390/children8050416
51. Kumar S, Tadakamadla J, Johnson N. Toothbrushing frequency and caries incidence. J Dent Res. 2016;95(11):1230–1236. https://doi.org/10.1177/0022034516655315
52. Jepsen S, Blanco J, Buchalla W, et al. Prevention and control of dental caries and periodontal diseases. J Clin Periodontol. 2017;44(Suppl 18):S85–S93. https://doi.org/10.1111/jcpe.12687
53. Noar SM, Benac CN, Harris MS. Does tailoring matter? Psychol Bull. 2020;146(2):135–159. https://doi.org/10.1037/bul0000210
54. Suryanti N, Putri FM. Educational intervention on dental caries prevention. Padjadjaran J Dent. 2024;36(1):25–38. https://doi.org/10.24198/pjd.vol36no1.48148
55. Haque SE, Rahman M, Itsuko K, et al. School-based oral health education in Bangladesh. BMC Oral Health. 2016;16:1–10. https://doi.org/10.1186/s12903-016-0202-3
56. Hamilton K, Cornish S, Kirkpatrick A, Kroon J, Schwarzer R. Parental supervision of toothbrushing. Br J Health Psychol. 2018;23(2):387–406. https://doi.org/10.1111/bjhp.12304
57. Sree RS, Louis CJ, Eagappan AS, et al. Parental participation in dental health programs. Int J Clin Pediatr Dent. 2022;15(4):417. https://doi.org/10.5005/jp-journals-10005-2411
58. Cruz S, Neff J, Chi DL. Transitioning from pediatric to adult dental care: part one. Pediatr Dent. 2015;37(5):442–446.
59. Bayarsaikhan Z, Cruz S, Neff J, Chi DL. Transitioning from pediatric to adult dental care: part two. Pediatr Dent. 2015;37(5):447–451.
60. Eriksson M, Sundberg LR, Santosa A, Lindgren H, Ng N, Lindvall K. Health behavioural change and social-ecological factors. Int J Qual Stud Health Well-being. 2025;20(1):2458309. https://doi.org/10.1080/17482631.2025.2458309

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