

# Dental and Oral Disease Education Model in Improving Knowledge and Attitudes of Dental Health Care in Adolescents

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**Abstract:-** Prevention of dental and oral diseases has been widely done with promotional and preventive efforts but has not succeeded in improving dental health maintenance behavior in adolescence. The strategy of addressing this problem is through a conventional approach to dental health education. But there are still obstacles such as easily damaged, the message delivered is not delivered in full because sometimes there are only pictures without captions. education is influenced by interesting media so that the delivery of materials is more effective. The educational media that is developing today among teenagers is technology-based media. The Purpose to produce an android-based dental and oral disease education model as a medium of dental health education and analyze the effectiveness of android-based education models in improving the behavior of maintaining the health of adolescents' teeth and mouths. The Research Method use Research and Development (R&D) and test model using quasy experiment (pre and post-test with control group design). The study subjects were divided into 2 groups: the intervention of 45 children and the control of 45 children. The data was tested using wilcoxon test and mann-whitney test. **Result:** Android-based education model is worthy as a medium of dental health education ( $p=0.004$ ) and effectively improves adolescent knowledge ( $p=0.002$ ), adolescent attitudes ( $p=0.01$ ) and is effective on information quality ( $p<0.001$ ). **Conclusion:** Android-based education has the potential to increase the knowledge of maintaining the health of adolescents' teeth and mouths.

**Keywords:-** Education, Android, Dental And Oral Diseases, Adolescent.

## I. INTRODUCTION

Dental and oral health is a very important health to be aware of in addition to other general body health[1].

Basic Health Research of the Indonesian Ministry of Health in 2018 reported that teenagers aged 10-14 years obtained data of 73.4% experienced caries, swollen gums or pulpitis by 23.6%, and stomatitis / canker sores by 17.4%[2]. Surveys conducted in the United States and Denmark found 60% of gingivitis and periodontitis disease data in

adolescents[3]. They did not know that during puberty they were also prone to dental and oral health problems.[4]

According to the World Health Organization (WHO) the group of teenagers who enter the school age are teenagers aged 12-15 years, namely those who sit in the junior high school bench. This age group still needs guidance in maintaining dental and oral health.[5] The government's efforts to address the problem are by promoting dental and oral health using conventional media. The program has been implemented but there are still some obstacles in the use of conventional media that is easily damaged, the message delivered is not delivered in full because sometimes there are only images without captions.[6] [7]

Among teenagers in Indonesia, got the third most internet users[8]. Individuals who have mobile phones in Indonesia amounted to 77% or about 196.7 million people. Age 9-15 years, 62.8% use mobile phones and 51.4% use smartphones. [9]

Dental and oral health education services need to be improved in supporting access oriented to the quality of individual health in accordance with the industrial revolution 4.0 so that it needs to be managed comprehensively through an integrated technology.[10][8] The field of Information Technology (IT) has been widely utilized and applied as a solution in addressing dental and oral health problems and helping teenagers to improve dental and oral health maintenance behaviors.[11]

## II. METHODOLOGY

This research uses Research and Development (R&D) development method. which is used to produce android-based dental disease education models as a medium of dental health promotion and test the effectiveness of educational models in improving the knowledge of adolescent dental and oral health. Research and development procedure includes five main steps, namely: 1) Information Collection, 2) Model design, 3) Expert validation and revision, 4) Model trial, 5) Model results. Below is a picture of Research Development.

The design of this study using Quasy Experimental Design with pre-post test with control group design and the selection of respondents was not done randomly. Respondents consisted

of 90 junior high school students aged 12-15 years. The minimum sample size is calculated based on the sample size by Sastroasmoro et al, with  $\alpha = 0.05$  and power = 0.90. The minimum required sample size is 90. The sample was divided into two groups, namely 45 intervention groups and 45 control groups. Students in this study were taken from SMPN 21 and SMPN 26 in Semarang.

