The Use of Toothbrushing Educational Videos to Improve Oral Hygiene Among Students of Elementary School

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ABSTRACT
The use of educational videos can motivate students to improve oral hygiene by observing and practicing what they see and hear. Preliminary observations conducted on 10 fifth-grade students revealed that 8 of them had poor oral hygiene status, with an average score of 3.2. This study aimed to determine the effect of toothbrushing educational videos on oral hygiene among students of SDN 54 Banda Aceh. This study employed a quasi-experimental design using a one-group pretest–posttest approach. Data were collected through oral hygiene examinations conducted before and after the educational intervention on May 9 and May 15, 2024. The study population consisted of fifth-grade students, with a total sample of 48 students selected using random sampling. Data were analyzed using the paired t-test. Before the intervention, the majority of students (43 students; 89.6%) had moderate oral hygiene status. After receiving the toothbrushing educational video, most students (36 students; 75%) showed good oral hygiene status. The results indicated a significant difference before and after the intervention (p-value = 0.000), with a mean difference of 13.1. In conclusion, the use of toothbrushing educational videos significantly improves oral hygiene among students. Students are encouraged to enhance their knowledge by actively reading and learning about oral and dental health.
Keywords: toothbrushing; educational video; oral hygiene; elementary school students

INTRODUCTION
Oral and dental health is fundamentally interconnected with overall systemic health [1-5], as the condition of the oral cavity can significantly influence general well-being; unhealthy teeth and gums may lead not only to pain, discomfort, and functional limitations in chewing and speaking, but also to aesthetic concerns that can affect self-confidence and social interactions, and in more severe cases, may contribute to systemic infections or chronic health conditions; therefore, maintaining optimal oral hygiene is a critical component of preventive healthcare, as proper cleaning practices help preserve the health of teeth and supporting tissues, including the gums and periodontal structures, while appropriate preventive and curative treatments can effectively reduce the risk of oral diseases and their complications [6].

Children at the elementary school level represent a particularly vulnerable group with regard to oral and dental health problems due to their developmental stage, behavioral patterns, and limited awareness of proper hygiene practices; consequently, early detection, accurate diagnosis, and comprehensive management of oral diseases are essential to prevent long-term complications; throughout their primary education years, children should receive continuous and structured instruction on oral hygiene, especially regarding correct toothbrushing techniques, frequency, and duration; in this context, healthcare professionals have a crucial responsibility not only to provide clinical care but also to deliver effective health education [7-10], while parents play an equally important role in reinforcing these messages at home by supervising, guiding, and consistently reminding their children about the importance of maintaining good oral hygiene habits.

During the elementary school period, health education should be delivered in a manner that is appropriate to children's cognitive and behavioral development, ensuring that the information is not only understood but also applied in daily life; repeated instruction on proper oral hygiene practices, particularly correct toothbrushing procedures, is necessary to build lasting habits; healthcare providers must actively engage in educating children using clear, practical, and interactive approaches, while parental involvement remains essential in supporting, monitoring, and motivating children to adopt healthy behaviors; one effective strategy to enhance children's understanding and awareness of oral health is through well-designed health education interventions, which should utilize suitable methods and media that align with children's learning preferences, attention span, and developmental characteristics in order to maximize engagement and effectiveness [11,12].

The use of educational media, especially video-based interventions, has emerged as an effective approach for delivering health education to elementary school children, who are generally more responsive to visual and auditory stimuli; videos offer several advantages, including the ability to present dynamic images, sound, and motion simultaneously, which can enhance comprehension and retention of information; through videos, complex concepts can be simplified, procedures such as proper toothbrushing techniques can be clearly demonstrated step-by-step, and learning experiences can be made more engaging and interactive; in addition, videos can influence not only knowledge acquisition but also skill development and attitude formation, making them a comprehensive educational tool; previous studies have also indicated that different forms of media, such as comics and animated films, vary in their effectiveness in improving students' awareness and behavior related to dental caries, with the design, structure, and presentation of content playing a significant role in determining outcomes, and animated videos in particular are considered highly effective because they can visually represent real-life situations in an appealing and easily understandable manner [13].

National data further highlight the urgency of addressing oral health problems among children; according to the Indonesian Basic Health Research (2018), dental caries, cavities, and associated pain are the most prevalent oral health issues, affecting 45.3% of the population, while 14% of individuals experience gum swelling or abscesses, indicating a substantial burden of oral disease; at the regional level, the prevalence of oral health problems reaches 56% in Aceh Province, reflecting a significant public health concern, and in Banda Aceh City specifically, approximately 34% of children aged 6–14 years are reported to have dental caries, demonstrating that school-aged children are among the most affected groups and require targeted interventions [14].

