



ANALYSIS BETWEEN ANIMATED VIDEO AND DENTAL PHANTOM IN TOOTH BRUSHING EDUCATION

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Abstract

Dental caries have been a problem in childhood. Poor knowledge causes poor dental hygiene. Health promotion is urged to conduct to give children of school age an understanding of how important is dental hygiene. Tooth brushing is a way to prevent dental caries. We initiated tooth brushing education research with a quasi-experimental design with a two-group pre-posttest design. The sample was taken with purposive sampling with 66 students in SDN Kalase, SDN Butong, and SDN Tateli located in a working area of Tateli Public Health Service, Minahasa, North Sulawesi, Indonesia. We employed animated video and dental phantom as the media and compare their effectiveness. First, we performed a normality test, the data is found not normally distributed. Hence, the Wilcoxon test was used to analyze whether the difference in the data exists, and the Mann-Whitney test was conducted to know whether the difference is significant. From the mean value of the Mann-Whitney test results, the effective of the methods is obtained. The results show that the Mann-Whitney test obtained Asymp. Sig (2 tailed) value of 0.000, less than a probability value of 0.005. Thus, there is a significant difference in knowledge level increase. The result of Mean value of a group with animated video is 49.26, higher than the dental phantom media group with only 17.74. So, in conclusion, animated video media is more effective than dental phantom media in improving students' knowledge level of tooth brushing.

Keywords: dental hygiene; animated video; dental phantom; children

1. Introduction

The increase of Early Childhood Caries (ECC) has made a major health problem in developing countries. ECC is a condition where one or more decayed, missing, or filled tooth surfaces in the primary tooth (Anil & Anand, 2017). Carries affect almost 60–90% of children at school age and, this condition affects the quality of life of the children and the family. Dental caries in childhood lead to pain and inability to eat or sleep and increases the number of missine schools. It will also lead the family to take care of

the children when they get a toothache. The parents also feel guilty and experience financial difficulties (Abed, et al., 2020).

Poor hygiene becomes one of the causes of oral diseases. Poor hygiene can be influenced by poor knowledge of dental and oral hygiene. Dental and oral hygiene, however, is essential for good health and well-being (Sopiatin et al., 2020). WHO defines oral health as a condition where the mouth, face, and throat are free of cancer, no mouth infections, and wounds as well as the gum and periodontal disease that border someone's ability to chew, bite, smile, talk, and psychosocial welfare (World Health Organization (WHO), 2020).

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Health promotion is the key for children to get an opportunity for learning how to keep their dental hygiene, such as in schools. The toothbrush is a tool in dental care to remove plaque. Effective tooth brushing can prevent children from dental caries (Atarbashi-moghadam & Atarbashi-moghadam, 2018; Rossi, et al., 2016). The success factor of tooth brushing is the tooth-brushing technique. Thus, the knowledge of tooth brushing is an integral part of successful tooth brushing. Conceptual models in teaching tooth brushing to children are important in influencing children's dental hygiene and their behavior (Trubey et al., 2015).

In improving knowledge and practice of tooth brushing, Media of books and pocketbooks have been used for teaching children tooth brushing in elementary school age and kindergarten (Nurdianti et al., 2019); Bramantoro et al., 2018). However, (Mona & Azalea, 2018), the media of a leaflet shows better than a book. Audiovisual media has also been used for teaching children tooth brushing and shows effectiveness to improve the tooth-brushing skills of the children. However, an improvement in audiovisual should also be considered to develop and enhance to be convenient for the children (Sanjaya et al., 2019).

Dental health education using animated video has been conducted by (Dali et al., 2020; Yanti et al., 2017; Jati Dyah Utami et al., 2021) which has shown that it can increase the level of knowledge of dental health, especially toothbrushing skill knowledge from bad to good. The teachers and students of dentistry considered using simulators such as dental phantom in the learning process to facilitate the theoretical study (Coro-montanet et al., 2022). Dental phantom is also used to demonstrate tooth brushing for students (Boel et al., 2021; Setiawati et al., 2020) which increased knowledge of tooth brushing. So, lately, animated videos and dental phantom are among the media used for dental teaching. Therefore, we used animated video and dental phantom to also analyze its effectiveness, especially the practice in school-age children. This urges the point of dental hygiene promotion to its children,

as children at age 6 - 12 are prone to caries (Achmad et al., 2021).

