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**Research Article**

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## **The Differences in Knowledge Improvement about Brushing Teeth between Health Education with Pop-Up Book and Video Media in Elementary School Children**

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*Article history:*

Submission 19 June 2025

Revised 24 June 2025

Accepted 30 June 2025

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### **ABSTRACT**

**Background:** Dental and oral health support health immunity and require attention because these problems need special treatment. Problems arise, one of which is caused by behavioral factors or attitudes that neglect cleanliness. Efforts to increase knowledge can be done in various ways, and providing health education through pop-up books and video media is one of the techniques.

**Objective:** Determine the difference between pop-up books and video media in increasing knowledge about the health education of brushing teeth.

**Methods:** A quasi-experiment will assess the conditions before and after testing. The sample consisted of 75 respondents, consisting of 35 respondents from the pop-up book media group (P) and 35 from the video media group (V).

**Results:** The results of the Wilcoxon statistical test in the two intervention groups were obtained in the pop up book group with a mean value of 84.00 and the video group with a mean value of 87.43 The results of the Mann Whitney test were obtained with a significant difference in knowledge increase from the two groups with a value of 0.031 (p value > 0.05).

**Conclusions:** Health education using video media is more effective in increasing knowledge of brushing teeth.

**Keywords:** *Brushing teeth, Dental and oral health, Health education, Pop-up book, Video*

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### **Background**

According to WHO and the FDI, based on the Global Goals for Health, dental and oral health problems significantly impact the country's health because teeth are essential parts of the body to meet human life needs and to consume food and drinks [1]. Dental and oral

health are a part of the body's health that cannot be separated from each other. If dental and oral health is disturbed, it will impact the body's health, ultimately affecting the quality of human resources [2]. Children are exposed to potentially harmful behaviors to dental and oral health. Children are the age group most

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*How to cite:*

Nuswantoro, S. P., Sunarto, & Sudiro (2025). The Differences in Knowledge Improvement about Brushing Teeth between Health Education with Pop-Up Book and Video Media in Elementary School Children. *Basic and Applied Nursing Research Journal*, 6(1), 57 – 64. doi: 10.11594/banrj.06.01.07

susceptible to dental and oral diseases. The emergence of dental and oral health problems is caused by behavioral factors or attitudes that neglect dental and oral hygiene. The most significant dental problems occur in children because they don't know how to brush their teeth properly and maintain their teeth and mouth health [3]. The results of studies conducted in America, Europe, Asia, and Indonesia, according to the World Health Organization (WHO), show that 80-95% of children under 12 years old have tooth decay. Approximately 90% of elementary school children worldwide have experienced caries. Caries occur most in Asia and Latin America, and Africa has the least percentage [1]. Early childhood tooth decay indicates that efforts are being made to maintain dental health. Looking at this condition illustrates that the dental and oral health of the Indonesian people still needs to be improved. With adequate education, synergy from various parties is required, including awareness from each individual about the health of their teeth and mouth. Human activities that ignore the importance of maintaining dental and oral health contribute to the high frequency of dental and oral diseases. Tooth decay is caused by an infection that can damage the complex tooth structure. The symptoms include cavities due to bacterial activity that produces acid and interferes with carbohydrate fermentation, such as sucrose, fructose, and glucose [4]. Dental caries are often caused by a lack of individual awareness in maintaining dental and oral hygiene, including improper brushing frequency. Many factors can cause dental caries in children, including factors in the mouth that are directly related to the process of tooth decay such as tooth structure, tooth morphology, tooth arrangement in the jaw, the degree of saliva safety and oral hygiene that are related to external factors that are positioned as predisposing factors and inhibitors that are indirectly related to the occurrence of tooth decay such as knowledge, attitude, and behavior towards maintaining dental health such as the habit of brushing teeth and reducing the consumption of foods and drinks containing sucrose can also help in the prevention of tooth decay [5].

Preventing dental problems such as caries is better than treating them after the problem

appears. Children taught to maintain dental and oral health early are likelier to keep this habit until adulthood. Teaching children how to brush their teeth will help them feel comfortable and confident when chewing food and interacting with friends. Tooth brushing is the easiest and cheapest preventive measure to do. Brushing your teeth regularly can reduce the formation of dental plaque. The ability to brush your teeth properly and correctly is essential in maintaining dental and oral health. Maintaining dental and oral hygiene is one of the efforts to improve health [6].

