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The Influence of Education Using Animated Videos on Dental and Oral Health Behavior in Elementary School Children

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ABSTRACT

Purpose of the study: The purpose of this study was to determine the effect of animated video education on dental and oral health behavior in elementary school-aged children.

Methodology: This research is a quantitative study employing a quasi-experimental one-group pretest-posttest design. The population consists of all students in grades 1 through 6 at Public Elementary School 1 Tunggulrejo, totaling 66 individuals. A sample of 57 students was selected using a probability sampling method with a proportional random sampling technique. The independent variable is an educational intervention using animated videos, while the dependent variable is dental and oral health behavior. Data were collected using a dental and oral health behavior questionnaire. The data analysis process included editing, coding, scoring, and tabulating, and was tested using the Wilcoxon signed-rank test.

Main Findings: The study found that prior to the intervention, 50.9% of students demonstrated poor dental and oral health behavior. After being given animated video education, 94.7% of students showed good behavior. The Wilcoxon test results indicate a significant improvement with a p-value of 0.000 ($p < 0.05$), confirming that animated video education had a statistically significant positive effect on students' health behavior.

Novelty/Originality of this study: The novelty of this study lies in the use of animated videos as interactive educational media that are more effective than conventional methods in improving children's dental and oral health behavior. With a narrative visual approach that is appropriate to cognitive development, this study contributes to technology-based health education strategies in schools and families.

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1. INTRODUCTION

Oral health in children is an important aspect during development. Dental health problems, such as cavities and gum disease, often arise due to lack of understanding and proper care [1]-[3]. Efforts to increase children's awareness and behavior in maintaining dental health need to be done early on so that these positive habits can continue into adulthood. Dental and oral health problems in elementary school-aged children are still a major problem because behavioral habits in maintaining teeth and mouths are still often wrong, such as still often

consuming foods high in sugar and improper tooth brushing methods [4]-[6]. Dental and oral health behavior has a significant impact on a person's quality of life, especially during a child's growth period. When children practice good dental and oral health behaviors, such as brushing their teeth regularly, cleaning their teeth properly, and avoiding sweet foods, they tend to avoid various dental and oral health problems.

The prevalence of dental and oral health problems in Indonesia according to the World Health Organization (WHO, 2023) is around 90% of the population has experienced dental disease as much as 78%, namely 573 million children suffer from untreated dental disease [7]-[9]. The prevalence of data from the Ministry of Health of the Republic of Indonesia (Kemenkes of the Republic of Indonesia, 2023) is around 80-90% of dental and oral health problems experienced by children under the age of 18, namely elementary school children. This problem includes conditions such as dental caries. This data shows an urgent need for increased efforts to prevent and treat dental health in the community, especially in school-age children. In East Java Province, around 85% of school-age children experience dental and oral health (East Java Health Office, 2023) including problems with damaged and decayed teeth 49.88%, broken teeth 30.67%, missing teeth due to tooth extraction, 2.40% of teeth filled or filled due to cavities, 18.48% infected teeth. In Tuban Regency, dental and oral diseases are still relatively high, namely 45.79%, including children aged 18.42% with dental caries being the main problem, (Tuban Regency Health Office, 2023) [10]-[12]. Based on a preliminary study conducted in 2024 through interviews with 10 students at Public Elementary School 1 Tunggulrejo, Tuban District, East Java, it was found that 7 out of 10 students exhibited improper behaviors related to dental and oral health. These included incorrect toothbrushing techniques, inadequate brushing frequency, and habits such as frequent consumption of sugary foods and drinks [13]-[15].

Oral health problems are often caused by several factors including behavior, environment, and lack of education. The habit of consuming sweet foods and drinks has been proven to be one of the dental health problems, especially in children. Improper brushing habits and brushing techniques can also cause errors in dental and oral care[16], [17]. One of the causes of children not maintaining dental and oral hygiene is the low knowledge of oral and dental hygiene which has an impact on the appearance of oral and dental health. Lack of social awareness, behavior and attitudes in maintaining dental and oral health can affect the appearance of teeth and mouth. As a result, it can increase dental and oral diseases that have an impact on life. Therefore, to overcome this problem, education through animated videos can be an effective solution in improving behavior and knowledge, especially in elementary school children [16]-[18].

