NVEO
Natural Volatiles &
Essential Oils

Strategies For Improving Behavioral Early Detection Of Cervic Cancer İn Reliable Age Women İn Medan City

Fatwa Imelda[1,*], Heru Santosa [2], Sarma Nursani L. Raja [3], Namora Lumongga Lubis[2]

[1]Student of Doctoral Study Program, Faculty of Public Health, University of North Sumatra, Medan, Indonesia

[2]Department of Demography and Biostatistics, Faculty of Public Health, University of North Sumatra, Medan, Indonesia

[3]Department of Obstetrics and Gynecology, Faculty of Medicine, University of North Sumatra, Medan, Indonesia

Abstract

The early detection program that has been carried out in Indonesia in anticipating cervical cancer by using the IVA test method is one of the programs that is integrated with activities at the puskesmas that are carried out on women of childbearing age (WUS), but the number of women who do early detection of cervical cancer is still low. . The most dominant obstacle is the lack of knowledge and low attitude. The Cervical Cancer Free Group (GBKS) application is an educational method using a Smartphone that can be installed on the Playstore Application.

The purpose of this study was to compare the Strategy to Improve Behavioral Early Detection of Cervical Cancer in Women of Childbearing Age in Medan City.

Research Methods Research design This research was conducted with a quantitative approach, namely Quasi Experiment with a Pre post Design approach with Control Group. The group was divided into 3 groups, namely the Control Group (without treatment), the Conventional Method group (Leafleat) and the GBKS Application Group on the Play store. This study involved 150 women of childbearing age with non-probability sampling by purposive sampling (50 for the control group, 50 for the conventional group and 50 for the GBKS application group). Data were collected through questionnaires and observations, then analyzed using pre-test and post-test methods. Knowledge test and attitudes using Mc Nemar analysis.

The results of the analysis of the differences between the pretest and posttest on the control, conventional, and GBKS application showed that there were differences in knowledge based on the results of the pretest and posttest in the three groups with p-values of 0.05 each. based on the results of the pretest and posttest in the control, conventional, and GBKS application groups all also showed differences in the results of the pretest and posttest with p-values of 0.012, 0.023 and 0.0001, respectively. However, the comparison of behavior based on the results of the pretest and posttest in the control group, conventional, and GBKS application, in the control and conventional groups did not show any difference in behavior in conducting early detection of the IVA test on the pretest and posttest with p values of 0.063 and 0.070, respectively (p is greater than 0.05). Only the GBKS Application strategy showed differences in behavior based on the results of the pretest and posttest with a p value of 0.0001.

Discussion: The results showed that the GBKS method was the most effective strategy used to improve the behavior of women of childbearing age to increase early detection of cervical cancer.

Conclusions and Research Suggestions: Mobile application-based health intervention is an effective strategy to improve health promotion behavior. This study shows that the use of mobile applications can improve health with early detection measures, thereby reducing cervical cancer morbidity and mortality. Future research should discuss the feasibility and effectiveness of using mobile applications for health promotion in developing countries. Researchers suggest recommending the use of the GBKS Application in WUS to improve behavior for early detection of cervical cancer.

Keywords: Strategy, Early Detection Behavior of Cervical Cancer, Implementation of GBKS

Introduction

February 4th every year is observed as World Cancer Day or World Cancer Day. Data from [1], cervical cancer cases in Indonesia reached 32,469 people. The death rate from cervical cancer reaches 18,279 people per year, meaning that around 50 Indonesian women die from cervical cancer. Globocan data states that in 2018 Asia was ranked 23rd and cervical cancer data was 23 point 4 per 100,000 population with an average death rate of 13 point 9 per 100,000 population. Every year there are about 400,000 new cases of cervical cancer, 80 percent of which occur in women living in developing countries. Based on Riskesdas data, the prevalence of cancer in Indonesia showed an increase from 1 point 4 per 1,000 population in 2013 to 1 point 79 per 1,000 population in 2018, with a very high mortality rate, with cervical cancer estimated to occur every 11 minutes. one person in the world who dies of cervical cancer, and every 3 minutes a new case occurs. Based on the latest data from the Ministry of Health as of January 31, 2019, there were 23 point 4 cervical cancers per 100,000 population with an average mortality rate of 13.9 per 100,000 population. The incidence of cervical cancer increases from the age of 25 to 34 years and shows its peak in the 45 to 54 year age group with an Age Specific Death Rate (ASDR) of 29 point 5 per 100,000 women[2].

