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Education on preventing dental caries in children

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Abstract

Background: Dental caries in children is a public health problem that remains very high in Indonesia, including in the city of Jambi. According to data from the 2023 Indonesian Health Survey, the prevalence of dental caries among school-aged children exceeds 40%, impacting quality of life, academic performance, and family economic burden. Low levels of knowledge and inadequate toothbrushing behaviour are the primary factors contributing to the high incidence of dental caries. **Objective**: This activity is to improve children's knowledge and skills in tooth brushing. **Methods:** The implementation of the activity consists of five stages: coordination with partners, provision of education and joint tooth brushing practice, dental health examination, and evaluation of dental hygiene. **Results:** There was an increase in children's knowledge and skills regarding dental health with a p-value of 0.000. **Conclusion:** Oral health education using engaging methods, such as videos and educational games, along with the active involvement of teachers and parents, can enhance children's knowledge and skills regarding oral health.

Keywords: Education; dental caries; children.

Cite This Article

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INTRODUCTION

Dental caries is a very common oral health problem in Indonesia. According to the 2023 Indonesian Health Survey (SKI), the prevalence of caries in Indonesia is 43.6% (1), while the 2018 RISKESDAS survey found it to be 45.3% (2). The decline in dental caries cases from 2018 to 2023 was only around 1.5%, indicating that this issue still requires comprehensive and sustained intervention. Dental caries in children is a particular concern because this phase is a transition period from primary teeth to permanent teeth, during which children are very vulnerable to caries due to suboptimal dental hygiene behaviour, consumption of cariogenic foods, and lack of dental health education (3).

In the city of Jambi, based on data from the local Health Office and the results of an internal survey, it was found that the prevalence of caries among first-grade primary school students is still high, with many children not yet having proper toothbrushing habits and minimal access to dental health education and prevention (4). This condition is exacerbated by the low utilisation of school-based prevention programmes, such as professional group toothbrushing.

Dental health education from an early age is one of the most effective preventive measures for forming clean and healthy living habits (5). Education provided to elementary school-aged children should be tailored to their stage of cognitive development. According to Piaget's developmental theory, children aged 6–7 years are in the concrete operational stage, where they more easily understand information through direct experience and fun activities such as playing and singing (6). Therefore, an engaging and interactive educational approach is essential for children to effectively receive health messages (7).

Learning media plays a crucial role in the success of health education. One effective medium for children is educational video, as it displays moving images, colors, and engaging sounds, increasing their appeal and retention of information (8). Furthermore, playing and singing are highly sought-after activities for children, helping them learn while having fun. Songs with educational lyrics and role-playing games have been shown to strengthen memory and improve children's understanding of proper tooth-brushing habits (9,10).

Several studies have shown that the use of interactive media such as videos, games, and songs in dental health education can significantly improve children's knowledge and skills compared to conventional lecture methods (11–13). Therefore, community service activities that combine video, play, and singing are expected to be an innovative and effective method in improving the knowledge and tooth brushing skills of first-grade elementary school children. This activity also serves as a form of academic contribution in supporting the Healthy Living Community Movement (GERMAS) program and the School Dental Health Program (UKGS) which aims to improve the dental and oral health of children in Indonesia (14).

Knowledge and habits of maintaining dental hygiene from an early age will influence future health behaviors (15,16). Early dental health education helps children understand the importance of brushing their teeth properly, using fluoride toothpaste, and maintaining a healthy diet (17). Educational videos containing images, animations, and music can stimulate various senses so that the message is easier to understand and remember (18). Playing and singing are natural activities for children that can be used as learning media. Through educational games, children learn actively and enjoyably without feeling forced (19). In dental health education, songs about brushing teeth or role plays such as playing the dentist can increase children's involvement and understanding of healthy behavior (20). Education that involves elements of

entertainment (edutainment) can reduce learning boredom and increase children's participation in activities (21).

The primary target audience for this program is first-grade elementary school students at Elementary School 66 in Jambi City. Observations indicate that there is no routine, structured program for dental health education and group toothbrushing, and there is still a lack of knowledge and awareness of the importance of preventing dental caries. The impact of untreated dental caries is a decreased quality of life for children, school absences due to toothache, and the potential for more severe systemic infections. Community empowerment efforts through education and regular group toothbrushing training are a comprehensive solution to reduce caries rates from an early age. Caries prevention in children is crucial because it can cause pain, infection, eating and speech disorders, and reduce academic achievement.

METHODS

This community service activity used a participatory educational approach with interactive health education methods. This approach was chosen because elementary school children aged 6–7 years old more easily understand health messages through fun and concrete activities. Participatory educational methods allow students to be actively involved in the learning process through observation, direct experience, play, and singing. The activities were carried out in the form of small group education using educational videos, educational games, and songs about dental hygiene. This approach combines the principles of edutainment (education and entertainment) to increase children's interest in learning, involvement, and retention of health messages.

The activity stages consist of:

1. Preparation and Coordination: Coordination with the school (principal and class teachers) to determine the time and location of the activity.
2. Conducting an initial survey of dental health status (DMF-T/def-t), student knowledge, and behavior, and an inventory of toothbrushing facilities at the school.
3. Health Education: Delivering dental health education materials through videos, games, and singing.
4. Conducting a group toothbrushing practice with correct brushing techniques for first-grade elementary school students at partner schools.
5. Behavior Monitoring: Routinely observing student brushing behavior and evaluating understanding through pre- and post-tests.

