

Development of Podio Models and Media (Poster Pop Up Touchless Button Audio) on Improving Dental Health Behavior among Public Elementary School Students

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Abstract

Introduction: The high prevalence of dental caries is due to behaviors that can be overcome by forming dental health maintenance habits early on through PODIO models and media (poster pop-up touchless button audio). **Objective:** Produce a PODIO (poster pop-up touchless button audio) media model for improving dental health maintenance behavior in State Elementary School students. **Method:** This type of research using a mixed method combines descriptive and analytical, with research and development (R&D) design, in model tests using a quasi-experiment technique. Bivariate analysis using paired t-test. The number of respondents was 35 elementary school students. **Result:** The PODIO (poster pop-up touchless button audio) model and media on improving the dental and oral health maintenance behavior of public elementary school students is feasible as a model for the health promotion of elementary school students. The PODIO (poster pop-up touchless button audio) model and media effectively improved the knowledge, attitudes, and skills of public elementary school students towards implementing the model and media compared to the control group. **Recommendation:** The development of a feasible PODIO (poster pop-up touchless button audio) model and media application effectively improves public elementary school students' dental health maintenance behavior. Therefore, it can be an alternative problem-solving in enhancing elementary school students' dental health maintenance behavior.

Keywords: pop-up touchless button audio poster, dental health maintenance, dental health



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INTRODUCTION

The most common dental and oral health problem affecting almost all population groups in the world is tooth decay, which significantly negatively impacts a person's quality of life. Dental and oral diseases are estimated to affect nearly 3.5 billion people worldwide, of which dental caries are the most common and serious problem in society. Worldwide, about 2.3 billion people suffer permanent tooth decay and more than 530 million children suffer deciduous tooth decay (1). In line with the results of the 2004 National Socioeconomic Survey (SUSENAS) showed that 62.4% of the population felt disturbed by work or school due to toothache with an average of 3.86 days (2).

The Indonesian Basic Health Research (RISKESDAS) in 2018 stated that the most significant proportion of dental health problems in Indonesia is cavities, with a percentage of 45.3%. The prevalence of 5-9-year-olds with cavity problems is 54%, the highest in the damaged or sick teeth category. Central Java Province has a high percentage of patients with dental and oral health problems. About 56.7% of the people of Central Java province still experience dental and oral issues, and only 9% of Central Javanese people get treatment and treatment from the medical team (3).

One of the causes of the high prevalence of dental caries is the behavior of maintaining dental health that is not optimal. As many as 90.7% of Indonesians brush their teeth, but only 12.6% brush their teeth after breakfast and 28.7% before bed at night. Indonesians brush their teeth an average of 1.27 times per day, with an average time of 57.29 seconds (4).

Various prevention programs have been carried out to restrain the pace of development and reduce the prevalence and incidence of dental and oral diseases. In Indonesia, efforts are made through the School Dental Health Business (UKGS) (13). The UKGS and dental and oral health service programs launched by the

Indonesian government and the international world have yet to yield results. It is proven that no country is free from dental caries (14).

The above dental health problems are far from the hope of achieving the Ministry of Health's long-term target, namely in 2020: the number of free dental caries (mixed teeth) aged six years by 50%, the free rate of dental caries class 6 by 70%, DMF-T aged 12 years ≤ 1 , PTI by 50% and the *dentally fit* rate of class 6 by 85%. Indonesia's 2030 target is caries-free. Previously steps needed to be taken to overcome dental health problems, but it is necessary to identify the cause of the problem. Dental health problems are caused by poor dental health maintenance behavior (13).

The formation of dental and oral health behaviors should start very young, and school is the most appropriate time to instill positive behavior formation values (5). Children spend most of their time in school, so it is appropriate to go to school to create a healthy environment and take actions that improve health, especially dental and oral health. However, studies have yet to be conducted using the Podio models and media (poster pop-up touchless button audio) to improve public elementary school students' dental health maintenance behavior.

Interventions in students are carried out to learn about hygiene and dental health as early as possible to increase student knowledge about the importance of maintaining physical health and the environment in general and health in particular dental and oral health (6).

PODIO (Poster Pop Up Touchless Button Audio) effectively delivers dental health education messages to form habits through improving dental health maintenance behaviors of elementary school students. This is because PODIO media (pop-up touchless button audio poster) is a 3D pop-up poster media about dental and oral health materials which include: healthy food for teeth, reducing sweet and sticky foods, brushing your

teeth at least two times a day, using toothpaste containing fluoride, checking teeth to the dentist, brushing your teeth with the proper movements. PODIO (pop-up touchless button audio poster) is a rectangular board with a touchless button feature that will activate if electrified. This touchless button is a sensor that can be used through the palm to operationalize media with audio displays. It was related to the elaboration or description of each pop-up image item on the poster board, thus attracting students' interest in health education.

