

BUILDING BETTER ORAL HEALTH HABITS THROUGH EDUCATION

Ika Kusuma Wardani^{1*}, M. Alfrio Aditama², Nor Najwa³, Aida Yanti⁴, Renie Kumala Dewi⁵

¹⁻⁵Lambung Mangkurat University

Email Korespondensi: ika.wardani@ulm.ac.id

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ABSTRACT

Oral and dental health is an important component of general health and quality of life. Dental caries remains one of the most common oral diseases among school-aged children. This community service project aims to provide oral health education to students of SDN Alalak Tengah 4. This community service project involved 55 students aged 10-14 years. The community service project was conducted by examining dental conditions using the DMF-T index and 20 item questionnaire that assessed oral and dental health knowledge before and after the intervention. The intervention was delivered through health education using posters. The results showed that most respondents were female (60%) and aged 11 years (50.9%). The majority of students were in the very low DMF-T category (45.5%). The questionnaire results showed that students' knowledge increased after the intervention, but there was no significant relationship between the level of oral health knowledge and the DMF-T index. These findings suggest that knowledge only is not sufficient to influence caries status unless accompanied by a positive attitude and consistent oral health practices. Therefore, oral health promotion programs should emphasize not only knowledge improvement but also behavioral changes in daily oral hygiene practices.

Keywords: Oral Health, Dental Caries, DMF-T Index, Oral Health Education, School Children.

1. INTRODUCTION

Oral and dental health constitute an integral component of overall systemic health and make a crucial role in determining an individual's quality of life (Jovina & Suratri, 2019). This concept encompasses the condition of both soft and hard tissues as well as all anatomical structures within the oral cavity teeth, as essential components of the masticatory system, perform vital functions in the human digestive process. Disorders affecting the oral and dental region are multidimensional in nature and may exert extensive impacts not only on physical well-being but also on psychological health and social interactions. Among the most prevalent oral diseases affecting the Indonesian population is dental caries (Diastuti et al., 2024). Age-based epidemiological data indicate that caries occurs more frequently in younger populations than in older age groups. The prevalence among individuals aged 10-24 years ranges from 66.8% to 69.5%, whereas it decreases to 53.3%

among those aged over 45 years and to 43.8% among individuals aged over 65 years (Jovina & Suratri, 2019).

Dental caries is defined as a pathological condition affecting the hard tissues of teeth that may occur on one or multiple tooth surfaces. The disease process typically initiates at pits, fissures, or interdental regions and subsequently progresses into deeper layers, including dentin and pulp tissues (Diasuti et al., 2024). Caries is a chronic and slowly progressive disease primarily triggered by external pathological processes that result in the demineralization and softening of dental hard tissues, eventually leading to cavity formation (Jovina & Suratri, 2019).

The etiology of dental caries is multifactorial, involving complex interactions among tooth and salivary conditions, microbial activity, dietary patterns, and exposure time (Pramita et al., 2019). Several risk determinants influence the severity of the disease, including previous caries experience, socioeconomic status, age, sex, educational level, geographic location, and oral health behavior (Hadi et al., 2021). Oral health behavior itself comprises three principal components: knowledge, attitudes, and practices. Adequate knowledge of oral health contributes indirectly to caries prevention by encouraging individuals to maintain oral hygiene and preserve dental function. Oral health status, particularly concerning dental caries, is commonly assessed using the DMF-T index (Decayed, Missing, and Filled Teeth).

A report from Alalak Tengah Community Health Center indicates that pulp and periapical tissue diseases are among the ten most prevalent health conditions, ranking third with 1,434 recorded cases. Contributing factors to the high incidence of caries in this region include limited community knowledge and unfavorable environmental conditions. As the primary healthcare facility, the community health center plays a strategic role in promoting health-oriented development, empowering local communities, and encouraging active public participation in maintaining independent health practices. Therefore, targeted and systematic measures are required, including comprehensive community assessment programs, to design appropriate services and effective interventions addressing oral and dental health problems, particularly those related to pulp and periapical tissue diseases. This community service project aims to provide oral health education to students of SDN Alalak Tengah 4.

2. PROBLEMS AND QUESTION FORMULATION

A report from Alalak Tengah Community Health Center indicates that pulp and periapical tissue diseases are among the ten most prevalent health conditions, ranking third with 1,434 recorded cases. The research question in this community service program is: How can dental health education be effectively implemented for students of SDN Alalak Tengah 4?

Figure 1 presents the geographical map of the location where the community service activities were conducted.



