

Educational Effectiveness of Android-Based Health Applications in Improving Community Knowledge and Behavior During The SARS-CoV- 2 Pandemic in Barengkrajan Village

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EDUCATIONAL EFFECTIVENESS OF ANDROID-BASED HEALTH APPLICATIONS IN IMPROVING COMMUNITY KNOWLEDGE AND BEHAVIOR DURING THE SARS- COV-2 PANDEMIC IN BARENGKRAJAN VILLAGE

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ABSTRACT

¹The Covid-19 pandemic has hit various countries around the world. Various preventive measures have been taken by the government to resolve this extraordinary case, such as physical distancing, social distancing, always wearing masks outside the home, etc. The impact of preventing Covid-19 greatly affects several sectors, especially the health service sector. Health services during the pandemic are changing very quickly, leading to online services (online); this aims to minimize direct interaction so that hospitals, health centers, and clinics have their own online systems from registration to consultation. This study aims to determine the effectiveness of e-health application education STIKES RS Anwar Medika in increasing the knowledge and behavior of the community. The research method used in this study is a quasi-experimental research method with a pre-post control group design with the research sample being residents of Barengkrajan Village, Dusun Badas and Dusun Bantengan. The results of this study are that there are differences in people's knowledge and behavior between before and after being given education related to the e-health application of STIKES at Anwar Medika Hospital and there is a relationship between knowledge and community behavior related to PHBS. This is evidenced by the Pearson correlation parametric statistical test where the results show that there is a positive correlation with a very strong and significant correlation strength.

Keywords: E-Health Application, Covid-19, Education, Knowledge and Behavior Improvement

INTRODUCTION

⁶At the beginning of 2020, the world was shocked by the outbreak of the Coronavirus (Covid-19), which infected almost all countries in the world. WHO has declared the world has entered a global emergency¹ related to the Covid-19 virus since January 2020. The government has taken various preventive measures to resolve this extraordinary case, such as physical distancing, social distancing¹ working from home, always wearing masks outside the home, and social restrictions. Large scale. The impact of preventing Covid-19 has greatly affected several sectors, especially the health service sector. Future pandemic health care change very quickly which leads to the online service (online), it is intended that

direct interactions can be minimized so that hospitals, health centers, and clinics have the system *online* itself from registration to consultation ¹.

Education Online (*online*) appeared to have a positive effect, namely to minimize the interaction of many people, it is not only used for the prevention Covid-19, but also to increase public knowledge and safety in general, especially in patients who need to be educated continuously. The era of the industrial revolution 4.0 is an era that greatly utilizes technology, STIKES Anwar Medika Hospital wants to contribute by creating an application that can be used on each individual *smartphone* called the *e-health* application. One of the reasons for the creation of the *e-health* application is because there is a new policy in health control to hospitals so that some hospitals apply if it is not too emergency, then there is no need to go to the hospital. However, a beneficial application will be wasted if people do not know about the usefulness of the application ².

The creation of an *e-health* application by STIKES RS Anwar Medika is an innovation that supports the prevention of Covid-19 in East Java, especially in Sidoarjo, where Sidoarjo is one of the districts with the highest number of positive cases of Covid-19 in East Java. The area that is the center of attention for the Covid-19 number in Sidoarjo is Barengkrajan Village, where according to the official Covid-19 website, Barengkrajan Village is the village in the Krian area with the most positive Covid-19 numbers. So based on the above background, the researcher is interested in conducting a study with the title "Educational Effectiveness of Android-Based Health Applications in Increasing Community Knowledge and Behavior During the Sars-Cov-2 Pandemic In Barengkrajan Village".

MATERIALS AND METHODS

The research carried out is a *quasi-experimental* type of research with a *pre-post control group design*. This research was conducted from January 2021 – March 2021. The research location covers the entire area of Barengkrajan Village, Krian District, Sidoarjo Regency. The population in this study were residents of Barengkrajan Village, Krian District, Sidoarjo Regency with an age range of 20 - 45 years, totaling 1,687 people. Sampling was based on certain criteria set by the researcher with a *non-random sampling* technique where the sampling technique was *purposive sampling*. Analysis of the data used in this study is a different test *t-test*. The *t-test* difference test is one of the testing methods of *parametric statistical tests*, where this test will show how far the influence of the independent variables in explaining the dependent variable. Analysis of the research data was carried out by measuring the *Likert* scale with the classification of answers for the variable knowledge score of 4 (strongly agree), 3 (agree), 2 (disagree) and 1 (strongly disagree) while the classification of answers for the behavioral variable scored 4 (very often), 3 (often), 2 (rarely) and 1 (never). After all respondents filled out the questionnaire that had been given, data was collected, then the standard deviation was calculated to determine whether there were differences in people's knowledge and behavior between before and after being given education.