Instruments to measure knowledge, attitude, quality of information and feasibility of models using questionnaires. The research data used interval scale, interclass correlation coefficient statistical test to test the feasibility of the model, while normality test using Kolomogorov-Smirnov test due to the number of respondents more than 50. The effectiveness test on the data is not normal using wilcoxon test and Mann-Whitney test.

### III. RESULTS

#### A. information Collection

The results of information collection are conducted by interview method and systematic review where it can be concluded that the characteristics of adolescents vary where at this age they are in the phase of moving from childhood to adulthood. Efforts that need to be made to improve dental health are focusing on prevention through dental and oral health education. The selection of dental health education should be effective and accessible.

#### B. Design And Build

The design of "Android-based Dental and Oral Disease Education Model" uses system development with Rapid Application Development (RAD) method, following rad stages: design planning, RAD design workshop, and Implementation. Model design is based on data collection results. The substance of the model contains about dental diseases, ways of prevention and how to maintain good and correct teeth.

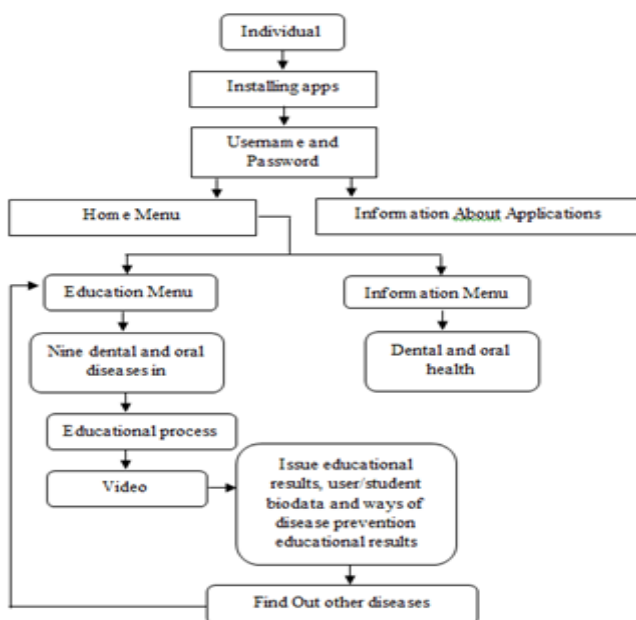


Fig 1:- Android-Based Education Model

#### C. Expert Validation

Table 1: - Expert Validation

N	F(%)	Mean	Category	p-value*
18	92%	96		0,004
18	98%		Excellent	
18	98%			

\*Interclass correlation Coeficient

Table 1 shows that expert validation results have a p-value of 0.004(<0.05), which means android-based dental and oral disease education models to improve adolescent dental and oral health maintenance behaviors are worthy as a medium of dental health education.

#### D. Experimental Design

##### • Intervention Group

Respondents conducted education independently with android-based education model for 21 days. Researchers set the model notifications so that notifications can enter each respondent's android.

##### • Control Group

Respondents conducted education with similar applications for 21 days. Researchers will remind respondents to conduct education through whatsapp groups formed during the study.

#### E. Model Test

Table 2. Respondent Characteristics Data

Variable	Intervention		Control		P-Value
	N	(%)	N	(%)	
Gender					
Male	18	40	16	35,6	0,668
Female	27	60	29	64,4	
Class					
VII	19	42,2	21	46,7	0,676
VIII	26	57,6	24	53,3	

\*Chi-Square

A total of 90 junior high school adolescents in this study with male gender were 18 (40%) and 16 (35.6%), women were 27 (60%) and 29 (64.4%) intervention and control groups. Class VII 19 (42.2%) and 21 (46.7%), class VIII 26 (57.6%) and 24 (53.3%) intervention and control groups. Table 2 shows that there are no significant differences between the two groups in the characteristic data (p=>0.05).