According to Mayer's 2023 theory, visual learning in the context of health education is effectively carried out with animated videos as an educational tool for children. Providing information to improve dental and oral health behavior can be done through educational films. The selection and use of media are important components. The most effective sense for transmitting knowledge to the brain is sight (around 75% to 87%), while 13% to 25% of human knowledge is obtained and transmitted through other senses [19]-[21]. A study states that counseling using animated videos can bring changes to students' knowledge, attitudes, and behavior, helping them understand material or knowledge better and be more focused because hearing and sight are used simultaneously. It is hoped that children can focus on watching videos. Researchers hope that by watching and making this animated video, children will find it easier to take care of themselves and brush their teeth in their daily lives, because dental and oral health is important for elementary school children. So researchers are interested in taking the research title "The Effect of Education Using Animated Videos on Dental and Oral Health Behavior in Elementary School Children [22]-[24].

Based on previous research that has been done, there is a gap in this study. As in the study conducted by Ulfah Nur Wulandari () which focused on improving children's knowledge and technical skills in brushing their teeth, without measuring behavioral aspects as a whole [27], [28]. Then the previous study conducted in 2023 () which focused on the use of animated videos to improve children's preparedness in facing the tsunami disaster with a wider range of variables, namely knowledge, attitudes, and actions, and using a stronger research design through a control group. While in this study the focus of the study emphasizes the influence of education using animated videos on the dental and oral health behavior of elementary school children. So the main gap lies in the difference in focus of the indicators measured, the absence of a control group in the first two studies, and the different educational contexts, namely dental health versus disaster preparedness.

Therefore, based on the gap analysis, this study presents a novelty in the form of a focus on educational intervention using animated videos to build comprehensive dental and oral health behavior in elementary school children, not only on the aspects of knowledge or technical skills alone [27]-[29]. Different from previous studies that focused more on increasing knowledge or skills in brushing teeth specifically without evaluating behavioral changes comprehensively, this study measures the impact of visual-based education on changes in children's real behavior in maintaining dental and oral health (good, sufficient, or lacking). In addition, this study also highlights the importance of educational media that is in accordance with children's cognitive development, namely through a visual-narrative approach in the form of animated videos, which has not been widely used systematically in dental health education in the context of elementary schools in areas with a high prevalence of dental problems [32]-[34]. Thus, this study contributes to the development of technology-based health education strategies that are

applicable and effective in elementary school environments, especially in forming healthy living habits from an early age.

This study has important implications in the field of child health education, especially in the development of innovative learning methods that are in accordance with the cognitive development stage of elementary school children. By utilizing animated videos as educational media, this study not only provides new insights into the effectiveness of visual media in improving dental and oral health behavior, but also opens up opportunities for the application of technology in health promotion programs in schools more widely [35], [36]. The results of this study are expected to be used as a reference by educators, health workers, and policy makers in developing interactive educational strategies that have a real impact on changes in children's healthy living behavior.

Dental and oral health problems are still a serious issue in elementary school children in Indonesia, with a high prevalence due to low awareness and healthy living behavior from an early age. Previous studies generally only emphasize the knowledge or technical skills of brushing teeth, but not many have examined behavioral changes as a result of educational interventions [37], [38]. On the other hand, conventional educational methods are often less interesting and ineffective for children, so a new approach is needed that is more in line with their characteristics and interests. Therefore, this study is important to answer the need for an effective, enjoyable educational model that has an impact on children's health behavior in a sustainable manner.

The purpose of this study was to determine the effect of education using animated video media on changes in dental and oral health behavior in elementary school children. This study aims to test the effectiveness of animated videos as a learning medium that can increase awareness and form positive habits in maintaining dental and oral hygiene, as well as contribute to health promotion and prevention efforts in elementary school environments [37]-[39].

