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ORIGINAL ARTICLE

Oral health knowledge and its correlation to caries experience among students

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ABSTRACT

Dental caries remains a significant global public health issue, particularly among school-aged children. A lack of knowledge regarding oral health maintenance is considered a primary contributing factor to the high prevalence and severity of caries in this demographic. This study aimed to analyze the influence of oral health maintenance knowledge on the severity of dental caries in Grade 6 students at SDN No. 060833. An analytical observational study with a cross-sectional design was conducted. A total of 39 students were selected using simple random sampling. Data on knowledge were collected using a validated questionnaire, while caries severity was assessed through direct oral examination and categorized as pit fissure caries, superficial caries, medium caries, or profound caries. Data analysis employed univariate and bivariate methods using the Chi-Square test. The majority of students (64.1%) had poor knowledge of oral health maintenance. The most common caries severity was superficial caries (35.9%), followed by medium caries (30.8%). Bivariate analysis revealed a statistically significant relationship between knowledge level and caries severity (p-value = 0.000). Students with poor knowledge were more likely to experience medium and profound caries. There is a significant influence of the level of knowledge about oral health maintenance on the severity of dental caries in Grade 6 students. Efforts to improve oral health knowledge through targeted education programs in schools are essential to prevent and reduce the severity of dental caries.

Keywords: dental caries, knowledge, oral health, school children

Introduction

Dental caries is one of the most prevalent oral health problems worldwide. The Global Burden of Disease Study 2019 reported that nearly half of the world's population, approximately 3.5 billion people, suffer from oral diseases, with dental caries being the most common.[1] The World Health Organization (WHO) estimates that over 514 million children globally are affected by caries. The situation is particularly concerning in Southeast Asia, where countries like Indonesia and the Philippines report high prevalence rates.[2] In Indonesia, the prevalence of dental caries in children reaches a staggering 92.6%.[3]

Elementary school-age children are highly susceptible to dental caries due to various factors, including the mixed dentition phase, dietary habits high in cariogenic foods, and inadequate oral hygiene practices.[4,5] A critical factor underlying poor oral hygiene behavior is a lack of knowledge. Knowledge is the result of knowing and awareness gained through the senses and experience, forming the basis for an individual's actions and behavior.[6,7] Without adequate knowledge, individuals lack a foundation for making informed decisions regarding their health.[8–10]

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Preliminary studies, such as one conducted by Yuniar et al.[11] at an elementary school, found that many students had low knowledge of proper tooth brushing techniques and timing, often brushing their teeth only while bathing. This highlights a significant gap in oral health education. Furthermore, research by Gestina & Meilita[12] and Hutagalung et al.[13] suggests a direct link between the level of oral health knowledge and the severity of caries experienced. Based on this background, this study was conducted to investigate the influence of oral health maintenance knowledge on the severity of dental caries in Grade 6 students at SDN No. 060833. The findings are expected to provide evidence for developing targeted interventions to improve oral health outcomes in this vulnerable population.

Method

This study employed an analytical observational method with a cross-sectional design. The research was conducted at SDN No. 060833 over a period of three months. The total population consisted of all 63 Grade 6 students at the school. To determine the sample size, the Slovin formula was used with a 10% margin of error, which resulted in a minimum requirement of 39 respondents. A total of 39 students were ultimately selected for the study using a simple random sampling technique. The inclusion criteria for participation were being a Grade 6 student at SDN No. 060833, being in good physical health, being cooperative, and being willing to participate as a respondent. The exclusion criteria included students who were uncooperative, did not have parental consent, or were absent during the data collection period.

Data were collected using two primary instruments. The first was a questionnaire used to measure the level of knowledge about oral health maintenance. This questionnaire consisted of 12 closed-ended questions. Knowledge was then categorized as "good" for scores of 75% or higher, "sufficient" for scores between 56-74%, or "poor" for scores below 55%. The second instrument was an observation sheet, which was used for direct oral examination to assess caries severity. Caries was classified into four distinct levels based on depth: pit fissure caries, superficial caries (limited to enamel), medium caries (reaching dentin but not more than half), and profound caries (reaching more than half of the dentin and potentially involving the pulp).

All data analysis was performed using SPSS Version 25. Univariate analysis was used to describe the frequency and percentage of each variable. Bivariate analysis was conducted using the Chi-Square test to determine the relationship between the independent variable (knowledge) and the dependent variable (caries severity). A p-value of < 0.05 was established as the threshold for statistical significance.

Results

The characteristics of the 39 respondents are shown in Table 1. The sample consisted of 17 male students (43.6%) and 22 female students (56.4%). Table 1 shows that the majority of students (64.1%) had a poor level of knowledge regarding oral health maintenance. Regarding caries severity, superficial caries was the most common (35.9%), followed by medium caries (30.8%). Only 10.3% of students had profound caries.