According to data from the North Sumatra Provincial Health Office, there were 283 cases of cervical cancer with the highest prevalence occurring at the age of 45 to 54 years. The high prevalence of cervical cancer patients at Haji Adam Malik Hospital in 2017 has treated 5,007 cervical cancer patients (new and old patients) and 121 cervical cancer patients treated in the emergency department. The 2018 Risekesdas data explains that people living in urban areas have a greater prevalence compared to rural areas from 1 point 7 percent in 2013 increasing to 2 point 06 percent in 2018.

The results of Dwi's research[3], factors related to the incidence of cervical cancer in dr. The most dominant Sardjito is having many partners and the age at first having sex is less than or equal to 20 years and there is a history of using oral contraceptives or pills. The results of the study by Fitrisia[4] at the Bungo Health Center there was a significant relationship (p<0.05) between the incidence of cervical precancerous lesions with age more than 35 years, age at first sexual intercourse less than 20 years, parity more than or equal to 4 time. , using vaginal cleansers, and duration of use of hormonal contraception more than or equal to 5 years.

Most of the early stages of this disease are asymptomatic and symptoms in more advanced stages can include vaginal bleeding, especially after sexual intercourse, foul-smelling vaginal discharge (Fluor Albus), or other symptoms related to tumor invasion or infiltration into other organs. (Cervical Cancer Management Committee). Due to the lack of symptoms caused by cervical cancer, treatment is often delayed so that the increase in cases continues to occur and the mortality rate continues to shift every year and often occurs at a younger age.

Especially for cervical cancer, based on data from various hospitals, it is known that 70 percent of cancer patients come after their condition has reached the fourth or final stage [5]. Cervical cancer is one of the cancer diseases that is an epidemiological burden in Indonesia, various prevention efforts have been carried out, namely early detection of cervical cancer. Prevention of cervical cancer can be done in three

ways, namely primary, secondary and tertiary prevention. Primary prevention that can be done so as not to be infected with the Human Paviloma Virus can be done by health education and vaccination of the Human Paviloma Virus. The Human Paviloma Virus vaccination can be given to girls who are not yet sexually active. Human Paviloma Virus vaccination has not been used as a mass immunization because it is still too expensive and its use is limited to poor countries[6]. Secondary prevention is early detection and appropriate treatment for those who have been diagnosed with cervical cancer. Tertiary prevention can be in the form of disability prevention and rehabilitation[7].

Cervical cancer can be found at the pre-cancerous stage (precancerous lesions) by the IVA Test method. According to WHO and the Indonesian Ministry of Health[8], the advantages of the IVA test are that it is easy, simple, inexpensive, and affordable with a wider scope and can be done every three years at the age of 25 to 60 years. . The VIA test is an examination by observing the cervix that has been stained with acetic acid or three to five percent vinegar for one minute. The abnormal area will change color with a firm border that becomes white (Acetowhite) which indicates the cervix may have a precancerous lesion[9].

The early detection program that has been carried out in Indonesia in anticipating cervical cancer using the IVA test method is one of the programs that is integrated with activities at the puskesmas which are carried out on women aged 30 to 50 years. 34 of 2015 concerning Management of Breast Cancer and Cervical Cancer.

The Medan City Health Office stated that all 41 Puskesmas in Medan City had provided early detection services for cervical cancer with the IVA test method. It was found that the percentage of women of childbearing age who underwent an IVA test in 2015 was only around one point 26 percent, while in 2016 there were 2,493 people, with 110 positive VIA findings. The highest percentage was at the Medan Tuntungan Health Center, which was around five percent and five percent empty. Until 2019, in North Sumatra, early detection of cervical cancer using the IVA Test method had been carried out on 113.416 women aged 30-50 years (5.07%). 4.5%). Data shows that the coverage of the IVA test in North Sumatra Province and Medan City is still very low and has not yet reached the national target of 50 percent[10]. The research of Sahr[11] shows that most women of childbearing age have not done the IVA test because of the Cues to Action perception that they are not motivated to do the IVA test due to the lack of information about the IVA test.

One of the health promotions that can be implemented to change people's behavior is the education method. Education as a strategy in increasing individual health beliefs about cervical cancer and early detection of cervical cancer[12]. Health promotion media that are often used are image media such as leaflets and posters. Leaflet media is printed media in the form of leaflets that function to convey health information or messages through folded sheets with short words. This leaflet media is classified as conventional media, because although it is often used, it is not comparable to the decrease in the incidence of cervical cancer in Indonesia. This is in line with the research of Ismarwati[13]. Audiovisual media are widely used in the current 4 point 0 industrial revolution era for the needs of health services that utilize technological developments such as smartphones. According to Coughlin[14], smartphones were chosen because they are friendly to use by almost all ages, even children. The use of smartphones makes health promotion activities cheap. Smartphone media that uses the Play Store application feature. Audiovisual media is provided through digital media using spoken words in the form of illustrations, photos, animations or videos[15]. Research by Abiodin[16] stated that education using multimedia in one meeting can increase knowledge and attitudes, but does not affect the behavior of early detection of cervical cancer. Therefore, education can be carried out several times so that it can not only increase knowledge and attitudes, but also improve early detection behavior[17]. Based on the foregoing, health promotion with education with

various strategies becomes a process of activity so that everyone is able to increase their knowledge, to be able to improve their health status.