Figure 1. Map of the Community Service Program Location

3. LITERATURE REVIEW

a. Theoretical Framework and Concept of Oral and Dental Health Knowledge

Oral and dental health knowledge refers to the measured level of patients' understanding of dental and oral health (Dewi et al., 2022). This level of knowledge is assessed using a structured questionnaire consisting of 20 items, with a minimum possible score of 0 and a maximum score of 20. Each correct response is assigned a score of 1, while an incorrect response receives a score of 0. The assessment criteria for the questionnaire are categorized as follows:

- 1) High knowledge level: more than 13 correct answers
- 2) Moderate knowledge level: 7-13 correct answers
- 3) Low knowledge level: fewer than 7 correct answers

b. DMF-T Index

The DMF-T index is used indicator for assessing oral and dental health status in permanent teeth (Syahputri et al., 2023). The scoring classification of the DMF-T index applied in this study is as follows:

Very low	: 0.0 - 1.1
Low	: 1.2 - 2.6
Moderate	: 2.7 - 4.4
High	: 4.5 - 6.6
Very high	: > 6.6

4. METHODS

a. Applied Method

The program involved oral health education and promotion activities using educational media (poster) that illustrating proper practices for maintaining oral and dental hygiene (Wardani & Deby Kania Tri Putri, 2022). The primary objective of this activity was to improve students' knowledge regarding the definition, etiology, pathogenesis of dental caries, and appropriate methods for maintaining oral and dental health among students of SDN Alalak Tengah 4.

b. Participants

The target participants of this program were students enrolled at SDN Alalak Tengah 4. The expected outcome of this activity was an improvement in students' knowledge concerning the definition, causes, development process of dental caries, and proper oral hygiene practices. Educational sessions were designed to be engaging and interactive to ensure students' attention throughout the program. A two-way communication approach was implemented to enhance participant engagement and facilitate better comprehension of the educational materials delivered (Wardani et al., 2023).

c. Community Service Procedures

The community service program was conducted through several sequential stages. The first stage involved administering a questionnaire (pre-test) to assess baseline knowledge levels. This was followed by oral and dental examinations, including odontogram recording to document participants' dental conditions. Subsequently, health education sessions were delivered using lecture-based methods supported by poster media, covering the definition, causes, development process of dental caries, and strategies for maintaining oral and dental health.

After the educational intervention, participants were asked to complete a second questionnaire (post-test) to evaluate knowledge improvement and determine the effectiveness of the educational session. The success indicators of this program included a reduction in new cases of dental caries, increased awareness and knowledge regarding dental caries and oral health maintenance, and greater willingness among students to undergo dental examinations, indicating successful knowledge transfer.

The health promotion activities involved 55 student respondents from SDN Alalak Tengah 4. Evaluation was carried out by reviewing questionnaire responses before and after the educational intervention. Additional educational reinforcement was provided to strengthen students' understanding of dental caries and oral hygiene practices. The evaluation method primarily relied on post-test questionnaire results to assess whether participants had adequately comprehended the educational materials presented.

5. RESULTS AND DISCUSSION**a. Results**

The assessment of oral and dental health knowledge was conducted among 55 students aged 10-14 years at SDN Alalak Tengah 4. The study involved DMF-T examinations and the administration of a structured questionnaire measuring oral health knowledge. Data collection was carried out from 12 to 14 August 2025.

Table 1. Respondent Characteristics

Gender	Number of Respondents	Percentage (%)
Male	22	40%
Female	33	60%
Total	55	100%
Age (years)	Number of Respondents	Percentage (%)
10	11	12.7%
11	28	50.9%
12	16	29.1%
13	3	5.5%
14	1	1.8%
Total	55	100%

Table 1 shows that most respondents were female (60%, n=33) and the majority of respondents were 11 years old (50.9%, n=28).

Table 2. Distribution of Parental Income

Category	Father's Income (IDR/month)	Respondents (%)	Mother's Income (IDR/month)	Respondents (%)
Low	No income / <535.000	14 (25.45%)	No income / <535.000	46 (83.63%)
Moderate	535.000 - 1.200.000	25 (45.45%)	535.000 - 1.200.000	6 (10.9%)
High	1.200.000 - 3.500.000	13 (23.63%)	1.200.000 - 3.500.000	2 (3.63%)
Very High	>3.500.000	3 (5.45%)	>3.500.000	1 (1.81%)
Total	55 (100%)		55 (100%)	

Table 2 indicate that most fathers' income fell within the moderate category (45.45%). In contrast, the majority of mothers had low income or no income (83.63%).