RESULTS

Coordination with partners

This meeting aims to establish a common understanding, identify specific needs in the field, and secure full support for the smooth running of the program. This is crucial to ensure that the program not only stops at education but is also implemented sustainably.

Children's dental health education outreach

Following coordination, the team conducted a socialization and education session. This activity not only provided theoretical material but also provided participants with practical techniques and demonstrations on proper tooth brushing techniques. The material covered the causes of tooth decay, proper tooth brushing techniques for children, good nutrition for dental health, and how to identify dental problems early. Participants were very enthusiastic and actively demonstrated their high level of interest in the dental health education.

Brushing teeth together

At this stage, the knowledge shared began to be directly implemented with the children. The community service team collaborated with teachers to demonstrate the correct way to brush their teeth. Each child was also given a free toothbrush and toothpaste. The children appeared happy and enthusiastic about participating in each activity, making this learning experience an unforgettable one.

Mentoring, monitoring, and evaluation

The team regularly provides mentoring to children to ensure that the material provided is effectively implemented. Monitoring is carried out through regular school visits to directly observe children's tooth brushing practices and discuss challenges faced with teachers. At the end of the program, an evaluation is conducted using questionnaires to measure the level of understanding and behavioral changes. The evaluation results indicate a significant increase in knowledge and tooth brushing practices.

Program sustainability

To ensure a sustainable impact, the program is designed to be self-sustaining and sustainable. The team has established "Healthy Teeth Ambassadors" who are committed to continuing the program internally. Educational modules and teaching aids have also been handed over to schools as assets for future activities. Thus, this dental caries prevention innovation is expected to become more than a one-time activity, but an ongoing part of the school's curriculum and health program. This success demonstrates that synergy between academics, practitioners, and the community can create real positive change.

Table 1. The result of student knowledge and skills analysis

Variable	Mean	SD	*P-value*	N
Knowledge*				
Pretest	42,00	6,027		84
Post test	84,80	6,238	0,000	
Skill*				
Pretest	30,00	5,458		84
Post test	73,40	8,818	0,000	

Based on the table above, it is known that the average pretest result of students' knowledge is 42.00, while the average posttest result is 84.80. Based on the P value of 0.000 (p-value <0.05) it can be concluded that there is a significant difference in students' knowledge between the pretest and posttest results. The average value of students' pretest skills is 30.00. The average value of posttest results is 73.40. Based on the results of statistical tests, it can be seen that there is a difference in students' skill scores in the pretest and posttest with a p value of 0.000 <0.05.

DISCUSSION

Dental caries remains one of the most common chronic diseases among children worldwide and in Indonesia, imposing significant burdens on child health, school performance, and family economics. Educational interventions aimed at improving knowledge, attitudes, and oral-care behaviours are a core component of community-level prevention strategies. Evidence from systematic reviews and randomized or controlled school-based interventions shows that oral health education (OHE) reliably

improves knowledge and short-term oral-hygiene measures (e.g., plaque scores, brushing frequency), although the direct impact on caries incidence is more variable and often modest unless education is coupled with preventive clinical measures (sealants, fluoride programs) and repeated reinforcement (22).

School-based and community-based education formats (including teacher-led sessions, practical demonstrations, supervised toothbrushing, and creative educational media) have clearer benefits when they are longitudinal, involve caregivers/parents, and are embedded in school curricula rather than delivered as single, one-off sessions. Several trials demonstrate significant reductions in plaque and improvements in oral hygiene behaviours following repeated school-based programs, but caries reduction typically requires longer follow-up and often additional preventive measures (e.g., topical fluoride, fissure sealants). Socioeconomic factors (parental education, household income) modify the effectiveness of such interventions; children from lower-SES backgrounds may show smaller gains unless programs include family engagement and structural supports (23).

Digital and creative educational media — such as interactive digital modules, comics, and illustrated booklets — are effective at increasing children's knowledge, interest, and short-term behaviour change. Studies conducted in Indonesia and other settings have shown that locally-tailored comics or age-appropriate digital lessons increase awareness and toothbrushing practices among primary schoolchildren, making these low-cost tools appropriate for community service projects aiming for wide reach and cultural relevance. However, the translation from improved knowledge to long-term caries reduction again depends on repeated reinforcement and parental involvement (24).

Barriers to achieving sustained caries reduction through education alone include limited parental engagement, inconsistent school health policy integration, resource constraints for follow-up and materials, and competing health priorities. Health professionals and program planners report that parent behaviours, access to preventive treatment, and system-level support strongly influence outcomes; addressing these barriers by integrating education with simple clinical preventive services and policy support improves the chance of meaningful caries reduction (25).

CONCLUSIONS

The community service activity successfully increased children's knowledge and understanding of the importance of maintaining dental health through an innovative approach in the form of educational animated videos. Video media proved to be more engaging, enjoyable, and easier for children to understand than conventional methods, enabling the educational message to be conveyed effectively. The involvement of teachers in accompanying children during the activity strengthened the internalization of values and habits of maintaining dental health from an early age. This program made a positive contribution to preventing dental health problems, particularly tooth decay, in children by promoting clean and healthy lifestyles.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE
We hereby confirm that no artificial intelligence (AI) tools or methodologies were utilized at any stage of this study, including during data collection, analysis, visualization or manuscript preparation. All work presented in this study was conducted manually by the authors without the assistance of AI-based tools or systems.

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