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Knowledge of Caries in Permanent First Molars Using Animated Video Media Among Sixth-Grade Students (A Study at SDN Pulorejo, Jombang)

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Abstract

Dental caries is one of the major problems affecting children in Indonesia because its prevalence remains relatively high. Preliminary observations at SDN Pulorejo, Jombang revealed a relatively high prevalence of dental caries among sixth-grade students. This suggests that students understanding of dental caries remains low. Therefore, this study aims to describe the level of knowledge among sixth-grade students at SDN Pulorejo regarding first molar dental caries before and after receiving health education using animated video media. This study employed descriptive design with a sample size of 40 students. Data collection was conducted through pretest and posttest questionnaires. Data processing and analysis were performed using frequency distributions and mean values. The results showed an increase in students' knowledge regarding first molar dental caries, with a mean score of 44.5% before the educational session and an increase to 82.5% afterward, meeting the "good" criterion. This indicates that animated video media is effective in helping students understand the material because it captures their attention and makes it easier for them to absorb information. It is concluded that health education using animated video media contributes to improving students knowledge of first molar dental caries, making it an effective alternative medium for elementary school-aged children.

Keywords: Knowledge, Dental Caries, First Permanent Molars, Animated Video

1. INTRODUCTION

Oral health remains a health issue that requires greater attention, particularly among elementary school-aged children. One of the most common oral health problems found in children is dental caries (Tul Hikmah et al., 2022). According to the World Health Organization (WHO), cases of dental caries are more prevalent in developing countries compared to developed countries, which have actually shown a declining trend in caries prevalence over time (WHO, 2019). The results of dental examinations in the 2023 Indonesian Health Survey (SKI) indicate that the prevalence of dental caries remains quite high, reaching 82.8% (SKI, 2023). This figure demonstrates that dental caries is a serious problem that requires immediate attention.

Dental caries is damage to the hard tissues of the tooth that generally begins on the outer layer of the tooth and then gradually spreads to deeper tissues, including dentin and cementum (Annisa et al., 2024). Caries is a chronic condition that develops slowly over a long period of time; if not treated promptly, it can spread to the pulp and cause infection. The process of caries development is multifactorial, influenced by the interaction between the substrate (cariogenic foods), the agent (dental plaque bacteria), the host (tooth resistance and saliva), and the time factor. One of the permanent teeth at high risk for caries is the first permanent molar (FPM).

The eruption of the first permanent molar (FPM) typically occurs in children aged 6–9 years (Azzah et al., 2023). At this age, the enamel of the FPM is still more porous and has a lower mineral content, making the tooth vulnerable to demineralization and the development of caries.

The morphology of primary molars, which feature pits and fissures, facilitates the retention of food debris and bacterial colonization, particularly by Streptococcus mutans, the primary cause

of caries (Nisyak et al., 2022). Functionally, primary molars play a crucial role in the stomatognathic system. Premature loss of GMPP due to caries can lead to a chain reaction of consequences, such as the migration of adjacent teeth toward the empty space, extrusion of opposing teeth, malocclusion, impaired chewing function that affects the digestive process, and even aesthetic and psychological issues in children (Taher et al., 2025; Tarigan, 2021). Therefore, comprehensive caries management is necessary, encompassing promotive (knowledge enhancement), preventive (prevention), and curative (treatment) measures (Rachmawati et al., 2022).

Problems related to dental caries were also found among sixth-grade students at SDN Pulorejo. Preliminary observations revealed that 80% of students had caries in their first permanent molars (FPM). This finding indicates that the goal of achieving a caries-free status at SDN Pulorejo is still far from the 2014 School Dental Health Program (UKGS) target, which aims for 70% of school-aged children to be caries-free. The still relatively high rate of dental caries suggests that students' understanding of oral health is not yet fully optimal (Kala'tiku et al., 2023). The high rate of dental caries highlights the need to prioritize improving knowledge about caries—particularly regarding the first permanent molars—so that elementary school children can recognize the early signs of tooth decay and understand how to prevent it.