Local data from healthcare and school settings further reinforce this issue; records from the Jeulingke Public Health Center in Banda Aceh from January to December 2023 indicate that there were 113 cases of dental caries among children aged 6–12 years, suggesting a consistent pattern of oral health problems within this age group; moreover, school-based screening conducted among students in grades 1–6 at SDN 54 Banda Aceh, which is located within the service area of the same health center, identified 166 students with dental caries, with the highest prevalence observed among fifth-grade students, totaling 56 cases; this high prevalence may be attributed to behavioral factors, including frequent consumption of sugary and sticky foods such as candy, chocolate, and ice cream, which are commonly available in school canteens, as well as inadequate oral hygiene practices, particularly incorrect toothbrushing techniques; preliminary observations conducted by the researcher revealed

that eight out of ten fifth-grade students had poor oral hygiene status, with an average score of 3.2, indicating a significant need for intervention; furthermore, interviews with students showed that many of them lacked basic knowledge regarding the correct method, appropriate duration, and proper timing of toothbrushing, highlighting gaps in both knowledge and practice; based on these findings, this study aims to evaluate the effect of using toothbrushing educational videos as an intervention to improve oral and dental hygiene among students of SDN 54 Banda Aceh.

METHODS

This study was conducted in May 2024 at SDN 54 Banda Aceh, with data collection carried out on May 9 and May 15, 2024, in order to assess changes in oral hygiene status before and after the intervention. The research employed an analytical method with a quasi-experimental approach, utilizing a one-group pretest–posttest design, which allowed the researchers to compare outcomes within the same group of participants prior to and following the intervention without the use of a control group [15-19].

The study population consisted of all fifth-grade students at SDN 54 Banda Aceh, representing a group considered vulnerable to oral health problems due to behavioral and developmental factors. The sample size was determined using the Slovin formula to ensure adequate representation, resulting in a total of 48 students selected as research participants. The sampling technique applied was random sampling, which provided each member of the population an equal opportunity to be included in the study, thereby reducing selection bias and improving the generalizability of the findings within the target population.

The independent variable in this study was the provision of a toothbrushing educational video as an intervention. The video was designed to deliver structured and engaging health education content, including demonstrations of proper toothbrushing techniques, recommended frequency and duration of brushing, and key messages related to maintaining oral and dental hygiene. The intervention aimed to enhance students' knowledge, attitudes, and practical skills through visual and auditory learning stimuli that are appropriate for elementary school children. The dependent variable was the level of oral and dental hygiene among the students, which was measured quantitatively using the Simplified Oral Hygiene Index (OHI-S). Data collection was performed through direct clinical examination using a diagnostic set to ensure accurate assessment. The OHI-S index evaluates oral hygiene status based on the presence of debris and calculus on tooth surfaces, and the results were categorized into three levels: good (score 0–1.2), moderate (score 1.3–3.0), and poor (score 3.1–6.0). Measurements were conducted both before the intervention (pretest) and after the intervention (posttest) to determine the extent of change in oral hygiene status attributable to the educational video.

The collected data were processed and analyzed using SPSS version 22. The analysis included descriptive analysis to describe the distribution of variables [20-22], as well as bivariate analysis to examine the relationship between the intervention and the outcome variable. The statistical test applied was the paired t-test, which is appropriate for comparing mean differences between two related measurements within the same group [23]. A significance level of 5% ($\alpha = 0.05$) was used to determine whether the observed differences before and after the intervention were statistically significant, thereby allowing conclusions to be drawn regarding the effect of the toothbrushing educational video on students' oral hygiene.

RESULTS

Based on the research conducted on May 9 and May 15, 2024, among fifth-grade students of SDN 54 Banda Aceh, the frequency distribution data of oral and dental hygiene status before and after the intervention are presented as follows.

Table 1. Distribution of oral and dental hygiene status before the provision of toothbrushing educational video

No	Category	Frequency	Percentage
1	Good	2	4.1
2	Moderate	43	89.6
3	Poor	3	6.3

Table 2. Distribution of oral and dental hygiene status after the provision of toothbrushing educational video

No	Category	Frequency	Percentage
1	Good	36	75
2	Moderate	12	25
3	Poor	0	0

Table 3. The results of paired samples t-test before and after the provision of toothbrushing educational video

Phase	Mean	Standard deviation	Mean difference (p)
Before	20.0625	7.28860	13.1 (0.000)
After	6.9167	5.81207	

Based on Table 1, it can be observed that prior to the intervention, the majority of students were categorized as having moderate oral and dental hygiene, accounting for 89.6% of the total respondents. Only a small proportion of students demonstrated good oral hygiene (4.1%), while 6.3% were classified as having poor oral hygiene. These findings indicate that, before receiving the educational video intervention, most students had not yet achieved optimal oral hygiene status, highlighting the need for effective educational strategies to improve their knowledge and practices.

Based on Table 2, there is a substantial improvement in oral and dental hygiene status following the intervention. The majority of students (75%) achieved a good category, while 25% remained in the moderate category, and no students were classified as having poor oral hygiene. This shift demonstrates a marked improvement compared to the pre-intervention condition, suggesting that the educational video had a positive impact on students' oral hygiene practices and awareness.

Based on Table 3, the results indicate a significant decrease in the mean oral hygiene score after the intervention, from 20.0625 in the pre-test to 6.9167 in the post-test. This reduction reflects an improvement in oral hygiene status, as lower scores indicate better hygiene conditions according to the measurement index used. The paired t-test analysis revealed a statistically significant difference between pre-test and post-test scores, with a p-value of 0.000 ($p < 0.005$), confirming that the intervention had a significant effect. The mean difference of 13.1 further emphasizes the magnitude of improvement observed among the students after watching the toothbrushing educational video, indicating that this method is effective in enhancing oral hygiene among elementary school students.