RESULTS

This research has previously tested the validation and reliability of the questionnaire using SPSS 26. Validation test is used to test whether each question has valid results or not so that it can proceed to the next stage. The validity test was carried out using the *Corrected item total correlation* method by correlating each item's score with the total score and making corrections to the overestimated correlation coefficient value. The validation results in this study are valid because they have a calculated *r* value > *r* table, where the *r* table value is 0.361 with 15 questions on knowledge variables and 15 questions on behavioral variables, for 30 respondents and with a significance level of 0.05. Furthermore, a questionnaire reliability test was conducted using SPSS 26. The instrument is said to be reliable if it is used several times to measure the same thing, it will produce the same data ². The results of the questionnaire reliability test were carried out using *Cronbach's Alpha* method which was measured based

on Cronbach's Alpha 0 to 1. The reliability results in this study were reliable because they had an arithmetic value $> r$ table, where the r table value was 0.361 with 15 questions for knowledge variables and 15 questions for variables. Behavior, for 30 respondents and with a significance level of 0.05.

After the questionnaire is declared valid and reliable, then the questionnaire can be disseminated. After the research is completed and all data is collected, the next step is the normality test, homogeneity test, correlation test, paired t-test, and independent t-test. The results of the normality test of the questionnaire are normal because, according to Dunakhri in 2019, a questionnaire said to be normal must have a significant value > 0.05 ⁴. The results of the homogeneity test of the questionnaire are homogeneous because according to Dunakhri in 2019, a questionnaire said to be normal must have a significant value > 0.05 ⁴. The results of the correlation test are divided into two, namely the correlation test in the control group and the correlation test in the intervention group, the correlation test between the control and intervention groups yields a *Sign* of 0.000. According to Hidayat in 2017, a questionnaire said to have a correlation between variables must have a *Sign* < 0.05 , so it can be concluded that the knowledge and behavior variables have a correlation in both the control and intervention groups.

The next test is the *paired t-test* which is a parametric difference test on two paired data, to see if there is a difference in the MEAN or the average of the two paired groups, the results of the *paired t-test* are that in the two groups there is an average difference - the average between the knowledge and behavior variables, so the results show that between the knowledge and behavior variables, both the control group and the intervention group the results are significant. However, in the behavioral variable results in the intervention group, there was a greater increase in results than the knowledge variable. It can be concluded that education related to PHBS and the use of health applications can have a positive impact on people's lives. The *independent t-test* was found that between the control group and the intervention group had the same average, so it can be concluded that there was no significant difference between the two groups.

The next step is the collection of demographic data, the demographic data included are the gender and age of the respondents. In the aspect of gender, the control group was dominated by men with 54 respondents, while the intervention group was dominated by women with 47 respondents. In the age aspect, the control group is dominated by the age range of 26-30 years, the intervention group is dominated by the age of 31-35 and 36-40 years by 18 respondents, while the intervention group is dominated by the age of 31-35 years by 28 respondents. After that, the questionnaire results were grouped based on *pre* and *post* categories. The distribution of respondents in the *pre test* category in the control group resulted in 11 respondents in the low category, 55 respondents in the medium category, and 15 in the high category, while in the *post-test* category, there were 10 respondents in the low category, 55 respondents in the medium category, and 16 respondents in the high category. The distribution of respondents in the *pre-test* category in the intervention group resulted in 11 respondents in the low category, 57 respondents in the medium category, and 13 respondents in the high category, while the *post-test* category resulted in 6 respondents in the low category, 60 respondents in the medium category, and 15 respondents in the high category. Next is the determination of the category of variables per each domain. Each knowledge and behavior variable has nine domain, where all the domains of the control group and the intervention group are in the moderate category.