One approach to promoting students' health—specifically, maintaining and improving their oral health—is to enhance their knowledge through health education (Laily et al., 2025). One effective tool for delivering oral health education to children is the use of animated videos (Antoro et al., 2026; Arja et al., 2025). This medium is considered effective because it captures students' attention through interactive visuals, attractive colors, and storytelling that is easy to understand and appropriate for the developmental stage of elementary school children (Pradana, 2025). Therefore, animated videos were selected as the medium for oral health education for school-aged children.

A number of previous studies have shown that knowledge about dental caries can be improved through interventions, one of which is the use of animated videos. Studies by Antoro et al., (2026) and Iszati et al., (2023) indicate that there is a difference in knowledge levels before and after the presentation of animated videos. Furthermore, a study by Putri & Rizqi (2021) indicates that animated videos are effective for enhancing knowledge among elementary school students. Although there have been several studies on animated videos and dental caries, research specifically addressing knowledge of first permanent molar caries (GMPP) among sixth-grade students at SDN Pulorejo remains limited. This study offers a novel contribution by focusing specifically on the topic of first permanent molar caries (GMPP), the use of animated videos, and the application of the Stimulus-Organism-Response (S-O-R) approach.

2. METHOD

This study employed a descriptive research design—a research method used to provide a systematic, factual, and accurate description of the phenomenon under investigation (Sugiyono, 2023). This design was used to describe students' knowledge of first permanent molar caries (FPMC) before and after receiving health education through animated videos. The study was conducted at SDN Pulorejo Jombang with a sample of 40 sixth-grade students, consisting of 20 students from Class VI A and 20 students from Class VI B.

The variable under study was knowledge of first permanent molar caries, with indicators covering the concept of caries, the definition and characteristics of caries, the consequences of caries, the process and mechanism of caries, and caries prevention. The data collection method

used in this study was a survey to obtain data—both past and present—regarding beliefs, opinions, and characteristics, and to test hypotheses about the variables under study (Sugiyono, 2023).

The data collection procedure involved distributing a pretest questionnaire to respondents, conducting an educational session by showing a 5-minute animated video on first permanent molar dental caries as an educational tool, and finally distributing a post-test questionnaire to the respondents. Data analysis was performed by processing the respondents' answer scores. Respondents' scores were totaled and averaged, then converted into percentages to determine the students' level of knowledge. The measurement tool used in the data analysis consisted of several categories of knowledge levels: "good" if the percentage of correct answers was 76–100%, "adequate" if the percentage was 56–75%, and "insufficient" if it was ≤55%.

3. RESULT AND DISCUSSION

The study was conducted on 40 sixth-grade students at SDN Pulorejo in Jombang by measuring their level of knowledge before and after an educational session using animated video media on first permanent molar tooth decay. These measurements were obtained from pre-test and post-test questionnaires that were distributed. The results showed that before the educational session using animated video media, the students' knowledge regarding first permanent molar tooth decay was only 44.5%. This indicates that the level of knowledge prior to the intervention was still in the "insufficient" category. After the educational session, the average knowledge level increased to 82.5%, which falls into the "good" category. Thus, there was a significant increase of 38% following the educational session using animated video media.

Table 1. Summary Knowledge Levels Regarding First Permanent Molar Tooth Decay Among Sixth-Grade Students at SDN Pulorejo Before and After an Educational Session Using Animated Video Media

Measurement	n	Average (%)	Category
Pre-test	40	44,5	Insufficient
Post-test	40	82,5	Good
Difference		**38%**	

Based on the results of this study, it was found that students' level of knowledge regarding first molar dental caries prior to receiving health education was still in the "insufficient" category. This low level of knowledge may be influenced by a lack of access to information, minimal dental health education in schools, and low awareness of the importance of maintaining oral health. Many students only know that cavities cause toothaches, but do not yet understand that caries can also cause difficulty chewing, reduce appetite, interfere with concentration during class, and increase the risk of infection if not treated promptly.

Most sixth-grade students at SDN Pulorejo are 12 years old. This age group is particularly vulnerable to dental caries because they are in a period of growth and the formation of health habits (Faizal, 2025). However, many students still do not fully understand the causes of dental caries, how to prevent it, or what steps to take when they develop caries. This indicates that students' knowledge of oral health remains limited. This finding is also supported by Haura (2025), who states that students' knowledge levels prior to the study were still relatively low due to the limited information available to them. Information about dental caries is generally obtained from healthcare professionals, television, and print media. Therefore, educational materials

presented in a simple manner and supported by animated videos are needed to improve students' understanding.