Materials and Methods

Study Design

This research is a quantitative research, meaning that it fulfills all the requirements to test the causal relationship with a Quasi Experimental Design approach using a Pre Post Design With a Comparison Group because in this study the researcher provided an intervention or intervention to the research subject, then the intervention was measured and analyzed.

Participant

In this study, the total population of women of childbearing age in Medan, North Sumatra amounted to 685,218 women of childbearing age. Dropout criteria. The drop out criteria are as follows: Did not follow the research completely, Moved from the research location (out of town).

Grouping of sample members. The grouping of sample members in the intervention group and control group was not done randomly, the intervention group became the selected research subject. Sampling was carried out in the working area of the Medan Sunggal Health Center, namely in Sunggal Village, Tanjung Rejo Village and Babura Village. The researcher determined that the selected sample size was 150 women of childbearing age who were divided into 3 groups, with each group of 50 women of childbearing age, namely the control group, the conventional group (leaflets) and the GBKS application. group.

Procedure

This research was conducted from February to October 2021. All respondents who met the inclusion criteria and were willing to become respondents by signing the Informed Consent were grouped into 3 groups. The time for pre- and post-test data collection in each group was one week, for the control group without any intervention, and for the Conventional group, counseling was given using leaflet media 3 times a week, then for the GBKS Application group, the intervention was carried out for a week guided by researchers who receive information from each homepage. All groups that are members of the watssApps Group to direct and control respondents to receive educational information that will be provided.

Outcome Measurement

The instrument in this study uses a questionnaire and has been tested for validity and reliability. The validity tests carried out were Content Analysis Validity and Cronbach Alpha Reliability. A knowledge questionnaire with 25 questions about the respondent's understanding of cervical cancer and its prevention efforts with the behavior of doing the IVA test, in the form of multiple choice questions, with a score of less than 76 percent, a good score if the score is more than or equal to 76 percent. An attitude questionnaire with 25 questions, a negative score if the assessment result is less than 78 percent, and a positive score if the score is more than or equal to 78 percent. For the action sheet, use the observation sheet about doing the IVA test in the form of finished and not finished.

Statistical Analysis

Analysis using univariate and bivariate. Univariate analysis includes data on respondent characteristics, and bivariate analysis uses Mc Nemar to determine the difference between pretest and posttest results in the control group, conventional (leaflet) and GBKS.

Etical Consideration

This research has received ethical approval from the Health Research Organization Ethics Commission number 538/KEP/USU/2021 and a Research Permit from the Health Office number 440/23621/VI/2021.

Result

Table 1: Characteristics of Respondents

Variable	n	%
Age		
17-25 years	32	21,3
26-35 years	17	11,3
36-45 years	51	34,0
>45 years	50	33,3
Employment		
Self-employed	40	26,7
Private employees	19	12,7
PNS/retirees	33	22,0
Daily labor	6	4,0
Housewives	52	34,7
Education		
SD	6	4,0
SMP/SMA	57	38,0
Academi/PT	87	58,0
Total	150	100

Table 2: Results of Pretest and Posttest Knowledge of Early Detection of Cervical Cancer in Women of Childbearing Age in Medan City in 2021

Strategy	Knowledge											
	Pretest						Posttest					
	Less		Enough		Good		Less		Enough		Good	
	n	%	n	%	n	%	n	%	n	%	n	%
Control	38	76,0	12	24,0	0	0,0	0	0,0	28	56,0	22	44,0
Conventional	34	68,0	16	32,0	0	0,0	0	0,0	17	34,0	33	66,0
GBKS	35	70,0	13	26,0	2	4,0	0	0,0	9	18,0	41	82,0

Based on table 2, it can be seen that based on the results of the pretest, of the 50 WUS control groups the most knowledgeable people were 38 people or 76.0 percent, in the conventional group (leaflets) the most knowledgeable was 68.0 percent. 50 WUS, and From 50 WUS in the GBKS group there are 35 people or 70.0 percent who have less knowledge. After being given the intervention, based on the posttest results in all untreated groups, none of them had a lack of knowledge about early detection of cervical cancer. Of the 50 WUS in the control group there were 22 people or 44.0 percent whose knowledge increased to good and 28 people or 56.0 percent had sufficient knowledge, in the conventional group there were 33 people or 66.0 percent whose knowledge increased to good and 17 people or 34.0 percent knowledgeable enough, and the greatest increase in knowledge occurred in the GBKS group where there were 41 people or 82.0

percent who had good knowledge and 9 people or 18.0 percent had sufficient knowledge after being given the intervention.