This study aims to analyze the effectiveness of dental hygiene education for children in elementary school using the media of animated videos and dental phantom about tooth brushing knowledge in Tateli, Mandolang District, Minahasa, Indonesia.

2. Method

This quasi-experimental design with two groups of pre-post test design research was carried out in three elementary school grade 4: SDN Kalase, SDN Butong, and SDN Tateli located in the working area of Tateli Public Health Service, Minahasa Regency, North Sulawesi, Indonesia. The population of the study was 180 students. While the sampling method was purposive sampling. The sampling amounted to 66 respondents with the inclusion that respondents are willing to be part of the retargeting permission from parents and present at the time of research. The sample was measured using the formula as follows, with $N = 180$, $d^2 = 10\%$. n is the sample size, N is the population, and d^2 is the acceptable error value.

$$n = \frac{N}{N \cdot d^2 + 1} \quad (1)$$

$$n = \frac{N}{N \cdot d^2 + 1}$$

$$n = \frac{180}{180 \cdot (0,1)^2 + 1}$$

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$$n = 65,8 = 66$$

The instrument in this research was a questionnaire. Students' knowledge was measured by using a questionnaire containing 20 questions and 2 answer choices, good category 31-49 and bad 20-30. The research was conducted from September to October 2020.

3. Result and Discussion

The results of the research are shown in Tables 1 - 5. There are two groups in the sample. Those are group "A" with the intervention of animated video and group "B" with the dental phantom. These groups are analyzed on their knowledge of tooth brushing after getting the intervention.

Table 1. Distribution of respondents according to age and gender

Distribution	f	%
Age		
9	21	31.8
10	38	57.6
11	7	10.6
Total	66	100
Gender		
Female	39	59.1
Male	27	40.9
Total	66	100

Source: primary data 2020

Table 1 shows the characteristics distribution based on age, in which it is dominated by the age of 10 years, as many as 38 students (57.6%), and based on gender, a female student is higher than the male, as many as 39 students (59.1%).

Table 2 before intervention indicates the students' abilities before and after being given intervention treatment. In group A, with animated video, the result shows that the higher point is bad knowledge for as many as 25 students (75.8%) and good knowledge for 8 students (24.2%) with Mean Standard Error (MSE) 0.336 and Standard Deviation (SD) 1.928. In group B with phantom media, the result shows that bad knowledge is higher than good knowledge, in as many as 27 students (81.8%), and 6 students with good knowledge (18.2%) with Mean Standard Error (MSE) 0.501 and Standard Deviation (SD) 2.877.

Meanwhile, after the intervention, the distribution of respondents' abilities of animated video media and dental phantom media shows the results of an increase compared to before the intervention in the good knowledge category in group "A" (animated video) of 33 students (100%) and group "B" (dental phantom) in the good category as many as 14 students (42.42%) and knowledge in the bad category by 19 students (57.58%). The Mean Standard Error (MSE) in the animated video group is 0.346 and the Standard Deviation is 1.985. In the dental phantom group, the MSE is 0.456 and the Standard Deviation is 2.622.

Table 2. Distribution of knowledge before and after intervention

Before Intervention	
Group	Value
Group A (Animated Video)	
Good	8 (24.2%)
Bad	25 (75.8%)
Total	33 (100%)
Std. Error	0.336
Std. Deviation	1.928
Group B (Dental Phantom)	
Good	6 (18.2%)
Bad	27 (81.8%)
Total	33 (100%)
Std. Error	0.501
Std. Deviation	2.877
After Intervention	
Group	Value
Group A (Animated Video)	
Good	33 (100%)
Bad	0 (0%)
Total	33 (100%)
Std. Error	0.346
Std. Deviation	1.985
Group B (Dental Phantom)	
Good	14 (42.42%)
Bad	19 (57.58%)
Total	33 (100%)
Std. Error	0.456
Std. Deviation	2.622

Before conducting a test related to the differences in scores in group A and group B, a normality test was performed.

Table 3. Normality test of pre-test and post-test of the group receiving animated video and dental phantom intervention

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest_ animation	0.190	33	0.004	0.920	33	0.019
Pretest_ phantom	0.218	33	0.000	0.899	33	0.005
Posttest_ animation	0.181	33	0.008	0.853	33	0.000
Posttest_ phantom	0.113	33	0.200*	0.957	33	0.206

The normality test in Table 3 shows that the data in pre-test animation, pre-test phantom, and post-test animation either in Kolmogorov-Smirnov and Shapiro Wilk shows $p < 0.05$, meanwhile the post-test phantom shows $p > 0.05$. The data are not normally distributed. So, t-tests cannot be used to analyze the differences between pre-test and post-test each in group A using animated video, and group B using dental phantom, instead, the Wilcoxon test is used to analyze whether there is a difference or not among the groups.