2. RESEARCH METHOD

Based on the purpose of this study, which is to determine the effect of education using animated videos on dental and oral health behavior in elementary school children, this study uses a quantitative approach using the quasi-experimental one group pretest-posttest design method, namely a type of quasi-experimental research (quasi-experimental) where there is only one group of participants, without a control group, who are given treatment or intervention [40]-[42]. In this design, measurements are taken before (pretest) and after (posttest) the intervention to see the changes that occur. With this approach, research can provide strong evidence about the effect of animated video education on dental and oral health behavior in children.

Population is a complete group or collection of all individuals, objects, or elements that have certain characteristics or properties that are relevant to the study of a unit of subjects or individuals at a certain time and location that have certain characteristics that will later be observed or studied[45]. The population in this study consisted of all students in grades 1 through 6 at Public Elementary School 1 Tunggulrejo, totaling 66 individuals. The sample is a representation of the population and is used to make inferences or conclusions about the population as a whole. The use of samples is generally done for efficiency, cost, and time constraints in conducting research. A good sample and selected randomly or with an appropriate method to avoid bias. In this study using the proportional random sampling technique, Sampling with the slovin formula to determine the sample size as follows.

$$n = \frac{N}{1 + N\,(e)^2} \qquad ...(1)$$

Information :
n = Number of samples
N = Population Size
e = Error rate

$$n = \frac{66}{1 + 66\,(0{,}05)^2}$$

$$n = \frac{66}{1 + 66\;0{,}0025}$$

$$n = \frac{66}{1 + \;0{,}165}$$

$$n = \frac{66}{1{,}165}$$

n = 56.65 rounded up to 57

The data collection technique in this study was carried out in three stages, the first was a pre-test, carried out by assessing the behavior of students before being given education, then data collection was carried out with dental health education treatment with animated videos, and the last was data collection by conducting a post-test by assessing the behavior of students after being given education [46], [47].

Several instruments were used to collect data in this study. The first was the Dental and Oral Health Education Session Plan (SAP), which served as a guideline for delivering educational outreach. This instrument involved the use of animated videos designed to provide dental and oral health education to elementary school students. Then the Dental and Oral Health Behavior Questionnaire in Elementary School Children in this study, the questionnaire will be specifically designed to measure dental and oral health behavior in elementary school children. After receiving dental and oral health education (in the form of animated videos). This questionnaire aims to assess changes in children's behavior and understanding of dental and oral health. Validity testing is a testing step carried out on the contents of an instrument with the aim of measuring the accuracy of the instrument used in a study [48], [49]. This test is carried out using Pearson's correlation to each item in the questionnaire. The results of the analysis show that most items have significant correlation values at the 0.01 and 0.05 levels. This shows that the instrument used is valid and appropriate for use in this study. Reliability testing is an instrument used in consistency research to obtain information that is used can be trusted as a data collection tool and is able to reveal actual information in the field. To measure the internal instrument, a reliability test was conducted using Cronbach's Alpha. The results of the reliability test showed a Cronbach's Alpha value of 0.919 for the 15 items used in the questionnaire. This value is far above the threshold of 0.7, so it can be concluded that the research instrument has a very good level of reliability.

The data analysis technique used in this study was carried out after the validity and reliability of the instrument were guaranteed, data analysis was carried out using the Wilcoxon test. This test is used to analyze the difference in pre-test and post-test scores in the same group, in order to measure the effect of education using animated videos on dental and oral health behavior. The Wilcoxon test was chosen because the data has an ordinal nature and is not normally distributed [49], [50]. The results of the Wilcoxon test will be the basis for determining the success of educational interventions in improving dental and oral health behavior in elementary school children. Univariate analysis is an analysis carried out to analyze each variable from the research results. Univariate analysis aims to explain the analysis of each variable descriptively from the independent variable to determine the results of dental and oral health behavior data using a questionnaire. Univariate analysis is carried out using the formula :

$$P = \frac{F}{N} \text{ x } 100\% \qquad \ldots(2)$$

Information :
P : Percentage of categories
F : Category frequency
N : Number of respondents

The univariate analysis used in this study is, first, the analysis of children's behavior before being given an educational intervention on dental and oral health (animated video). Second, the analysis of children's behavior after being given an educational intervention on dental and oral health (animated video).