Table 3. Normality Data

Variable	p-value	
	Interventio n	Control
Knowledge pre-test	0,008	0,000
Knowledge post-test	0,000	0,000
Attitude pre-test	0,000	0,200
Attitude post-test	0,001	0,076
Quality of information pre-test	0,000	0,000

Quality of information <i>post-test</i>	0,000	0,001
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\*Kolmogorov-Smirnov

Table 3 shows the normality test of knowledge data, attitude, and quality of information is mostly abnormally distributed, so it can be continued with non-parametric tests.

Table 4. Adolescent Knowledge Effectiveness Test

Group	Mean±SD	Mean±SD	P-value
	Pre-Test	Post-Test	
<b>Test Paired Data*</b>			
Intervention	12,24 ±2,002	13,93±1,615	0,000
Control	10,44±4,224	12,38±2,674	0,001
<b>Test Data Not Paired **</b>			
	Mean±SD Pre-Test	Mean±SD Post-Test	
Intervention	12,24 ±2,002	13,93±1,615	
Control	10,44±4,224	12,38±2,674	
P-Value	0,204	0,002	
<b>Test Data Not Paired Change Values (Δ)**</b>			
	Mean±SD		
	Pre-Post Test		
Intervention	1,69±3,525		0,794
Control	1,94±2,429		

\*Wilcoxon \*\*Mann-Whitney

Table 4 shows the effectiveness test of paired and unpaired data on knowledge. In the paired data test showed that the p-value of the intervention group by 0.000 (p<0.05) means that the android-based dental disease education model effectively improves adolescent knowledge. The control group's p-value of 0.001 (p<0.05) means that applications in the control group effectively improve adolescent knowledge.

The test of effectiveness of non-paired data showed a p-value in the pre data of 0.204 (p>0.05) and in the post data of 0.002 (p<0.05) with a higher mean value compared to the control, meaning that the android-based dental disease education model was more effective at improving adolescent knowledge compared to applications used in the control group.

Table 5. Adolescent Attitude Effectiveness Test

Group	Mean±SD	Mean±SD	P-value
	Pre-Test	Post-Test	
<b>Test Paired Data*</b>			
Intervention	48,62±3,725	54,67±4,676	0,000
Control	45,98±7,560	47,91±5,226	0,045
<b>Test Data Not Paired **</b>			
	Mean±SD Pre-Test	Mean±SD Post-Test	
Intervention	48,62±3,725	54,67±4,676	

Control	45,98±7,560	47,91±5,226	
P-Value	0,042	0,000	
<b>Test Data Not Paired Change Values (Δ)**</b>			
	Mean±SD		
	Pre-Post Test		
Intervention	6,05±5,152		0,008
Control	1,93±6,913		

\*Wilcoxon \*\*Mann-Whitney

Table 5 shows the effectiveness test of paired and unpaired data on knowledge. In the paired data test showed that the p-value of the intervention group by 0.000 (p<0.05) means that the android-based dental disease education model effectively improves adolescent attitudes. The control group's p-value is 0.045 (p<0.05), meaning that the application in the control group effectively improves adolescent attitudes.

The data effectiveness test of non-paired change values (Δ) showed a p-value of 0.008 (p<0.05) with a higher mean value compared to control, meaning that android-based dental disease education model was more effective at improving adolescent attitudes compared to applications used in the control group.

Table 6. Information Quality Effectiveness Test

Group	Mean±SD	Mean±SD	P-value
	Pre-Test	Post-Test	
<b>Test Paired Data*</b>			
Intervention	24,82±3,179	29,82±2,871	0,000
Control	24,04±4,622	25,04±2,236	0,116
<b>Test Data Not Paired **</b>			
	Mean±SD Pre-Test	Mean±SD Post-Test	
Intervention	24,82±3,179	29,82±2,871	
Control	24,04±4,622	25,04±2,236	
P-Value	0,596	0,000	
<b>Test Data Not Paired Change Values (Δ)**</b>			
	Mean±SD		
	Pre-Post Test		
Intervention	5,00±3,662		0,000
Control	1,00±4,296		

\*Wilcoxon \*\*Mann-Whitney

Table 6 shows the effectiveness test of paired and unpaired data on knowledge. In the paired data test showed that the p-value of the intervention group of 0.000 (p<0.05) means that the information on the android-based dental and oral disease education model is effective against the quality of information in addition to respondents' understanding of dental and oral health maintenance. The control group's p-value is 0.116 (p>0.05) meaning that the information in the application used in the control group is ineffective on the quality of information in addition to respondents' understanding of dental and oral health maintenance in the effective control group.