OBJECTIVE

The study aimed to develop a PODIO (Poster Pop Up Touchless Button Audio) media model for improving dental health maintenance behavior in State Elementary School students.

METHODS

The method used is Research and Development (R&D). Test the model using quasi-experimental pre and post-test with a control group design. The main steps of the research and development procedure include the stages: 1). information gathering, 2). design and build models, 3). Expert validation and revision, 4). Test modules, 5). The final models. The study was conducted in an elementary school in Semarang, Indonesia.

Sample, Sample size, and sampling technique

The study had a population of 75 students. The sampling technique uses the Slovin technique with results 63. In anticipation that the respondent would drop out, the number of samples was 10%, bringing the number of samples to 69 students. The minimum number of respondents in each group of both intervention and control groups was 35.

The instrument for data collection

Three instruments were used to measure the variables (knowledge

questionnaire, attitude checklist, and action checklist). The questionnaire used was 10 questions about brushing teeth. The correct answer was scored 1, and the wrong answer was scored 0. The attitude checklist table consists of 10 statements, the assessment uses a Likert scale, and the answers consist of 4 pieces: strongly agree, agree, disagree, and strongly disagree. The check sheet for brushing your teeth is a modification of the material for a good and correct brushing step, namely by doing the brushing action, with a score of 1 if you do it correctly and a score of 0 if you don't.

Data collection process

We divide the collection data procedure into pre-intervention and intervention phases. In the pre-intervention stage, we processed a letter of permission from the Health Office, Education office, Public Center Health, and research ethics committee for ethics of approval.

Conducting apperceptions pre-tests, counseling interventions with PODIO media on students, monitoring, and evaluating with post-tests. Data collection was carried out for 21 days by researchers and research assistants in April 2022.

Data analysis

Data were analyzed using IBM® SPSS® Statistics 26.0 with a significance value of 0.05. The demographic data of respondents are presented as a frequency distribution. This study used the *paired t-test*, dan *independent t-test* to assess the relationship between the independent.

Ethical consideration

Each participant who agreed signed the informed consent. Participant has the right to withdraw. The researcher got approved to conduct the study from the committee ethic of Poltekkes Kemenkes Semarang 0223/EA/KEPK/2022.

RESULTS

a. Data Collection

The collection of information results

concluded that dental health education for elementary school is carried out using gamification (games) and simulation methods accompanied by media to attract children's attention (7). Media selection must be varied, innovative, interesting, and fun to generate interest.

b. Design and Build

The results of information gathering are used in designing the model building with the Notoatmodjo theory approach as follows: Model and PODIO Media (Pop Up Touchless Button Audio Poster) Towards Improving Dental and Oral Health Maintenance Behavior of State Elementary School Students.

c. Expert Validation

Table 1 The result of expert validation shows that the p-value = 0.000, which means that model and media PODIO (poster pop-up touchless button audio) is relevant and appropriate as a medium for increasing dental health behavior in elementary school.

Table 1. Statistics Validation Test

Expert Validation				
Name	Score	Average	Category	p-value
A	85	86.6	Very Worth	0.000
B	90			
C				

d. Model Test

Table 2 shows the results of the normality of the normal distribution data test proven by the p-value > 0.005.

Table 2. Normality Test Data

Variable	p-value	
	Intervention	Control
Pre-test knowledge	,055	,130
Post-test knowledge	,135	,207
Pre-test attitude	,075	,079

Post-test attitude	,140	,171
Pre-test skills	,074	,199
Post-test skills	,099	,058

Table 3 shows the results of the homogeneity test of elementary school students' knowledge, attitudes, and actions with a sig. Value > 0.05, meaning that the data is the same or homogeneous.

Table 3. Homogeneity Test

Variable	Intervention		Control		Data Homogeneity-Test
	n	%	n	%	
Knowledge					
Pre-test	35	100	35	100	0.989
Posttest	35				
Attitude					
Pre-test	35	100	35	100	0.989
Posttest	35		35		
Skills					
Pre-test	35	100	35	100	0.845
Posttest	35		35		

Table 4. The paired data effectiveness test results showed that the p-value of the intervention group was .000 (p < 0.05). It was indicated that the PODIO (Poster Pop Up Touchless Button Audio) media model of maintaining oral and dental health improved elementary school students' knowledge, attitudes, and skills compared to the control group.