Dental and oral health problems tend to rise, so efforts are needed to encourage behavioral change by giving instructions or counseling on brushing your teeth correctly and adequately, because the prevention of caries in children must be the top priority. A pop-up book and video media assist this health education. A pop-up is a three-dimensional book with picture illustrations that can move when opened and closed, creating a more interesting and realistic visualization. The illustrations in this book give surprises on every page, making readers interested and leaving an interesting impression [6]. In addition to pop-up book media, other media that can help to provide health education include videos that have been proven to provide a convenient, easily accessible, cost-effective method to encourage positive changes and increase knowledge and behavior in children. With video media that can display images and sounds simultaneously, effective video media can increase elementary school children's understanding of how to brush their teeth correctly and adequately. This video media has been proven to provide a convenient, easy-to-access, cost-effective method to encourage positive changes in improving children's behavior. This is because video media allows them to listen and see the lessons taught [3].

A preliminary study conducted at SD N Kateguhan 02, Tawang Sari District, Sukoharjo Regency, on Monday, June 10, 2024, obtained the results of an interview with one of the students at SD N Kateguhan 02 said that students often snack carelessly and ignore the health of their teeth and mouths and students do not know how to brush their teeth correctly and

adequately. Then the results of the interview with the Principal showed that in SD N Kateguhan 02, Tawang Sari District, Sukoharjo Regency, many students have problems with tooth decay and cavity problems. The school has not made any efforts to overcome the problem of tooth decay and cavities, nor has it provided health education regarding dental and oral health. The interview results also showed that only a few times has there been Posyandu BIAS (School Children Immunization Month). However, the caries problem in Elementary School children has not been solved. Then through interview activities with the teacher, data was obtained that from grade 1 to 6, the most people who had problems with tooth decay and cavities were grade 4 and 5 with 75 students, the teachers here have also never explained about dental and oral health and have never taught how to brush teeth correctly and adequately.

Based on the phenomenon above, he researchers here try to provide health education about brushing their teeth to students so that they understand the dangers caused if students do not care about their teeth and mouth health. Based on the background above, health education about teeth and mouth, with a pop-up book and video media, can increase knowledge. Therefore, the author is interested in researching "The Difference in Knowledge Improvement About Brushing Teeth Between Health Education With Pop Up Book and Video Media".

## Methods

### Study design

This quantitative study employs a pretest-posttest design with a control group and a quasi-experimental methodology. We conducted a first observation (pretest) before the intervention, followed by a second observation (posttest) after the intervention [7]. The research was carried out at SMPN 2 Kalijambe, Sragen. Data collection was carried out from August 26 to 30, 2024.

### Sample

This study's target population is students at SMPN 2 Kalijambe. Meanwhile, the affordable population that will be used is 63 students in grade VII. A total of 63 respondents will be

sampled, and they will be split into two groups: the PowerPoint group (P), which will consist of 32 participants, and the booklet group (B), which will consist of 31 participants

### Instruments

The instrument used in this study is a questionnaire containing 10 questions that have been tested for validity and reliability, and valid and reliable results were obtained. Furthermore, the contents of the questionnaire include good habits of maintaining dental health, when and how to brush your teeth, the impact of not maintaining dental health, how to choose a good toothbrush, how to select food to avoid dental problems, and routine dental health checkups. As for the pop-up book and video media, two experts (Expert adjustment) in learning media and child nursing. Both experts have provided input and have been included in the media used in this study.

### Intervention

Respondents were gathered in one room based on classes, and the researcher explained the purpose and benefits of the study. As many as 75 students agreed to the informed consent sheet and were willing to be respondents. The researchers divided the respondents into two groups, namely class IV for the pop-up book group and class V for the video group. The group entered a different room and did a pre-test for 15 minutes. After doing the pre-test, each group was given a different intervention. This is done in the morning during school hours, then the respondents are given a 10-minute break and do another post-test.

### Data analysis

The research hypothesis between free and bound variables is tested with a bivariate analysis. Bivariate analysis is used to determine the difference in improving knowledge about brushing teeth between health education with pop-up book media and video to test hypotheses and answer the formulation of existing problems. Researchers conduct statistical tests with the help of computer processing programs. The researchers used the normality test as a prerequisite for the Kolmogorov-Smirnov test to determine how the data is distributed.