Bivariate analysis is used to see the influence between 2 variables, namely the influence of education using animated videos on dental and oral health behavior in elementary school children. The test used is the Wilcoxon test using SPSS software. If the significance value $p < \alpha$ (0.05), then there is a significant influence between education using animated videos on dental and oral health behavior in elementary school children. Conversely, if $p > \alpha$ (0.05), there is no significant influence.

The procedure of this research began with the researcher determining the research title and consulting with the academic supervisor. This was followed by preparing the research proposal and obtaining a research permit letter from ITSKes ICME Jombang, addressed to the principal of Public Elementary School 1 Tunggulrejo, Tuban. After obtaining permission, the researcher explained the purpose of the research to prospective respondents and asked them to sign an informed consent form. Furthermore, initial behavioral measurements were carried out with a questionnaire before the intervention, which was in the form of dental and oral health education through animated videos for 60 minutes. After the intervention, re-measurements were carried out with a questionnaire, followed by data processing and preparation of a research report.

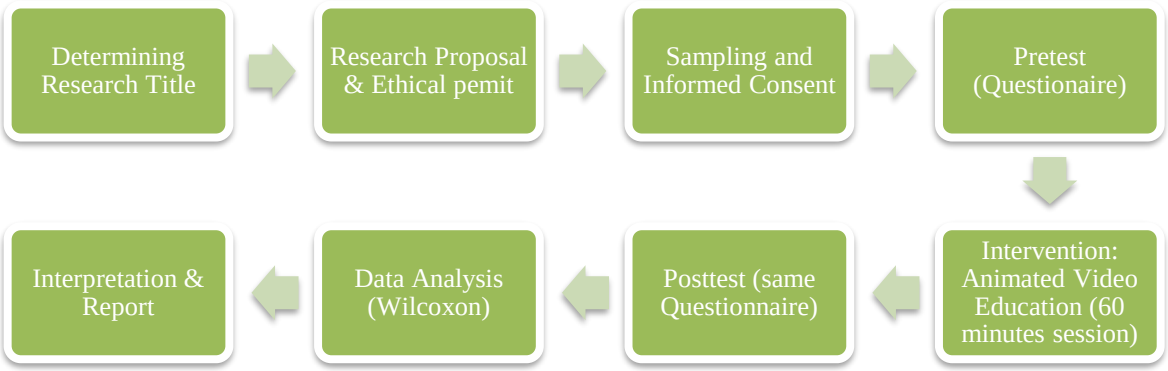

Chart 1. Research procedurer

3. RESULTS AND DISCUSSION

3.1. Result

Dental and oral health behavior before being given education

Table 1. Frequency distribution of dental and oral health behavior before being given education in December 2024

No.	Pre Test	Frequency	Precentage (%)
1.	Good	0	0%
2.	Enough	28	49,1%
3.	Less	29	50,9%
Total		57	100%

Based on the table of children's behavior before education was given to students, it shows that half of the respondents had poor behavior, namely 29 students (50.9%). Dental and oral health behavior after being given education.

Table 2. Frequency distribution of dental and oral health behavior after being given education in December 2024.

No.	Post Test	Frequency	Precentage
1.	Good	54	94.7%
2.	Enough	3	5..3%
3.	Less	0	0%
Total		57	100%

Based on table 2, children's behavior after being given education to students shows that almost all of the respondents have good behavior, namely 54 students (94.7%). Cross tabulation of the influence of education using animated videos on dental and oral health behavior in school-age children.