Table 4. The Wilcoxon test results on animated video and dental phantom

	N Total	Ties	Mean Rank	Sum of Ranks	Asymp. Sig. (2-tailed)
Pre-Post animated video	33	0	17.00	561.00	0.000
Pre- Post dental phantom	33	3	15.40	446.50	0.000

Table 4 shows the results of the statistical test obtained the Asymp value. Sig (2 tailed) 0.000 which is less than 0.05. This indicates that there is a difference in the effect of dental hygiene education with animated video and dental phantom media on tooth brushing knowledge before and after the intervention. The second analysis is to check whether the difference is significant or not, and which media is effective, is by using Mann Whitney test as the data is not normally distributed, referring to table 3 normality test.

Table 5. Analysis of the difference between animated video and dental phantom

Group	N	Mean Rank	Sum of Ranks	Asymp. Sig. (2-tailed)
Animated video	33	49.26	1625.50	0.000
Dental phantom	33	17.74	585.50	

The results of Tabel 5, the Mann-Whitney statistical test show the Asymp. Sig value of 0.000 less than a probability value of 0.005. Hence, there is a significant difference between the intervention of the animated video and the dental phantom. This can be seen from the results of the Mean value in the animated video

group 49.26 > compared to the dental phantom group mean value of 17.74. Therefore, animated video media is more effective than a dental phantom in increasing students' knowledge of tooth brushing.

The prevention of caries and improvement of dental hygiene can be conducted by health education, as it is part of health promotion. Health education is intended either to increase knowledge and awareness which in the end can bring a good impact on individuals' attitudes and practice in taking care of their good dental hygiene. Animation as part of multimedia has been used widely as a teaching companion, which can increase student academic achievement. By using animation, the respondents are easier to understand the teaching (Sinor, 2014). Animated videos in health promotion are also shown effective to attract respondents to understand the message of counseling. The percentage of success in delivering education to participants reaches 93% understanding of nutrition education (Limanto, et al., 2019). This shows that animated video can attract the attention of the participant to pay attention to the material provided. Animation video is also effective to teach deaf students about oral health (Sariyem et al., 2017) where the knowledge and plaque score shows a significant influence.

Audiovisual technology creates an effect on the audience to obtain the message (Nor et al., 2013). People nowadays get used to technology. Technology is the basis where information can be widely spread out to the people. Technology development led to changes in the way people interact. People make their own choice by various resources to meet their satisfaction. Compared to the traditional method, people tend to choose something, which employs technology the traditional method (Arkorful & Abaidoo, 2014).

Dissemination of information is easier by using technology. Animation and pictures give visual displays that can deliver information better than just using words and are more attractive (Husnifa, 2017; Khalidiyah, 2015). Besides, animation can create clear information which meets the needs of the audience, increasing the willingness to learn and building a scientific environment (Dorneles et al., 2020).

Dental phantom functions to simulate learning. It provides students to learn procedural skills explained by dental cadres or dental nurses. One objective of simulation itself is that to make control and standardization (Fugill, 2013). Despite creating standardization of learning has a significant advantage, it fails to deliver features of the clinical setting which can lead to affect skill transfer to patients or respondents. Besides, aspects of professionalism, communication, and teamwork are needed when delivering material to participants directly (Halkett et al., 2011).

The strength of this research is that it can improve good behavior in maintaining the dental health of school-age children. This research can be used as a reference for learning media for dental health cadres in elementary schools. This research was conducted with support from schools and public health centers. This study is limited by the sample size with a too-small number of participants.

4. Conclusion and Suggestions

We have presented research in dental hygiene education for students of elementary school grade IV. This research grouped the respondents into an intervention group with animated video and an intervention group with the dental phantom. Providing those two media was intended to understand whether there is an influence on effective on knowledge of the students in tooth brushing. The evidence from this research points to the idea that animated video is more effective in dental hygiene education than a dental phantom. Our research could be a useful aid for dental practitioners in using media for dental hygiene education to enforce health promotion. The future work of this study can be an analysis of the effect of applying animated video and dental phantom as dental education media toward dental health status (Debris Index, OHI-S).

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