The results of the Kolmogorov-Smirnov normality test obtained p-values on some data with  $p < 0.05$ , so it can be concluded that the data is distributed abnormally. Next, a non-parametric test was conducted, the Wilcoxon Signed Ranks test to compare data from one group and the Mann-Whitney Test to compare data from 2 unrelated groups.

### Ethical considerations

Researchers submit ethical clearance to prove that the research design meets ethical standards. Researchers use the research ethics agreement published by the Health Research Ethics Commission, Dr. Moewardi Surakarta, and the letter was issued on September 25, 2024, with ethical clearance number 2.323/IX/HREC/2024.

## Result

### 1. Characteristic of respondents

Table 1. Respondent's Gender Frequency Distribution (n=70)

Sex	P		V	
	n	(%)	n	(%)
Male	17	48,6	21	60,0
Female	18	51,4	14	40,0
Total	35	100	35	100

Based on Table 1 above, the study results showed that the respondents in the pop-up book media group were female, namely 17 respondents (48.6%), and 18 respondents were

male, 51.4%. Meanwhile, the number of respondents in the female video group was 21 respondents (60.0%) and 14 male respondents (40.0%).

Table 2. Frequency Distribution of Respondents' Age (n=70)

Age	P		V	
	n	(%)	n	(%)
9	35	100,0	0	6,5
10	0	00,0	18	51,4
11	0	00,0	17	48.6
Total	35	100	35	100

Table 2 above shows that most of the respondents in the pop-up book group were 9 years old, with as many as 35 respondents (100.0%). Meanwhile, in the 10-year-old video group, there were 18 respondents (51.4%) and 17 respondents (48.6%).

2. The effect of before and after is given through health education using a pop-up book and video media.

Table 3. Level of Knowledge Before and After Health Education with Pop-Up Book and Video Media.

		Mean	Std.dv	p value
P	Pre	53,43	5,913	0,000
	Post	84,00	7,356	
V	Pre	56,86	5,827	0,000
	Post	87,43	7,005	

According to Table 3 above, the Wilcoxon test results show that the value of the intervention book pop-up group is 0.000 and the value

of the video group is 0.000. This indicates that using PowerPoint lecture methods and booklet

media to provide health education impacts the growth of respondents' knowledge, with a score of  $<0,05$ .

3. The difference in the average level of knowledge in health education between the pop-up books and video media

*Table 4. The difference in the average level of knowledge in health education between pop-up books and video media*

Intervention	Mean	Sum of Ranks	N	p value
Skor				
P	30,71	1410,00	35	0,031
V	40,29	1075,00	35	

Based on Table 4 above, there is a difference in improving health education knowledge about brushing teeth with a pop-up book and video media, with a p-value of 0.031, which means  $p\text{-value} < 0.05$ , so  $H_0$  is rejected and  $H_a$  is accepted. Then the difference test in both intervention groups obtained the mean rank in the pop-up book media group, which is 30.71, and the value of the video media group, which is 40.29, which can then be interpreted that video media is more effective than pop-up book media in providing health education.

## Discussion

The research results showed that the majority of respondents in this study, with two intervention groups, were aged 9 years, with as many as 35 respondents (50%). Research conducted by Noviyanti supports this, showing the results of his interview with Dr. Andri Tino Sanubari, a dentist at Peusangan Health Center, who said that many children aged 7-9 years old were brought by their parents to the Health Center. Cavities, tooth decay, tartar, swollen gums, and bad breath are their problems [8]. Many children do not take good care of their teeth and mouth, which causes problems with dental and oral health.

Etty Yuniarly said that behavioral factors are the cause of this problem [9]. A lack of knowledge about the health and maintenance of teeth and mouth usually causes behavior that neglects dental and oral hygiene.

The study results showed that the total number of male respondents was 39 (55.8%), more than the number of female respondents, 31 (44.2%). Stefanicia argues that there is no relationship between gender and the level of adolescent knowledge of health behavior,

because everyone in society is given the same health education [10].

This is in line with research conducted by Risviany, showing that out of 67 respondents, there are more men, namely 36 respondents (53.7%), compared to women, namely 31 respondents (46.3%) [11]. The Chi Square statistical test results obtained a p-value of 0.61, so it can be interpreted that statistically at 5 5 5% alpha, there is no significant relationship between gender and dental and oral hygiene problems.