Table 3. Frequency distribution of respondents by age in December 2024

Behavior	Pre test	Post test	Total
Good	0 (0%)	54 (94.7%)	54 (47.4%)
Enough	28 (49.1%)	3 (5.3%)	31 (27.2%)
Less	29 (50.9%)	0 (0%)	29 (25.4%)
Total	57	57	114 (100%)
Wilcoxon Asymptotic Significance Test (2-sided) = 0.000			

Based on the results of the study, it shows that half of the students of SDN 1 Tunggulrejo before being given education on dental and oral health behavior were lacking, namely 29 respondents (50.9%), then after being given education on dental and oral health behavior, almost all showed good, namely 54 respondents (94.7%). The results of the Wilcoxon Statistical Test obtained a significant value of 0.000 or <0.05, so H1 is accepted, which means that there is an influence of Education Using Animated Videos on Dental and Oral Health Behavior in Elementary School Children at State Elementary School 1 Tunggulrejo, Tuban Regency.

3.2. Discussion

3.2.1. Dental and Oral Health Behavior Before Being Given Animated Video Education

The results of the study of dental and oral health behavior at State Elementary School 1 Tunggulrejo before being given animated video education based on table 5.4 show that half of them have less behavior as many as 29 students (50.9%). According to researchers, dental and oral health behavior in girls at the elementary school level shows significant deficiencies. Girls ignore the information received a little, they often prefer sweet foods and sweet drinks, which can increase the risk of tooth decay. Lack of knowledge about the impact of eating sweet drinks, proper tooth brushing techniques and schedules for visits to the dentist so that this can cause them to ignore dental and oral health. In addition, the influence of peers and social media that often display unhealthy foods and drinks can also influence their choices. Factors that influence dental and oral health behavior before being given education at SDN 1 Tunggulrejo are gender based on table 5.2 showing that most are female (54.4%).

Dental and oral health behavior in elementary school children, especially girls, several studies show that girls tend to often ignore information related to eating and drinking sweets can cause toothache. This can be caused by various factors, including the lack of effective dental health education at school and at home, as well as social influences that may distract them from dental health care. Girls are often influenced by social and cultural norms that can affect their behavior in maintaining dental health. For example, if their environment does not provide good examples in terms of oral hygiene, they may not feel motivated to have good brushing habits. In addition, girls may be more focused on other aspects of physical appearance, thus neglecting dental and oral health.

The results of the questionnaire analysis before being given education showed that the total score of high-sugar food and beverage consumption behavior was 121, with an average per respondent of 24.2. This fact is supported by the questionnaire analysis, where in questions 3, 5, and 7, most students were unable to answer correctly. These questions relate to the frequency of brushing teeth, the correct way to brush teeth, and patterns of consuming sweet foods. According to researchers, the low level of dental and oral health behavior of students is caused by a lack of basic knowledge about healthy habits. The lack of education that focuses on the importance of dental health behavior in the school and home environments also contributes to less than optimal behavior. According to researchers, this shows the need for interactive and interesting educational methods, such as the use of animated video media, to increase children's interest in learning dental health habits.

Low dental health behavior is often related to minimal support from the surrounding environment, including parents and teachers. Therefore, the use of animated video-based educational media can be an effective solution to overcome this problem, because children are more motivated to pay attention to information presented in an interesting format. Factors that influence dental and oral health behavior before being given education are the age of respondents based on table 5.3 showing that almost half are 9-10 years old (36.6%). According to researchers, the age of elementary school children, especially between the ages of 9 and 10 years, is a developmental phase in the formation of health habits, including dental and oral health behavior. At this age, children are in a transitional stage, but their understanding of the importance of maintaining oral hygiene is still in the process of development. At this age, children are often exposed to a variety of food and drink choices, especially those that contain high sugar, such as candy, soda, and fast food. Excessive consumption of these sweet foods can increase the risk of tooth decay, if not balanced with good brushing habits.