Table 3. Distribution of Parental Educational Level

Father's Education	Respondents (%)	Mother's Education	Respondents (%)
D3/S1	8 (14.545%)	D3/S1	5 (9.1)
SMA	30 (54.545%)	SMA	23 (41.81%)
SMP	8 (14.545%)	SMP	9 (16.63%)
SD	4 (7.272%)	SD	8 (14.545%)
No Formal Education	5 (9.1)	No Formal Education	10 (18.18%)
Total	55 (100%)	Total	55 (100%)

Table 3 indicates that most fathers (54.55%) and mothers (41.81%) had completed senior high school.

Table 4. DMF-T Index Distribution

Category	Number of Respondents	Percentage (%)
Very Low	25	45.5%
Low	17	30.9%
Moderate	7	12.7%
High	6	10.9%
Very High	0	0%
Total	55	100%

Table 4 shows that nearly half of the respondents had a very low DMF-T index (45.5%).

Table 5. Somers' D Correlation Test on the Association between Oral and Dental Health Knowledge Level and DMF-T Index

Level of Knowledge	DMF-T Category					Total	r value	p value
	VL	L	M	H	VH			
Low	0	1	0	0	0	1	-0.23	0.870
Moderate	6	6	3	0	0	15		
High	19	10	4	6	0	39		
Total						55		

Based on table 5, the Somers' D correlation test produced a p-value of 0.870 ($p > 0.05$), indicating that the hypothesis was accepted. This result demonstrates that there is no statistically significant association between the level of oral and dental health knowledge and the DMF-T index.

Table 6. Wilcoxon Test Results Before and After Oral and Dental Health Education among Students of SDN Alalak Tengah 4

Variable	Value
Z	-5.349
Asymp. Sig. (2-tailed)	0.000

Based on table 6, the value was less than 0.05, indicating rejection of the null. This finding confirms a statistically significant difference in students' knowledge levels before and after receiving oral and dental health education.



Figure 2. Health Education Media



Figure 3. Health Education

b. Discussion

Knowledge represents the outcome of cognitive processes that occur after an individual perceives a particular object through sensory experience (Parmasari et al., 2022). Oral and dental health knowledge influences attitudes and practices related to maintaining oral hygiene and dental care. Adequate knowledge plays a crucial role in preserving oral cleanliness, preventing infections within the oral cavity, and contributing to overall immune resilience (Sari et al., 2020). Insufficient knowledge may lead to inappropriate behaviors and misconceptions regarding oral health maintenance, whereas accurate and comprehensive knowledge promotes positive health behaviors, particularly in maintaining oral and dental hygiene (Suwandi et al., 2022).

Behavior important for determining health status. According to Blum's theory, behavior results from accumulated human experiences and interactions with the environment, manifested through knowledge, attitudes, and actions. Knowledge is closely associated with an individual's attitude toward disease prevention and health maintenance. Without adequate knowledge, individuals lack the basis for decision-making and appropriate responses to health-related problems. Limited oral health knowledge constitutes a predisposing factor that may lead to adverse health behaviors and increased disease risk (Aripin et al., 2024). Conversely, improving oral and dental health knowledge enhances public awareness and encourages preventive practices. Such knowledge can be evaluated through understanding oral hygiene practices, dental care

routines, harmful habits affecting oral health, and awareness of primary causes of dental caries (Parmasari et al., 2022).

Dental caries is defined as localized destruction of hard dental tissues occurring on specific tooth surfaces. Tissue damage arises from the loss of enamel and dentin structures due to acid deposition produced by plaque bacteria accumulated on tooth surfaces. This process results from bacterial metabolism of foods rich in fermentable carbohydrates (Astuti et al., 2017). Caries development begins with demineralization of hard tissues followed by degradation of organic components. Risk factors for dental caries include local factors such as previous caries experience, oral hygiene, dental plaque, tooth alignment, cariogenic dietary habits, and brushing practices, as well as systemic and socio-demographic factors including age, sex, ethnicity, cultural background, smoking habits, socioeconomic status, and educational level. Caries results from the interaction of host factors (saliva and teeth), microorganisms, dietary substrates, and time, thereby categorizing it as a multifactorial disease (Ramadhanintyas, 2020).