Table 1. Distribution of respondents' knowledge and caries status (n=39)

Variable	Frequency (n)	Percentage (%)
Knowledge Level		
Sufficient	14	35.9
Poor	25	64.1
Caries Severity		
Pit Fissure Caries	9	23.1
Superficial Caries	14	35.9
Medium Caries	12	30.8
Profound Caries	4	10.3

The results of the bivariate analysis to determine the relationship between knowledge level and caries severity are presented in Table 2. Table 2 demonstrates a strong and statistically significant relationship between knowledge level and caries severity (p-value = 0.000). Among students with sufficient knowledge, the majority (23.1%) had only pit fissure caries, and none had profound caries. In contrast, students with poor knowledge predominantly had more severe caries, with 28.2% having medium caries and 10.3% having profound caries.

Table 2. The influence of knowledge level on caries severity (n=39)

Knowledge Level	Caries Severity, n (%)				Total	p-value
	Pit Fissure	Superficial	Medium	Profound		
Sufficient	9 (23.1%)	4 (10.3%)	1 (2.6%)	0 (0.0%)	14 (100%)	
Poor	0 (0.0%)	10 (25.6%)	11 (28.2%)	4 (10.3%)	25 (100%)	0,000
Total	9 (23.1%)	14 (35.9%)	12 (30.8%)	4 (10.3%)	39 (100%)	

Discussion

This study found that the majority of Grade 6 students at SDN No. 060833 had a poor level of knowledge regarding oral health maintenance. This finding is consistent with previous research. For instance, a study by Supariani et al.[14] also reported low knowledge and skills in tooth brushing among elementary school students in Denpasar. Similarly, Wulandari[15] found that the average knowledge of students at SDN Semarapura Kauh was in the "poor" category. This common trend indicates a systemic issue of insufficient oral health education integrated into the school curriculum or delivered effectively at home.

The distribution of caries severity in this study showed that superficial caries was the most prevalent. This suggests that the carious process in many students is still in its early stages, which is a critical window for preventive intervention. However, a substantial proportion of students (30.8% and 10.3%) had already progressed to medium and profound caries, indicating a need for both preventive and restorative care.

The core finding of this research is the significant influence of knowledge level on the severity of dental caries (p-value = 0.000). This result aligns with the Health Belief Model and the theory that knowledge is a fundamental domain that shapes a person's health actions.[16] Students with sufficient knowledge are more likely to understand the causes of caries (such as consuming sugary foods and poor brushing habits) and the importance of preventive measures (like regular brushing with fluoride toothpaste and dental check-ups). This understanding translates into better oral hygiene practices, thereby preventing the development and progression of caries.[17]

Conversely, students with poor knowledge lack this awareness. As seen in the results, they are far more likely to develop medium and profound caries. This is supported by the research of Gestina & Meilita[12], who concluded that a lack of knowledge in school-age children is a primary risk factor for poor oral health behavior and subsequent caries. Another study by Sitanaya et al.[18] found that the actions of elementary students were not commensurate with their knowledge, and poor oral health behavior was a risk factor for caries. A critical point raised by Gestina & Meilita[12] is that high knowledge alone is not sufficient to ensure good behavior; the knowledge must be applied in daily life. This underscores the importance of not only providing education but also ensuring it is practical, reinforced, and supported by a conducive environment, including the role of parents and teachers.[19]

Therefore, comprehensive and sustainable efforts are needed. Schools, in collaboration with health institutions, should implement regular oral health education programs, including demonstrations of proper tooth brushing, counseling on cariogenic foods, and routine dental screenings. The active involvement of parents is also crucial to supervise and motivate children to maintain oral hygiene at home.

Conclusion

This study concludes that the level of knowledge about oral health maintenance among Grade 6 students at SDN No. 060833 is predominantly poor. There is also a significant influence of this knowledge level on the severity of dental caries. Students with poor knowledge are at a higher risk of experiencing more severe levels of caries. Based on the conclusion, a comprehensive set of recommendations is proposed. This approach begins in the educational environment, where schools are advised to collaborate with local health centers (Puskesmas) to conduct regular and structured oral health education and promotion programs. This effort must then be reinforced at home, so the study suggests parents increase their supervision of children's oral hygiene habits and facilitate regular dental check-ups. To support both schools and families, health agencies are advised to intensify their outreach and dental care services, treating elementary schools as a strategic target for oral disease prevention. Finally, to broaden the understanding of this issue, future researchers are encouraged to conduct further studies with larger sample sizes while also considering other influencing factors, such as dietary habits, socioeconomic status, and the role of parents' knowledge.

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