Table 4. Test the effectiveness of paired sample t-test

Group	Paired samples t-test				
		n	Mean (SD)	Average Difference Mean (SD)	p-value
Knowledge Intervention	Pre	3	3.46	3.68 (1.79)	.000
		5	(1.79)		
	Post	3	7.14	(1.83)	
		5	(1.83)		
Control	Pre	3	3.91	2.83 (1.77)	.000
		5	(1.87)		
	Post	3	6.74	(1.77)	
		5	(1.77)		
Attitude Intervention	Pre	3	3.49	3.45 (1.65)	.000
		5	(1.65)		
	Post	3	6.94	(1.97)	
		5	(1.97)		
Control	Pre	3	3.80	2.74	.000

		5	(1.94)	(1.94)	
	Pos	3	6.54		
	t	5	(1.97)		
Skills					
Intervention	Pre	3	4.31	3.00	.000
		5	(2.01)	(1.71)	
	Pos	3	7.31		
	t	5	(1.71)		
Control	Pre	3	4.66	2.51	.000
		5	(2.04)	(1.79)	
			3)		
	Pos	3	7.17		
	t	5	(1.79)		

Table 5. The unpaired data effectiveness test results showed that the p-value of the intervention group was .000 ($p < 0.05$). It was indicated that the PODIO (Poster Pop Up Touchless Button Audio) media model of dental and oral health maintenance improved elementary school students' knowledge, attitudes, and skills compared to posters for maintaining dental and oral health.

Table 5. Test the effectiveness of the independent sample t-test

Group	Independent sample t-test		
	Mean	SD	p-value
Knowledge			
Intervention			
Pre-test	3.46 ± 1.788		.000
Post-test	7.14 ± 1.883		
Control			
Pre	3.91 ± 1.869		.000
Post	6.74 ± 1.771		
Attitude			
Intervention			
Pre-test	3.49 ± 1.652		.000
Post-test	6.94 ± 1.970		
Control			
Pre-test	3.80 ± 1.937		.000
Post-test	6.54 ± 1.975		
Skills			
Intervention			
Pre-test	4.31 ± 2.011		.000
Post-test	7.31 ± 1.711		
Control			
Pre-test	4.66 ± 2.043		.000
Post-test	7.11 ± 1.790		

DISCUSSION

The results of the collected

information researchers concluded that school students enjoy moving, are happy to play, are delighted in the group, and like to practice directly. Change in the behavior of maintaining the dental health of elementary school children, appropriate, attractive, fun learning methods and media are needed, in accordance with the characteristics of elementary school children and involving children in their implementation. The proper method used is a game-based learning method (8). Suitable media to make this happen is PODIO (Poster Pop Up Touchless Button Audio) dental and oral health maintenance compared to dental and oral health maintenance poster media.

Based on the results of the validation test of the model and media experts, PODIO (Poster Pop Up Touchless Button Audio) explained the feasibility score value is 86.66 with a very decent category and a p-value result of 0.000. It was indicated that the PODIO and media are relevant and feasible as a dental health education model for elementary school students. Podio model and media (Poster Pop Up Touchless Button Audio) can be used in the dental and oral health education process. The posters with the theme of maintaining dental health are designed to be attractive and equipped with touchless button audio sensors to stimulate children's intelligence and introduce how to maintain oral and dental health.

The findings of effectiveness testing showed the value of the paired sample t-test, knowledge of attitudes and skills of elementary school students in the intervention group showed that the p-value was < 0.05 . It was indicated that the PODIO (Poster Pop Up Touchless Button Audio) model and media effectively improved elementary school students' knowledge, attitudes, and skills. The value of knowledge in the intervention group increased. It was due to respondents receiving interventions in the form of counseling with the gamification method using the PODIO (Poster Pop Up Touchless Button Audio) model and media. To

increase the independence and awareness of students, students received counseling methods using PODIO (*Poster Pop Up Touchless Button Audio*), followed by students brushing their teeth together.

Health promotion using new media that is more attractive can change student attitudes compared to the media commonly used in health promotion and counseling (9). Attitude improvement occurs if there is a person's response after being given information and then weighing will act in accordance with the information provided (10).

The most important thing in maintaining oral and dental health is awareness and actions to sustain personal oral health. Dental health material is delivered attractively without reducing the material's content (11). Implementing health promotion programs is likely successful if participants experience increased knowledge through understanding the material, reflected in attitudes and performing skills (12). The PODIO (*Poster Pop Up Touchless Button Audio*) model and media are said to be successful because children are given an understanding of dental and oral health materials and perform simulations correctly to perform actions in accordance with the information provided.

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