The test of effectiveness of non-paired data showed a p-value in the pre data of 0.596 ( $p > 0.05$ ) and in the post data of 0.000 ( $p < 0.05$ ) with a higher mean value compared to the control, meaning that the information in the android-based dental and oral disease education model was more effective on the quality of information in addition to respondents' understanding of dental and oral health maintenance than the applications used in the control group.

**F. Model Result**

The resulting product is an android-based application to prevent dental and oral health problems in adolescents. Educational application contains several menus:

1. Menu *Log in*



Fig 2:- Log In

2. Home Menu

On the main menu there is a homepage, information and log out. The homepage consists of an educational menu containing dental and oral diseases. for information about the application and to log out is used when the user wants to exit the application.



Fig 3:- Home Menu

**IV. DISCUSSION**

Based on the research conducted it can be concluded that improving dental health maintenance behavior in adolescents is necessary promotional and preventive through health education.[12] Dental and oral health education is a maintenance in dental health, dental health research, and emergency medicine for the needy. [13]

The implementation of dental health education requires media. Media is a tool that affects health education in the delivery of information to individuals / groups that can be touched, felt, heard or kissed so as to generate interest in the target, facilitate the provision of health information, give rise to one's desire to know, deepen and do. [14] Media is divided into print and electronic media.

Electronic media is a medium that involves the senses in a person. The advantages of this electronic media include, more easily understood, involving all sensory, there are sounds and images that move so that it attracts more attention.[15] [16]

This android-based dental disease education model is given to adolescents to improve the maintenance of dental and oral health by looking at improved knowledge and attitudes in adolescents. Improved year-on-year and attitudes towards dental health maintenance were identified using questionnaires. The results of the Mann-Whitney statistical test show knowledge ( $p\text{-value}=0.002$  Table 4) and the statistical test results of Mann-Whitney attitude show ( $p\text{-value}=0.008$  Table 5).

According to Mubarak knowledge is the result of learning a person from not knowing to being aware of objects through his senses. [17]

In this study, adolescent knowledge increased because the material on dental disease education model uses easy-to-understand language and material accompanied by color images and videos that make teenagers do not get bored easily in digging for dental health information. Eka et al research (2019) proves that dental health counseling using flipcharts is more effective than counseling using phantoms because of images that make children remember more in a long period of time. [18] The increasing attitude of youth is also influenced by good knowledge. . Information from the media will carry an inviting message where if the message is strong will provide an effective basis to assess something so that a good attitude direction is formed.[19] Suryaningsih, E, et al's research proves that dental health counseling using video improves children's attitudes in dental care. [20]

The change in one's attitude is inseparable from the process of knowledge that increases from not knowing to knowing then understanding and making attitude patterns change. A person can be kind after learning that if they do not change healthy behaviors will be at risk of becoming ill. [21]

Android-based dental disease education model is also effective against the quality of information. The results of the Mann-Whitney statistical test show the quality of the information ( $p\text{-value}=0.000$  Table 6). The quality of information in the educational model effectively adds to the understanding of the maintenance of dental and oral health in adolescents. Interesting educational media can raise the spirit and motivation of children's learning. Interesting media is a medium that contains color images and videos that are easy to understand so that the education given to children is not monotonous. [22]

**V. CONCLUSION**

Adolescent age group is an age group that is very difficult to accept changes and prone to tooth and mouth diseases, so it is necessary a method of education with interesting and not boring media that directly engages

adolescents so as to stimulate adolescent students to make changes in dental health behaviors that are good and correct.

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