Table 3: Results of Pretest and Posttest Attitudes for Early Detection of Cervical Cancer in Women of Childbearing Age in Medan City in 2021

Strategy	Attitudes							
	Pretest				Posttest			
	Negative		Positive		Negative		Positive	
	n	%	n	%	n	%	n	%
control	39	78,0	11	22,0	30	60,0	20	40,0
conventional	33	66,0	17	34,0	21	42,0	29	58,0
GBKS	38	76,0	12	24,0	11	22,0	39	78,0

Based on table 3, it can be seen that of the 50 WUS in the control group based on the pretest results, there were 39 people or 78.0 percent who were negative and 11 people or 22.0 percent who were positive. While in the conventional group, 66.0 percent had a negative attitude and 34.0 percent had a positive attitude towards early detection of cervical cancer. Of the 50 WUS in the GBKS group, 76.0 percent were negative and 24.0 percent were positive. After being given the intervention, based on the posttest results, it can be seen that in the control group there are 30 WUS or 60.0 percent who have a negative attitude and 20 people or 40.0 percent who have a positive attitude. In the conventional group, there were 21 people or 42.0 percent who had a negative attitude and 29 people or 58.0 percent who had a positive attitude. Of the 50 WUS in the GBKS group, 11 people or 22.0 percent had a negative attitude and 39 people or 78.0 percent had a positive attitude towards early detection of cervical cancer

Table 4: Pretest and Posttest Results of Cervical Cancer Early Detection Behavior in Women of Childbearing Age in Medan City in 2021

Strategy	Behavior							
	Pretest				Posttest			
	Don't Do		Do		Don't Do		Do	
	n	%	n	%	n	%	n	%
control	42	84,0	8	16,0	37	74,0	13	26,0
conventional	38	76,0	12	24,0	32	64,0	18	36,0
GBKS	40	80,0	10	20,0	6	12,0	44	88,0

Table 4 explains that based on the pretest results, out of 50 WUS in the control group, 42 people or 84.0 percent did not do it and 8 people or 16.0 percent did early detection of cervical cancer. While in the conventional treatment group (leaflets), 38 people, 76.0 percent did not do it and 12 people or 24.0 percent did early detection of cancer. Of the 50 WUS people who received GBKS treatment, 80.0 percent did not do it and 20.0 percent did early detection of cervical cancer. After being given the intervention, based on the posttest results, it was known that of 50 WUS people in the control group, 74.0 percent did not do it and 36.0 percent did early detection of cervical cancer. Meanwhile, in the leaflet group, there was an increase in behavior where 18 WUS or 36.0 percent did and 32 WUS or 64.0 percent did not do early

detection of cervical cancer. There was a significant increase in behavior in the GBKS group where there were 44 WUS or 88.0 percent who did early detection of cervical cancer and only 6 people or 12.0 percent who did not do it after being given an intervention using the GBKS application.

Table 5: Differences in Pretest and Posttest Results Knowledge of Early Detection of Cervical Cancer in Women of Childbearing Age in Medan City in 2021

Pretest	Posttest		Total	p
	Enough/Less	Good		
	n	n		
Control				
Enough/ Less	28	22	50	0,0001
Good	0	0	0	
Total	28	22	50	
Conventional (Leaflet)				
Good/ Less	17	33	50	0,0001
Good	0	0	0	
Total	17	33	50	
GBKS				
Enough/ Less	7	41	48	0,0001
Good	2	0	2	
Total	9	41	50	

Based on table 5, it can be seen that in the control group there are 28 people whose knowledge of the pretest results is sufficient/less and after the posttest the knowledge is still sufficient/less. There were 22 respondents whose pretest knowledge was sufficient/less, but after the posttest their knowledge increased to good. The p-value obtained is 0.0001 so it can be concluded that in the control group there are differences in knowledge of the results of the pretest and posttest.

Meanwhile, in the conventional method group using leaflets, there were 17 people who had sufficient/less knowledge of the pretest and after the posttest the knowledge was sufficient/less. There were 33 respondents whose pretest knowledge was sufficient/less, but after the posttest their knowledge increased to good. The p-value obtained is 0.0001, so it can be concluded that in the conventional group there are differences in the knowledge of the pretest and posttest results.