DISCUSSION

This research was carried out from February 2021 to April 2021 in Barengkrajan Village, Badas and Banten hamlets with a total of 162 respondents divided into 81 respondents from Badas Hamlet and 81 respondents from Bantengan Hamlet. This research was conducted using a *pre post test* system with the division that the residents of Dusun Badas were included in the control group while Dusun Bantengan residents were included in the intervention group. The control group was given a questionnaire containing

knowledge and behavior related to PHBS and drug information without providing education, while the intervention group was given a questionnaire containing knowledge and behavior related to PHBS and drug information and required to install the *e-health* application of Hospital STIKES Anwar Medika on each respondent's *smartphone* and provided education regarding information on the use of *e-health* applications and information contained in applications such as PHBS and drug information. The researcher gave 14 days for the intervention group respondents to be able to conduct consultations or seek information through the STIKES *e-health* application at Anwar Medika Hospital.

Next, the researcher tabulated the data per individual starting from the *pretest* to the *posttest* per group. The results of the study in the control group resulted in individual data on the *pretest* were 11 respondents in the low category, 55 respondents in the medium category, and 15 respondents in the high category. The results obtained on the respondents allow researchers to make observations. Respondents in the low category are respondents aged 36 - 40 years and 41 - 45 years, this is because at that age respondents are more likely to focus on work so that respondents indirectly ignore health-related problems. The medium category is dominated by respondents aged 26-30 years and 31-35 years, this is because at that age respondents still have an awareness of the importance of maintaining health so that respondents are quite careful in maintaining health. how to maintain health in several media. The high category is dominated by respondents aged 20-25 years, this is because at that age respondents have a high awareness of the importance of maintaining health besides that respondents at that age often get information related to health problems from various media and educational institutions which result in them having high awareness. After doing the *pretest* research, the next is *posttest* research with the results that 10 respondents are in the low category, 55 respondents are in the medium category, and 16 respondents are in the high category. Based on these results, there was a reduction of 1 respondent in the low category, 0 respondents in the medium category, and the addition of 1 respondent in the high category. The researcher conducted an analysis related to the shift in the category, resulting in an analysis that there was an increase in knowledge of PHBS and drug information due to widespread health promotion in several media even though respondents did not install the STIKES *e-health* application at Anwar Medika Hospital. Based on this, the media plays a role in knowledge and behavior change, this is in accordance with the statement of Hakim & Kadarullah in 2016 which explained that there is a variety of information in the mass media that affects various aspects, one of which is the cognitive aspect or one's knowledge ⁶.

The results of the study in the intervention group resulted in individual data on the *pretest* were 12 respondents including the low category, 54 respondents including the medium category, and 15 respondents including the high category, this is obtained from the range of values listed in Table 4.12. Respondents in the low category are respondents aged 36 - 40 years and 41 - 45 years, this is because at that age respondents are more likely to focus on work so that respondents indirectly ignore health-related problems. The medium category is dominated by respondents aged 26-30 years and 31-35 years, this is because at that age respondents still have an awareness of the importance of maintaining health so that respondents are quite careful in maintaining health. how to maintain health in several media. The high category is dominated by respondents aged 20-25 years, this is because at that age respondents have a high awareness of the importance of maintaining health besides that respondents at that age often get information related to health problems from various media and educational institutions which result in them having high awareness. In addition, this age is a critical age in finding information, including through online media. After doing the *pretest* research, the next is *posttest* research with the results of 7 respondents including the low category, 56 respondents including the medium category, and 18 respondents including the high category. Based on these results obtained a reduction of 5 respondents in the low category, the addition of 2 respondents in the medium category, and the addition of 3 respondents in the high category. The researcher conducted an analysis related to the shift of the

category¹ resulting in an analysis that there was an increase in knowledge of PHBS and drug information due to the effectiveness of the STIKES *e-health* application at Anwar Medika Hospital. Based on this, the *e-health* application STIKES Hospital Anwar Medika is an effective health application because according to Yuliet & Mulyono in 2020 that there are three main functions of using smartphone applications in society, namely, as an educational tool, improving health education and lifestyle behavior, optimizing the use of limited resources, overcoming geographic and financial barriers and improving the use of health services, home care and self-management to improve disease prevention and management⁷.