The pathological mechanism of dental caries involves progressive demineralization of tooth structures caused by acids produced by microorganisms, leading to cavity formation in enamel, dentin, or cementum. The disease is chronic, irreversible without treatment, and may ultimately cause tooth loss. Caries progression is strongly associated with bacterial activity within dental plaque, which creates an acidic microenvironment. Plaque is a gelatinous biofilm composed of bacterial colonies adhering to tooth surfaces and serves as a critical precursor in caries formation. *Streptococcus mutans*, commonly found in plaque, ferments residual carbohydrates particularly sucrose and glucose into organic acids. Bacterial metabolism reduces pH levels to approximately 5.0-5.5, promoting enamel demineralization and progressive structural damage (Astuti et al., 2017).

The questionnaire results indicate that most respondents whose fathers had completed senior high school exhibited a mean DMF-T index of 2.1, categorized as low. Similarly, students whose mothers had completed senior high school demonstrated a mean DMF-T index of 2.3, also categorized as low. Educational attainment influences oral health status, as higher parental education levels facilitate broader access to health-related information and improved understanding of oral diseases. Conversely, parents with limited educational backgrounds may encounter difficulties in acquiring adequate health knowledge, thereby affecting family health practices (Sofiyah et al., 2020).

Among the 55 respondents, most parents had moderate to high educational backgrounds. Individuals with higher formal education typically have better employment opportunities and greater financial capacity to access healthcare services. Furthermore, education enhances comprehension and attitudes toward healthy lifestyles (Wardani et al., 2023). Conversely, limited knowledge may hinder individuals from adopting newly acquired health values. Parents with stable financial conditions are more likely to provide quality healthcare services for their children, and children from middle and upper income families generally experience improved access to healthcare facilities (Parmasari et al., 2022).

Parental income distribution showed that most respondents' fathers had moderate income levels (IDR 535,000-1,200,000 per month) and their children exhibited a very low DMF-T index. In contrast, most mothers had low or no income (< IDR 535,000 per month), and their children showed a low DMF-T index. Children from families with sufficient income have greater opportunities to obtain comprehensive healthcare services, including dental care (Haryanti et al., 2020). Adequate parental income enables better healthcare provision for children, whereas families with limited economic resources often prioritize basic needs, potentially limiting healthcare access (Putri et al., 2021). Occupation also reflects social status and serves as a means to obtain income necessary for fulfilling living needs and accessing preferred healthcare services. Consequently, better occupational status is associated with improved living standards and healthcare access (Rahman & Norfai, 2018).

Lawrence Green and Kreuter's behavioral theory states that behavior is influenced by internal and external factors categorized into predisposing, reinforcing, and enabling factors (Constantika et al., 2022). Knowledge constitutes a predisposing factor that facilitates behavioral change (Muhtar et al., 2020). Limited knowledge regarding oral and dental health prevents individuals from understanding the causes and prevention strategies of dental caries (Suwandi et al., 2022). Knowledge strongly determines individual actions, adequate dental health knowledge increases motivation to maintain oral hygiene and reduces caries risk (Herlina & Lilia, 2023).

Knowledge encompasses theoretical and practical understanding of a subject. It may also be defined as familiarity, awareness, information, descriptions, or skills acquired through experience or education via perception, discovery, and learning processes (Utami et al., 2023). Individuals are considered to have limited knowledge when they are unable to recognize, explain, or analyze a particular condition. Knowledge measurement is commonly conducted through questionnaires or interviews. In the present survey, oral and dental health knowledge among fifth and sixth grade students of SDN Alalak Tengah 4 was assessed using a 20-item questionnaire addressing oral hygiene practices. The findings revealed that the highest proportion of respondents (45.5%) exhibited very low oral health knowledge levels. Meanwhile, the DMF-T assessment indicated that the largest proportion of students (34.5%) fell within the high DMF-T category.

The Somers' D correlation test yielded a significance value of 0.870 ($p > 0.05$), indicating no statistically significant association between oral and dental health knowledge levels and the DMF-T index. This finding aligns with previous research by Rahman & Norfai (2018) which reported no correlation between oral health knowledge and dental caries prevalence. This discrepancy may arise because knowledge alone does not necessarily do into daily oral health practices (Wardani et al., 2024). High knowledge levels are insufficient to reduce caries prevalence unless accompanied by appropriate attitudes and consistent oral hygiene behaviors in daily life (Liasari et al., 2021).

6. CONCLUSION

Knowledge may not necessarily be associated with caries status because individuals do not always do oral and dental health knowledge into daily health practices. Although a person may possess a high level of knowledge, this alone is insufficient to reduce the prevalence of dental caries unless it is accompanied by appropriate attitudes and consistent actions in maintaining oral and dental health in everyday life. For further research, attention needs to be paid to adding confounding variables, such as attitudes and behavior.

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