There were 7 people in the GBKS group who had sufficient/less knowledge of the pretest and after the posttest the knowledge was sufficient/less. There were 41 respondents whose pretest knowledge was sufficient/less, but after the posttest their knowledge increased to good. However, there are 2 respondents whose knowledge pretest results are good, but the posttest results have sufficient/less knowledge. The p-value obtained is 0.0001 so it can be concluded that in the GBKS group there are differences in the knowledge of the pretest and posttest results.

Table 6: Differences in Pretest and Posttest Attitudes for Early Detection of Cervical Cancer in Women of Childbearing Age in Medan City in 2021

Pretest	Posttest		Total	p
	Negative	Positive		
	n	n		
Control				
Negative	29	10	39	0,012
Positive	1	10	11	
Total	30	20	50	
Conventional (Leaflet)				0,023
Negative	15	18	33	
Positive	6	11	17	
Total	21	29	50	
GBKS				
Negative	8	30	38	0,0001
Positive	3	9	12	
Total	11	39	50	

Table 6 explains that in the control group there were 29 people whose pretest results had a negative attitude and after the posttest their attitude remained negative. There were 22 respondents whose pretest results had a negative attitude, but after the posttest their attitude changed to positive. However, there was 1 person who had a positive attitude at the time of the pretest, after the posttest his attitude turned negative. 10 respondents who initially had a positive attitude during the pretest, after the posttest their attitude remained positive. The p-value obtained is 0.012 so it can be concluded that in the control group there are differences in attitudes from the results of the pretest and posttest.

While in the conventional group there were 15 people whose pretest results had a negative attitude and after the posttest their attitude remained negative. There were 18 respondents whose pretest results had a negative attitude, but after the posttest their attitude changed to positive. However, there were 6 people who had a positive attitude at the time of the pretest, after the posttest their attitude turned negative. 11 respondents who initially had a positive attitude during the pretest, after the posttest their attitude remained positive. The p-value obtained is 0.023 so it can be concluded that in the conventional group there are differences in attitudes on the results of the pretest and posttest.

In the treatment group using the GBKS method, there were 8 people whose pretest results were negative and after the posttest their attitudes remained negative. There were 30 respondents whose pretest results had a negative attitude, but after the posttest their attitude changed to positive. However, there were 3 people who had a positive attitude at the time of the pretest, after the posttest their attitude turned negative. 9 respondents who initially had a positive attitude during the pretest, after the posttest their attitude remained positive. The p value obtained is 0.0001 so it can be concluded that in the GBKS group there are differences in attitudes on the results of the pretest and posttest.

Table 7: Differences in Pretest and Posttest Results of Cervical Cancer Early Detection Behavior in Women of Childbearing Age in Medan City in 2021

Pretest	Posttest		Total	p
	Don't Do	Do		
	n	n		
Control				
Don't Do	37	5	42	0,063
Do	0	8	8	
Total	37	13	50	
Conventional (Leaflet)				0,070
Don't Do	31	7	38	
Do	1	11	12	
Total	32	18	50	
GBKS				
Don't Do	6	34	40	0,0001
Do	0	10	10	
Total	6	44	50	

Based on table 7, it can be seen that in the control group there are 37 people whose behavior results from the pretest were not carried out and when after the posttest their behavior still did not do early detection of cervical cancer. There are 5 respondents whose behavior results from the pretest not being carried out, but after the posttest their behavior increases to be carried out. There were no respondents who did the pretest behavior, after the posttest their behavior changed to not doing. 8 respondents who initially did the pretest, after the posttest their behavior continued. The p value obtained is 0.063 (p is greater than 0.05) so it can be concluded that in the control group there is no difference in behavior based on the results of the pretest and posttest.

While in the conventional group (leaflets) there were 31 people whose behavior pretest results were not carried out and when after the posttest their behavior still did not carry out early detection of cervical cancer. There are 7 respondents whose behavior results from the pretest not being carried out, but after the posttest their behavior increases to be carried out. There was 1 respondent who at the time of the pretest his behavior was fine, after the posttest his behavior changed to not doing. 11 respondents who initially did the pretest, after the posttest their behavior continued. The p value obtained is 0.070 (p is greater than 0.05) so it can be concluded that in the conventional group there is no difference in behavior based on the results of the pretest and posttest.