Children aged 9-10 years are in a crucial developmental phase, where they begin to show changes in various aspects of life, including in terms of eating habits and self-care. At this age, children are often influenced by the social environment and habits of their peers, which can encourage them to consume foods and drinks that are high in sugar and acid, such as candy, chocolate, and soda. This habit, if not balanced with a good understanding of the importance of maintaining dental and oral health, can cause dental health problems, such as caries and cavities. 5.2.2 Dental and Oral Health Behavior After Being Given Animated Video Education.

The results of the study of dental and oral health behavior at State Elementary School 1 Tunggulrejo after being given animated video education based on table 5.5 show that most of the respondents have good behavior, amounting to 54 students (94.7%). According to researchers, dental and oral health is part of children's general health. At elementary school age, especially for girls, they are very susceptible to dental problems caused by eating and drinking sweets. Therefore, it is important to provide proper education about dental and oral hygiene from an early age. Educational programs that utilize animated videos have shown promising results in improving dental and oral health behavior among elementary school girls. The animated videos used in this program are not only informative, but also fun and interesting with cute characters and entertaining stories, children can easily connect with the material presented. Factors that influence dental and oral health behavior after being given education at SDN 1 Tunggulrejo are gender based on table 5.2 showing that most are female (54.4%).

Effective oral health education is essential to improve children’s health behavior, especially girls in elementary school. The use of animated videos as an educational medium can have a significant positive impact on their oral health knowledge and behavior. Animated videos, with a combination of text, images, sound, and motion effects, are able to attract children’s attention and make the material more interactive and easy to

understand. After participating in an educational program using animated videos, girls showed a clear improvement in their understanding of the importance of maintaining oral health. They became more aware of good practices, such as brushing their teeth regularly, avoiding sweet foods, and having regular dental check-ups with a dentist. This increase in knowledge not only impacts their behavior but also contributes to improving their overall oral health.

Based on the results of the questionnaire conducted after the education, a total score of 178 was obtained with an average of 35.6. This fact is supported by questionnaires Questions 3, 7, and 10 showing an increase in students' knowledge in brushing their teeth in the right way and at the right time (after eating and before going to bed). Before education, only 40% of students knew how to brush their teeth properly, but after education, it increased to 95%. Questions 5 and 8 showed a decrease in the consumption of sweet foods. Previously, 60% of students consumed sweet foods more than twice a day, but after education, this figure dropped drastically to 10%. Question 9 showed an increase in the frequency of dental check-ups with the doctor. Before education, only 30% of students routinely checked their teeth, but after education, it increased to 85%. This shows that the education provided has a positive impact on increasing the behavior of brushing teeth properly. Indicators of good behavior can be seen from children's understanding of the correct brushing technique, such as the direction of brushing, duration, and frequency of brushing. According to researchers, it is believed that animated videos as educational media are an effective way to improve dental and oral health behavior in elementary school children. Children are more interested and focused on visual content, so educational materials are easier to understand and apply in everyday life. This is in line with the research hypothesis, which shows a significant influence of animation-based education on health behavior.

Visual learning using animated videos can improve students' understanding because the combination of images, movements, and sounds stimulates the visual and auditory senses simultaneously. This allows students to remember information longer and apply it in real actions. Animated media is effective in changing health behavior because it attracts children's attention and makes it easier for them to understand complex material. In addition, health education using animated videos can improve good behavior, such as brushing teeth properly, because students feel entertained while learning.

Factors that influence dental and oral health behavior after being given education are the age of respondents based on table 5.3 showing that almost half are 9-10 years old (36.6%). According to researchers in the current digital era, technology plays an important role in education, including in the health sector. One interesting example is the use of animated videos to provide education about dental and oral health to elementary school children aged 9-10 years. Based on experience and observation, it can be concluded that the dental and oral health behavior of these children has increased significantly after they received education through this interesting media.