This finding is consistent with the Stimulus–Organism–Response (S-O-R) theory proposed by Skinner (1938) as cited in Notoatmodjo (2018). This theory explains that changes in a person's behavior or knowledge begin with a stimulus received by that person. In this study, prior to receiving the health education session, the students had not yet been exposed to any stimuli related to dental caries in the first permanent molars. Consequently, as organisms (O), the sixth-grade students at SDN Pulorejo did not yet possess sufficient information to process into knowledge. This had an impact on the response (R) they demonstrated, namely the students' still-low level of knowledge regarding the definition, characteristics, development process, consequences, and prevention of dental caries in the first permanent molars.

The low level of knowledge among sixth-grade students at SDN Pulorejo prior to the educational session indicates a need for educational materials designed to help students understand first permanent molar dental caries in a more engaging and effective way. One engaging educational medium that can be used is an animated video. This medium presents engaging visuals and audio, allowing the dissemination of information about caries in the first permanent molars to be tailored to the characteristics of elementary school students and easily understood by them.

After the educational session, it was found that the level of knowledge regarding dental caries following the use of animated video media met the "good" criteria. These results indicate an increase in knowledge following the intervention. This improvement suggests that the majority of students were able to understand the presented material well, covering indicators such as understanding, definitions and characteristics, processes and mechanisms, consequences, and prevention of dental caries.

The increase in students' knowledge can also be explained by the Stimulus–Organism–Response (S-O-R) theory. In this study, animated video served as the stimulus (S), conveying information about dental health in an engaging manner through a combination of moving images, sound, and easy-to-understand explanations. This stimulus was then received by the organism (O)—the sixth-grade students at SDN Pulorejo—through the processes of seeing, hearing, paying attention, understanding, and remembering the material presented. After the information is processed by the students, a response (R) emerges in the form of increased knowledge regarding caries of the first permanent molars. This is evidenced by higher post-test scores compared to pre-test scores after the educational session was conducted. Thus, the S-O-R theory explains that animated video media, as a stimulus, is capable of producing a positive response in the form of increased student knowledge.

According to Maulana (2019), animated videos can improve information comprehension and retention because they engage both the senses of sight and hearing simultaneously. The combination of instruction from a presenter and the use of educational videos can be an effective method for increasing students' knowledge about first molar dental caries, thereby helping them better understand the importance of maintaining the health of their permanent teeth from an early age. These results are consistent with the study by Antoro et al., (2026), which showed that students' knowledge increased after they received education using animated videos on the definition, causes, and consequences of dental caries. Research conducted by Haura (2025) and Priska (2025) also showed that animated videos are effective in increasing knowledge about dental caries. In fact, there was an increase in knowledge after students received education through this medium.

Education through animated videos is effective in increasing the knowledge of sixth-grade students at SDN Pulorejo regarding dental caries in the first permanent molars. The findings of this study also support the Stimulus-Organism-Response (S-O-R) theory, which explains that a stimulus in the form of health education media is processed by an individual, resulting in a response in the form of increased knowledge. Thus, animated videos can be used as an effective health education medium to improve elementary school students' knowledge regarding caries of the first permanent molars.

4. CONCLUSION

Based on the research findings and discussion, the level of knowledge about first molar dental caries among sixth-grade students at SDN Pulorejo before receiving education using animated video media fell into the "inadequate" category. After the intervention using animated video media, the level of knowledge regarding first permanent molar caries among sixth-grade students at SDN Pulorejo met the "good" criteria. This study demonstrates that health education delivered via animated video media is effective in improving knowledge regarding first permanent molar caries among sixth-grade students at SDN Pulorejo.

Based on these findings, the following recommendations can be made: 1) Schools are encouraged to facilitate oral health education activities by collaborating with community health centers or health professionals to provide education on dental health; 2) Future researchers are encouraged to expand on this study by incorporating additional variables that influence dental caries.

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