Next, the researcher tabulated the data per statement group starting from the *pretest* to the *posttest* per statement which was divided into two variables, namely knowledge and behavior. Variable knowledge has seven groups of statements that will be compared the results between the *pretest* and *posttest* with entirely the result is **Average**, but although overall had moderate results are the percentage difference between *pretest* and *posttest*. The results of the Covid-19 prevention statement group by washing hands were that in the control group there was an increase of 1.84% while in the intervention group there was an increase of 2.59%. The results of the Covid-19 prevention statement group with antiseptic soap and hand sanitizer were that in the control group there was an increase of 0.84% while in the intervention group there was an increase of 1.25%. The results of the Covid-19 prevention statement group by wearing masks were that in the control group there was an increase of 3.70% while in the intervention group there was an increase of 1.27%. The results of the Covid-19 prevention statement group with *social distancing* were in the control group there was an increase of 0.38% while in the intervention group there was an increase of 0.97%. The results of the drug information statement group were that in the control group there was an increase of 2.17% while in the intervention group there was an increase of 3.62%. The results of the *lifestyle* statement group during the pandemic were that in the control group there was a decrease of 0.95% while in the intervention group there was an increase of 1.83%. The results of the Covid-19 symptom statement group were that in the control group there was an increase of 5.31% while in the intervention group there was an increase of 0.17%. Based on the results of these percentages, it can be concluded that from the 7 statement groups the increase was dominated by the intervention group. The analysis of the increase in the percentage increase in the control group is the number of media providing information related to PHBS related to Covid-19 prevention so that the percentage data has increased while the lack of information related to *life style* during the pandemic caused a decrease in the percentage. The analysis of the increase in the percentage of all intervention groups is that in the *e-health* STIKES application at Anwar Medika Hospital there is various information ranging from PHBS prevention of Covid-19 to drug information so that respondents find it easier to get the information, besides that there is a feature to consult doctors and pharmacists so that the information obtained is more valid.

Next, the researcher tabulated the data per statement group starting from the *pretest* to the *posttest* per statement which was divided into two variables, namely knowledge and behavior. Behavioral variables have 7 groups of statements that will be compared the results between the *pretest* and *posttest* with all of them being moderate, but even though all of them have moderate results, there is a difference in percentage between the *pretest* and *posttest*. The results of the Covid-19 prevention statement group by washing hands were that in the control group there was a decrease of 1.07% while in the intervention group there was an increase of 0.78%. The results of the Covid-19 prevention statement group with antiseptic soap and hand sanitizer were that in the control group there was a decrease of 0.83% while in the intervention group there was an increase of 1.66%. The results of the Covid-19 prevention statement group by wearing masks were that in the control group there was a decrease of 3.27% while in the intervention group there was an increase of 3.65%. The results of the Covid-19 prevention statement group with *social distancing* were in the control group there was a

decrease of 0.57% while in the intervention group there was an increase of 1.75%. The results of the drug information statement group were that in the control group there was a decrease of 4.24%, while in the intervention group there was an increase of 3.00%. The results of the *lifestyle* statement group during the pandemic were that in the control group there was an increase of 1.88% while in the intervention group there was an increase of 0.07%. The results of the Covid-19 symptom statement group were that in the control group there was an increase of 5.96% while in the intervention group there was an increase of 2.11%. Based on the results of these percentages, it can be concluded that from the 7 statement groups the increase was dominated by the intervention group. The analysis of the increase in the percentage increase in the control group is on the *lifestyle* and symptoms of Covid-19, this is because the respondents have sufficient knowledge so that they apply it, besides the fear of being infected with Covid-19 causes respondents to study more about *life style* and symptoms to know more, while in the statement which experienced a decline in behavior because respondents still paid less attention to small things that could prevent Covid-19 even though respondents had sufficient knowledge to be able to better implement the correct behavior. The analysis of the increase in the percentage of all intervention groups is that in the *e-health* STIKES application at Anwar Medika Hospital there is various information ranging from PHBS prevention of Covid-19 to drug information so that respondents find it easier to get the information, besides that there is a feature to consult doctors and pharmacists so that the information obtained is more valid which will give respondents confidence to improve PHBS behavior and know how to use drugs.

Based on the results of the tabulation of individual and group statements of each variable, it can be concluded that the intervention group experienced an increase in overall better than the control group although indirectly the results of the statement group tabulation were Moderate in both research groups. The increase in the score from the intervention group indirectly proves the effectiveness of the *e-health* application STIKES Anwar Medika Hospital because the *e-health* application has features such as watching educational videos, reading normal value info, nutritional info, supplements and drugs and other health information. The *e-health* STIKES application at Anwar Medika Hospital provides health services such as consultations between patients and health workers, so that respondents in the intervention group are able to manage their time during the pandemic without the need to come directly to the health care center by optimizing existing facilities, thus activeness. respondents in the intervention group in building their own knowledge through the *e-health* application STIKES Anwar Medika Hospital are expected to help government programs in breaking the chain of the Covid-19 virus.