In the group with GBKS treatment, there were 6 people whose behavior pretest results did not carry out and when after the posttest their behavior still did not carry out early detection of cervical cancer. There are 34 respondents whose behavior results from the pretest not being carried out, but after the posttest their behavior increases to be carried out. There were no respondents who did the pretest behavior, after the posttest their behavior changed to not doing. There were 10 respondents who initially did the pretest, after the posttest their behavior continued. The p value obtained is 0.0001 (p less than 0.05) so it can be concluded that in the GBKS group there are differences in behavior based on the results of the pretest and posttest.

Table 8: Relationship of Strategy Used (Control, Conventional, and GBKS Application) with Knowledge of Early Detection of Cervical Cancer Based on Posttest Results in Women of Childbearing Age in Medan City in 2021

Strategy	Knowledge				Total	p
	Good		Enough/Less			
	n	%	n	%		
Control	22	44,0	28	54,0	50	
Conventional	33	66,0	17	34,0	50	0,0001
GBKS	41	82,0	9	18,0	50	

Table 8 shows that the posttest results for 50 control group respondents, 44.0 percent have good knowledge and 54.0 percent have sufficient/less knowledge. While in the conventional group, 66.0 percent have good knowledge and 34.0 percent have sufficient/less knowledge. There are 82.0 percent of respondents in the GBKS group who have good knowledge and another 18.0 percent have sufficient/less knowledge about early detection of cervical cancer. Obtained a p value of 0.0001 (p less than 0.05) so that it can be concluded that there is a relationship between the strategies used and the increased knowledge of respondents about early detection of cervical cancer.

Table 9: Relationship of Strategy Used (Control, Conventional, and GBKS Application) with Attitudes of Early Detection of Cervical Cancer Based on Posttest Results in Women of Childbearing Age in Medan City in 2021

Strategy	Attitude				Total	p
	Positive		Negative			
	n	%	n	%		
Control	20	40,0	30	60,0	50	
Conventional	29	58,0	21	42,0	50	0,001
GBKS	39	78,0	11	22,0	50	

Table 9 shows that the posttest results for 50 respondents in the control group, 40.0 percent had a positive attitude and 60.0 percent had a negative attitude. While in the conventional group, 58.0 percent were positive and 42.0 percent were negative. There are 78.0 percent of respondents in the GBKS group who have a positive attitude and another 22.0 percent have a negative attitude towards early detection of cervical cancer. Obtained a p value of 0.001 (p less than 0.05) so that it can be concluded that there is a relationship between the strategies used and the attitude of respondents towards early detection of cervical cancer.

Table 10: Relationship of Strategy Used (Control, Conventional, and GBKS Application) with Cervical Cancer Early Detection Behavior Based on Posttest Results in Women of Childbearing Age in Medan City in 2021

Strategy	Behavior				Total	p
	Do		Don't Do			
	n	%	n	%		
Control	13	26,0	37	74,0	50	
Conventional	18	36,0	32	64,0	50	0,0001
GBKS	44	88,0	6	12,0	50	

Based on table 10, it can be seen that the posttest results in 50 control group respondents, 26.0 percent did and 74.0 percent did not do early detection of cervical cancer. While in the conventional group 36.0

percent did and 64.0 percent did not. There were 88.0 percent of respondents in the GBKS group who did and another 12.0 percent did not do early detection of cervical cancer. Obtained a p value of 0.0001 (p less than 0.05) so that it can be concluded that there is a relationship between the strategies used and the behavior of respondents towards early detection of cervical cancer.

The Most Effective Strategy to Improve Screening Behavior for Cervical Cancer Early Detection

Table 11: The Most Effective Strategy to Improve Cervical Cancer Early Detection Behavior in Women of Childbearing Age in Medan City in 2021

Strategy	The difference in P value between the results of the pretest and posttest		
	Knowledge	Attitude	Behavior
Control	0,0001	0,012	0,063
Conventional	0,0001	0,023	0,070
GBKS Application	0,0001	0,0001	0,0001

Based on the results of the analysis of differences in pretest and posttest using Mc Nemar's test, both in the control group, conventional (leaflet), and GBKS, it shows that there are differences in knowledge based on the results of the pretest and posttest in the three groups with p-values of 0.05 each. Meanwhile, the comparison of attitudes based on the results of the pretest and posttest in the control, conventional, and GBKS groups all also showed differences in the results of the pretest and posttest with p-values of 0.012, 0.023 and 0.0001, respectively. However, the comparison of behavior based on the results of the pretest and posttest in the control, conventional, and GBKS groups, in the control and conventional groups did not show any differences in the behavior of early detection of cervical cancer in the pretest and posttest. with p values of 0.063 and 0.070, respectively (p greater than 0.05). Only the GBKS strategy showed behavioral differences based on the pretest and posttest results with a p value of 0.0001, so it can be concluded that the GBKS method is the most effective strategy used to improve the behavior of women of childbearing age to improve early detection. from cervical cancer.