The results of this study showed that the average before describing the healthcare system for teeth brushing by pop-up book media was 53.43, and that after publication of health education by Pop-up Book media, there was an increase in knowledge to 84.00

. The Wilcoxon Signed-rank test obtained a significant p-value of 0.000. It can be concluded that there is increased knowledge before and after being given health education through pop-up book media.

Wijanarko stated that learning media is a means to convey various information and has a vital role in the learning process to stimulate interest and attention to achieve goals [6]. The results of the research that has been done show that pop-up book media influence health education because the selection of interesting media can increase students' understanding, thus improving knowledge.

Then the results of the research with video media showed that the mean value before being given health education experienced an increase in knowledge, which was 56.86, and after being given health education with video media, which was 87.43. The Wilcoxon Signed-rank test obtained a significant p-value of

0.000. It can be concluded that there is an increase in health education knowledge about brushing teeth with video media.

Nurwahidah stated that video electronics can combine audiovisual technology to create dynamic and engaging shows [12]. Videos can be made on VCD, DVD, or other internet media such as YouTube. Besides being easy to carry and use, videos are also easy for many people to access.

This aligns with the previous study, which obtained the Asymp Sig value results. (2-Tailed) In the intervention group,  $0.000 < 0.05$  means that  $H_a$  was accepted, and  $H_o$  was rejected; there is a significant difference between pretest and posttest values after being given an intervention in the form of counselling [13]. This means that counseling using pop-up book media influences students' brushing skills.

Based on the results of the data analysis that has been carried out, it is obtained that video media is more effective in conveying health education about brushing teeth. It is easier for students to absorb the information conveyed by the video with various illustrations presented, so paying attention is not monotonous and boring. Besides that, the video can be watched and repeated many times. Thus, videos are more effective than pop-up books because pop-up books only contain points, not detailed information, and are pretty boring when read or listened to.

To achieve learning goals successfully, teachers need learning media that help achieve learning goals. Thus, to make learning active, creative, engaging, and meaningful, teachers must create media that can be used to explain subjects better and creatively. The media used significantly affects the success rate of the students. Learning media must consider factors that can affect its quality and efficiency. Color, layout, texture, and other elements must be considered. The validation results show that the images in the learning media can be evident and engaging, so that this media provides an overview of the learning material that is taught in a more realistic way and close to the actual form [14].

Students' ability to understand concepts sometimes becomes a problem in learning

research. According to one of the studies on the issue, video media can help students overcome a poor understanding of concepts. It is easier for students to understand the material from the video, which can be repeated during the learning process. The presentation of the material in a well-organized manner also makes it easier for students to understand the material, especially the concept. These two advantages show that video is an effective medium to encourage elementary school students to understand the concept [15].

Jelita stated that video media is the most interesting form of image, in the form of a moving image simulation that depicts the movement of an object [16]. For the learning of children in grade 5 of elementary school, video playback is suitable. It has many benefits, such as increasing interest in education, giving a sense of joy during the teaching and learning process, providing a more realistic picture, and increasing memory resistance because it is more interesting and easier to remember.

This is in line with Ardhani [17], research showing that before being given dental and oral health education with video media, almost all respondents were knowledgeable enough, after being given health education, all respondents were knowledgeable, and there was an influence of dental and oral health education with video media on the knowledge of brushing teeth of students in grades 1-2 with a p value of  $0.000 < 0.005$

## Limitations and Implications

In this study, researchers experienced limitations in data collection because the place of implementation did not support two interventions in one place. Hence, the researchers had to divide the two groups into different areas. Another thing related to the location factor of the class is that it is not wide, so maybe in the pre- and post-test, they will be able to see each other. Researchers do not control other factors affecting students' knowledge before the research. Educational institutions or health workers in the community can use the results of this research as a source of information and consideration for using this method.

## Conclusion

The results of this study show the difference in increased knowledge of teeth brushing during health education using pop-up books and video. Furthermore, the results of this study can be applied in the community as a source of information and reference. Finally, for further researchers, they can combine it with other media or different respondents while controlling uncontrolled bias.

## Acknowledgement

We would like to express our gratitude to the Surakarta Ministry of Health Polytechnic, respondents, and all parties who have played a role in this research.

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