Elementary school children aged 9-10 years are in an important phase of cognitive and emotional development, where they begin to understand the concept of health and personal hygiene [51], [52]. Their dental and oral health behavior can be significantly improved through interesting educational methods, such as the use of animated video media. This media not only presents information in a fun way, but also combines visual and audio elements that can strengthen children's memory and understanding of the material presented. Animated videos are able to present with the presentation of cute characters and interesting stories in the video can create greater interest, making children more focused and motivated to learn. In addition, the use of simple language and clear illustrations helps children understand the importance of maintaining dental and oral health, as well as the steps that need to be taken to prevent dental problems.

After being given education through animated videos, children tend to show positive changes in their behavior, such as brushing their teeth more diligently, avoiding sweet foods, and better understanding the importance of regular visits to the dentist[53], [54]. The results of the study showed a significant increase in dental health knowledge and practices among students, as reflected in the pretest and posttest results. Thus, the use of animated video media as an educational tool has proven effective in improving children's dental and oral health behavior, making them more aware and responsible for their dental health.

3.2.2. The Influence of Education Using Animated Videos on Dental and Oral Health Behavior

The results of the study based on table 5.6 show that half of them before being given education on dental and oral health behavior were lacking as many as 29 respondents (50.9%), and almost all of them after being given education on dental and oral health behavior were good as many as 54 respondents (94.7%). The results of the Wilcoxon Statistical Test obtained a significant value of 0.000 or <0.05, so H1 was accepted, which means that there is an effect of Education Using Animated Videos on Dental and Oral Health Behavior in Elementary School Children at State Elementary School 1 Tunggulrejo, Tuban Regency.

According to researchers, the use of animated videos as an educational tool has a very significant influence on dental and oral health behavior in elementary school children. In the digital era that is full of various visual media, children tend to be more interested in interactive and fun content. Animated videos are able to present information in a way that is not only interesting but also easy for children to understand. With cute characters and

interesting stories, this video can convey important messages about dental health, such as how to brush your teeth properly, the importance of choosing healthy foods, and routine habits to maintain oral hygiene.

In addition, animated videos can make the learning process more fun. Children are not only taught about the importance of taking care of their teeth, but they are also entertained and educated. This can improve their retention of the information presented, making them more likely to implement good habits in their daily lives. For example, after watching a video showing their favorite character brushing their teeth, children may be more motivated to do so themselves. Animated videos can also be an effective tool to raise awareness of often overlooked dental health issues. By presenting relatable situations, such as characters experiencing dental problems due to not taking care of their teeth, children can better understand the consequences of bad habits. This can also encourage them to talk to their parents about the importance of regular visits to the dentist and following the health advice given. In the context of education, collaboration between parents, teachers, and health workers can also be strengthened through the use of these animated videos. By involving parents in the education process, they can better understand how to support their children in maintaining dental and oral health.

Effective health education is a key component in shaping healthy behavior, especially in elementary school-aged children. At this stage of development, children begin to form habits that will affect their future health. However, the main challenge in teaching children about the importance of maintaining dental hygiene is their lack of interest and understanding of information delivered conventionally. Therefore, the use of animated video media as an educational tool is an interesting and innovative solution.

Animated videos have strong visual appeal and are able to convey messages in a fun way. By combining story elements, interesting characters, and dynamic visuals, animated videos can create interactive and entertaining learning experiences. Research shows that children are more likely to engage and be motivated to follow positive behaviors, such as brushing their teeth, after watching an engaging educational video. This is due to the ability of animated videos to present information in a more engaging way than traditional methods, such as lectures or textbooks.

One of the main advantages of animated videos is their ability to convey complex information in a simple and easy-to-understand manner. For example, the concept of how to brush your teeth properly, the importance of maintaining dental health, and the effects of bad habits such as consuming sugary foods can be explained clearly through animation. By using relatable characters and familiar situations, children can more easily understand and internalize the message being conveyed. Studies have shown that after being educated through animated videos, there is a significant increase in children's motivation and behavior in brushing their teeth, which can help prevent dental health problems such as caries.