Discussion

Differences in Pretest and Posttest Results Knowledge of Cervical Cancer Early Detection
Based on the results of the study, it can be seen that there are differences in the results of pretest and posttest knowledge about early detection of cervical cancer. Based on the results of the analysis using Mc Nemar's test, all p-values in the control, leaflet, and GBKS groups were 0.0001 (p less than 0.05). Based on the posttest results, 22 people in the control group had good knowledge, 33 people in the group who received the intervention using leaflets, and 41 people in the group who got the intervention using GBKS who had good knowledge. The level of knowledge of respondents increased most significantly in the GBKS group. In line with the research of Collado[18], the results showed that hematology patients were provided with health education about appointment management, disease management advice and counseling rooms about patient complaints that were accessible free of charge. charging through an application on a smartphone can increase patient knowledge. This is in line with the research conducted by Torkian[19], the results of this study showed that after the installation of the educational consultation application in the intervention group, the average score of knowledge, attitudes, and practices after the intervention was significantly higher. compared before the intervention with p value obtained is 0.001. The conclusion in his research is that mobile-based educational and counseling applications improve the knowledge, attitudes,

and practices of couples in premarital education. In addition, research conducted by Oktaviani[20] found that there was a significant relationship between the ASI-Mobile application and the mother's attitude with a p-value of 0.046 and behavior with a p-value of 0.018. ASI-Mobile which is an android-based application is more effective for changing mothers' attitudes and behavior about exclusive breastfeeding. Meanwhile, in the study entitled "The Effect of Android-Based Learning Media on Students' Cognitive Levels in Sports Physiology" the results showed that the use of Android-based learning media had a significant effect on students' cognitive levels in the learning process, the average score of the experimental class was higher than the control class. It can be seen that the significance number for android media obtained from the Anova test is 0.0001[21].

Research conducted by Sari[22] entitled "The Effect of Using Android-Based Modules on Knowledge and Attitudes of Nursing Students About Transcultural Nursing", found that there was a significant effect of android-based and print-based modules on knowledge of transcultural nursing (p less than 0, 05), but not for attitude (p is more than 0.05). Based on independent t-test, there was no significant difference in students' knowledge and attitudes about transcultural nursing between the two groups (p more than 0.05). Android-based modules are considered useful (97.9 percent) with an average value of 44, and easy to use (91.5 percent) with a median value of 40. In addition, a study conducted by Ningsih[23] with the title "Android-based Mobile Learning "The Effect on Student Learning Achievement" indicates that the significance value is less than 0.05, which means that there is a significant difference between the students' pretest and posttest scores, so it can be concluded that android-based mobile learning is effective. Research conducted by Ghazisaeedi[24] entitled "The Effect of Android-Based

Applications on Caregiver Knowledge of Cerebral Palsy" obtained significant results regarding the effect of using educational applications on caregiver knowledge in all child parenting domains, except eating with a p value of less than 0 ,05. Furthermore, multiple-choice test results revealed that the use of applications can improve parenting. knowledge of rs in all domains except play (p less than 0.05). cerebral palsy. Research conducted by Froome[25] entitled The Effectiveness of the Serious Game Mobile Foodbot Factory on Increasing Nutritional Knowledge in Children, it was found that there was no significant difference in knowledge observed in the beverage subscore. Foodbot Factory has the potential to be an effective educational tool to support children in learning about nutrition.

Based on the results of this study, increasing knowledge with the GBKS application is effective in increasing WUS knowledge because the GBKS application is a media that has been designed as attractive as possible because it contains interesting features consisting of 5 educational videos, and display of information about early detection of cervical cancer which is modified with a picture display. . attractive images to be seen, read and watched by service users.

Differences in Attitudes Pretest and Posttest Early Detection of Cervical Cancer

The results showed that there were differences in the results of the pretest and posttest WUS attitudes in each group, both in the control group, conventional (leaflet), and GBKS. The posttest results showed that in the control group there were 10 respondents with positive attitudes, 18 positive attitudes in the leaflet group, and 30 positive attitudes in the GBKS group. The GBKS group was the group that experienced the most improvement in attitudes after the intervention, where there were 30 people who initially had a negative attitude on the pretest, but based on the posttest results their attitude changed to positive towards early cervical cancer screening. The p-value obtained in the GBKS group was the most significant, namely 0.0001 when compared to the control group (0.012) and the leaflet group (0.023). Research

conducted by Fuadah[26] showed that intervention activities using the "Darling Women" education-based website had an effect on WUS. This is because the majority of people have smart phones that are easy to use to access information so that the use of website-based media is very appropriate to use. The advantage of using the website as a means to provide education is that it is more effective and easy to access so that it can improve the knowledge, attitudes, and behavior of WUS to perform the IVA test. The interview results show that the information available on the website affects the motivation to do the IVA test.