DISCUSSION

The results of the paired sample t-test indicate a statistically significant difference in the level of oral hygiene before and after the implementation of the toothbrushing educational video, demonstrating that the intervention had a meaningful impact on improving students' oral hygiene status. This finding suggests that exposure to structured and visually engaging instructional media can effectively enhance students' understanding and practice of proper oral hygiene behaviors, as reflected in the observed improvement following the intervention. In practical terms, students showed a clear transition from less optimal oral hygiene conditions toward more favorable outcomes after participating in the video-based learning activity.

From the researcher's perspective, the improvement in oral hygiene status can be attributed to the enhancement of students' baseline knowledge regarding oral health maintenance. Prior to the intervention, many students had limited understanding of correct toothbrushing techniques, appropriate timing, and the importance of maintaining oral hygiene on a daily basis. Through the educational video, students were able to observe proper practices in a structured and repetitive manner, enabling them to internalize and apply these behaviors more effectively [24]. As a result, students demonstrated better awareness and adherence to recommended oral hygiene practices, which subsequently contributed to the improvement in their oral hygiene status.

Before the intervention, most students were generally categorized as having a moderate level of oral hygiene, indicating that while some basic practices may have been performed, they were not carried out consistently or correctly. After being exposed to the educational video, a substantial shift was observed, with the majority of students moving into the good category of oral hygiene. This change reflects not only an increase in knowledge but also an improvement in practical skills and behavioral habits related to toothbrushing, highlighting the effectiveness of audiovisual learning in influencing both cognitive and behavioral domains [25].

The effectiveness of video as an educational medium is supported by its ability to present learning material in a comprehensive, engaging, and easily understandable manner. Video-based learning allows the integration of visual and auditory elements, making the content more attractive and interactive for students, especially those at the elementary school level. In addition, video media can be controlled, replayed, and used repeatedly, enabling learners to revisit important information and reinforce their understanding. It also stimulates multiple senses simultaneously, which enhances comprehension and retention of information, and can be utilized as a discussion tool in group learning settings, thereby increasing its educational value [26].

Furthermore, previous studies have demonstrated that the use of video media in health education interventions can produce significant improvements in oral hygiene indicators, particularly when comparing conditions before and after educational exposure. These findings reinforce the notion that audiovisual approaches are highly effective in promoting behavioral change in children. Through video, children are not only able to receive information passively but also actively observe and imitate demonstrated behaviors, which encourages them to practice proper toothbrushing techniques in their daily routines [27,28].

Video as a learning medium combines both audio and visual elements, making it particularly effective in capturing attention, illustrating detailed processes, and simplifying complex concepts. This dual-sensory approach enhances students' ability to understand and retain information. Additionally, the use of visually appealing elements, such as animations and cartoon-based representations, further increases engagement among children, as they tend to prefer colorful and dynamic content over static or text-based materials. The integration of images and narration in educational media not only stimulates children's imagination but also improves memory retention and learning motivation, thereby making the educational process more effective and enjoyable for young learners [6].

Despite these positive findings, this study has several limitations that should be acknowledged. First, the use of a one-group pretest–posttest design without a control group limits the ability to fully attribute the observed improvements solely to the intervention, as external factors such as prior exposure to information, peer influence, or parental guidance may also have contributed to the outcomes. Second, the relatively short duration between the pretest and posttest measurements restricts the ability to assess the long-term sustainability of the behavioral changes observed among the students. Third, the study was conducted within a single school setting with a limited sample size, which may affect the generalizability of the findings to broader populations with different socio-demographic characteristics. Additionally, the measurement focused primarily on clinical oral hygiene status and did not extensively explore changes in knowledge, attitudes, or behavioral consistency over time.

Therefore, future studies are strongly recommended to address these limitations by employing more robust research designs, such as randomized controlled trials with comparison groups, to strengthen causal inference. Longitudinal studies with extended follow-up periods are also needed to evaluate the durability of the intervention's effects on oral hygiene behavior. Moreover, future research could incorporate a larger and more diverse sample across multiple schools or regions to improve external validity. It is also important to explore the integration of video-based education with other interactive or participatory methods, such as demonstrations, peer education, or parental involvement programs, in order to maximize the effectiveness of oral health promotion among children.

CONCLUSION

In conclusion, the toothbrushing educational video effectively improved students' oral hygiene, shifting it from generally moderate to predominantly good. This indicates that video-based education is beneficial in enhancing oral hygiene practices among elementary school students.

Ethical consideration, competing interest and source of funding

-In terms of research ethics, this study was conducted in accordance with established ethical standards and received formal ethical approval, as indicated by the ethical clearance number DP.04.03/12.7/104/2024. This approval ensured that the research procedures adhered to principles such as respect for participants, informed consent, confidentiality, and the protection of participants' rights and well-being throughout the study.
-There is no conflict of interest related to this publication.
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