In addition, animated videos can also improve information retention. Children tend to remember information presented in visual and narrative form. By watching animated videos that tell the story of a character's adventure in maintaining dental health, children not only learn about the correct tooth brushing technique, but also remember the importance of maintaining oral hygiene in a broader context. This can create a deeper awareness of dental and oral health, and its impact on overall health. The importance of dental and oral health education for children cannot be ignored, considering the high prevalence of dental health problems among children.

So in this study it can be identified that the influence of animated video education on the behavior of elementary school children's dental and oral health. This study showed significant results with an increase in good behavior from 0% to 94.7% after the intervention, but only focused on the behavioral aspect without evaluating changes in knowledge or attitudes separately. This is different from the study of Muhammad Rahmadi Nurfaizal [55] which emphasized increasing students' knowledge about preventing diarrhea, and the study of Frenta Helena Simaibang et al. who simultaneously evaluated changes in students' knowledge and attitudes related to reproductive health. In addition, Frenta's study [56] also used a combination of educational media, namely animated videos and flipcharts, which provided a variety of approaches and the potential for stronger learning effects. This study only relied on animated video media alone without testing the effectiveness of other media combinations such as posters or other visual aids. In addition, the measurement results in this study were ordinal and descriptive, only dividing behavior into good, sufficient, and less categories, while the other two studies used a numeric scale that provided more varied and exploratory data. In terms of affective and cognitive involvement, Frenta's research emphasizes attitude change as an important foundation for behavioral sustainability, which has not been touched on by this study. Therefore, it can be concluded that although this study has succeeded in showing the positive impact of using animated videos on changes in dental and oral health behavior, this study still has limitations in exploring the cognitive (knowledge) and affective (attitude) dimensions, and has not compared the effectiveness of the media comprehensively. These gaps are important to be used as a basis for further research to strengthen the validity of the results and expand the scope of scientific contributions in elementary school children's health education.

The novelty of this study lies in the application of animated video media as an educational approach that is specifically focused on forming real behavior in maintaining dental and oral health in elementary school children, not just increasing knowledge or attitudes theoretically [57]. Unlike previous studies that have focused more on the effects of education on cognitive knowledge (such as in diarrhea prevention and sexuality education),

this study directly evaluates changes in children's behavior in the context of dental and oral hygiene practices that are relevant to everyday life.

This study provides an important contribution in the development of interactive visual media-based health education strategies that are in accordance with the characteristics and needs of elementary school-aged children. Significant results in improving behavior after providing education using animated videos indicate that the visual approach is able to improve children's attention, memory, and involvement in the health learning process [58]. This study strengthens the role of technology-based educational media as an alternative method in dental and oral health education that is more effective than conventional methods. The practical implications of these findings can be utilized by teachers, school health workers, and parents to instill the habit of maintaining dental and oral hygiene from an early age through methods that are fun and easy for children to understand.

This study has several limitations. First, the research design used was a quasi-experimental design without a control group, so it could not completely isolate the effect of the intervention from other external factors. Second, the focus of measurement was only on behavioral aspects without assessing children's initial knowledge or attitudes, even though both are important components in the process of forming sustainable behavior [59], [60]. Third, the media used was limited to a single animated video, without comparison with other media or a combination of media (eg posters, leaflets, or flipcharts) that could enrich the educational approach. In addition, the measurement of behavioral outcomes was still descriptive in categories (good, sufficient, lacking), so it did not reflect more precise numerical differences.

4. CONCLUSION

Before being given education through animated videos, the dental and oral health behavior of elementary school children at Public Elementary School 1 Tunggulrejo was still lacking in most students. However, after being given education using the media, there was a significant increase, where almost all students showed better dental and oral health behavior. This shows that there is a positive influence of education with animated videos on changes in dental and oral health behavior in elementary school children, so that this method can be an effective strategy in increasing awareness and habits of maintaining dental and oral health from an early age. Further research needs to use an experimental design with a control group, measure knowledge and attitudes, compare the effectiveness of educational media, use numerical instruments, and expand the sample and location to increase the validity and generalization of the results.

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