Another advantage that supports effective *e-health* application education is shown by several factors, including the activeness of respondents in consulting both with doctors and pharmacists so that respondents have more knowledge than control group respondents who do not use *e-health* applications. Another advantage is that respondents in the intervention group do not need to pay to consult a doctor or pharmacist because respondents are able to consult online through the *e-health* application STIKES Hospital Anwar Medika.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the study, it can be concluded that there are differences in people's knowledge and behavior between before and after being given *e-health* application education, this is evidenced by an increase in the value of each individual on the average value in the knowledge variable and behavior variable between before and after being given health education. . In addition, there is also a relationship between knowledge and community behavior related to PHBS. This is evidenced by the Pearson correlation parametric statistical test where the results show that there is a positive correlation with a very strong and significant correlation strength.

Advice from researchers is the existence of the application of *e-health* STIKES Anwar Medika Hospital today is the first step in health care based on Android desperately needed, especially during the current

pandemic, for it is necessary for updating information ter -*Update* every week and feature development for the app *e-health* can continue to provide maximum *digital health* services.

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ATTACHMENT

Research Results Table

Table 1. Average Results of the Knowledge Variable Questionnaire

No	Domain	Control					Intervention				
		Pre		Post		percentage %	Pre		Post		Percentage (%)
		Average	Category	Average	Category		Average	Category	Average	Category	
1.	Prevention of Covid-19 by washing hands	2.45	Currently	2.53	Currently	1.84%	2.44	Currently	2.57	Currently	2.59 %
2.	Prevention of Covid-19 with Antiseptic Soap and Hand Sanitizer	2.37	Currently	2.42	Currently	0.84%	2.37	Currently	2.43	Currently	1.25 %
3.	Prevention of Covid-19 by Wearing a Mask	2.35	Currently	2.53	Currently	3.70%	2.35	Currently	2.40	Currently	1.27 %

4.	Prevention of Covid-19 with Social Distancing	2.64	Currently	2.67	Current ly	0.38%	2.55	Currentl y	2.59	Curr entl y	0.97 %
5.	Drug Information	2.48	Currently	2.60	Current ly	2.17%	2.26	Currentl y	2.43	Curr entl y	3.62 %
6.	Life Style During the Pandemic	2.66	Currently	2.63	Current ly	-0.95%	2.68	Currentl y	2.78	Curr entl y	1.83 %
7.	Symptoms of Covid-19	2.67	Currently	2.98	Current ly	5.31%	3.01	Currentl y	3.02	Curr entl y	0.17 %

No	Domain	Control					Intervention				
		Pre		Post		Percen tage (%)	Pre		Post		Present tase (%)
		Averag e	Catego ry	Avera ge	Category		Average	Cate gory	Average	Cate gory	
1.	Prevention of Covid-19 by washing hands	2.52	Current ly	2.48	Currently	-1.07%	2.53	Curr ently	2.57	Curre ntly	0.78%
2.	Prevention of Covid-19 with Antiseptic Soap and Handsaniti-zer	2.42	Current ly	2.39	Currently	-0.83%	2.38	Curr ently	2.45	Curre ntly	1.66%
3.	Prevention of Covid-19 by Wearing a Mask	2.53	Current ly	2.37	Currently	-3.27%	2.39	Curr ently	2.52	Curre ntly	3.65%
4.	Prevention of Covid-19 with Social Distancing	2.66	Current ly	2.63	Currently	-0.57%	2.53	Curr ently	2.62	Curre ntly	1.75%
5.	Drug Information	2.58	Current ly	2.37	Currently	-4.24%	2.43	Curr ently	2.58	Curre ntly	3.00%
6.	Life Style During the Pandemic	2.61	Current ly	2.71	Currently	1.88%	2.82	Curr ently	3.03	Curre ntly	0.07%
7.	Symptoms of Covid-19	2.68	Current ly	3.02	Currently	5.96 %	2.78	Curr ently	2.90	Curre ntly	2.11%

Table 2. Average Results of Behavioral Variable Questionnaire

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