In line with the research conducted by Aditya[27] with the title "The Effect of the "MH Mobile" Andorid Application on the Attitudes of People with Leprosy", the results show that statistical analysis shows that there is an effect of MH Mobile on attitudes (p is equal to 0.0001). . There were significant changes in both groups between pre and post intervention with MH Mobile. In addition, research conducted by Saraswati[28] with the research title The Effect of the Android Application "Aneminfo" on Adolescent Girls' Knowledge and Attitudes About Prevention of Iron Deficiency Anemia, showed that there was a significant increase in knowledge in the intervention group. (p of 0.001), and there was a significant increase in attitude in the intervention group (p of 0.011) compared to the control group. The conclusion of this study is that the Aneminfo android application can be an alternative media for the government and health workers in providing education about iron deficiency anemia in an effort to increase adolescent knowledge and prevent anemia from an early age. Meanwhile, a study conducted by Latif[29] with the title "Irene Donut Application: Acceptance and Changes in Parents' Attitudes in Preventing Dental Caries in Kindergarten Students in Serang City" shows that by using the Irene Donut application there is a statistically significant difference . obtained. There was an effect on attitude (p of 0.001), positive attitude increased by 5.6 percent. In general, app user acceptance increased within 3 weeks (4.9 percent). Positive acceptance is usefulness, appropriateness, triability, observability, and behavioral intention. In conclusion, the Irene Donut application is effective in improving the dental and oral health attitude of parents to prevent dental caries in children and the Irene Donut application has received a positive response from users.

The research conducted by Herbuela[30] with the title "An Integrated Health App for Dengue Reporting and Mapping, Health Communication, and Behavior Modification: Development and Assessment of Mozzify", obtained a high acceptance rate and very good satisfaction. (average score more than/equal to 4.0 out of 5). Based on the MARS subscale indicates that the application has excellent user design, functionality, usability, engagement, and information among public health experts, environmental and health researchers, and end users. The subjective quality of the application (recommending the application to others and the overall star rating of the application), and the specific quality (raising awareness, increasing knowledge, and changing attitudes about dengue i.e. health care seeking behavior and intention to change behavior in dengue prevention practices) also obtained excellent satisfaction ratings from the participants.

Differences in Pretest and Posttest Results of Cervical Cancer Early Detection Behavior

Based on the results of the study, it can be seen that there is no difference in the results of the pretest and posttest behavior in the control and leaflet groups, the p-values obtained in the control and leaflet groups are 0.063 and 0.070, respectively (p is greater than 0.05). Interventions carried out using leaflets were less effective where the posttest results showed that only 18 respondents carried out early detection of cervical cancer with the IVA Test, while initially only 7 respondents did not, but after being given the intervention, their behavior increased to carry out early cancer detection. cervix. While the p value obtained by the leaflet group was 0.070 so that there was no significant increase in behavior in the leaflet group. Of the three groups, only the GBKS group showed significant results, there were differences in the results of the

pretest and posttest behavior of early detection of cervical cancer in the GBKS group with a p value of 0.0001 (p less than 0.05). The use of the GBKS method is effective in changing the behavior of WUS, where from 50 people there are 44 people who do early detection of cervical cancer based on posttest results and there are 34 people whose behavior increases from not doing to early detection of cervical cancer.

The results of the study are in line with research conducted by Fuadah[26] in the working area of the Berbek Public Health Center, Nnganjuk Regency where the use of an education-based website "Darling Women" is useful for improving WUS behavior to perform the IVA test. After WUS received an intervention through the "Sayang Wanita" website, it was found that there were differences in the behavior of the IVA Test examination between the group who received the intervention using the "Sayang Wanita" website and the control group. 86.4 percent of the group that received the intervention underwent an IVA test, while the control group did not come for an IVA test with a percentage of 95.5 percent. Research conducted by Ginting[31]in Dolok Silau District, Simalungun Regency, showed that there was an influence of education through the Whatsapp application on husband's support for his wife. The test results using the Wilcoxon Signed Rank Test gave significant results (p of 0.0001) so that there was a change before and after being given education where before education 50 wives did not receive husband support and after education 41 wives received support from husbands. Husband's support for his wife for early detection of cervical cancer increased after receiving education through Whatsapp.

Research conducted by Lee[32] with the research title "Mobile App-Based Health Promotion Programs: A Systematic Review of the Literature" shows that the inclusion criteria study was a randomized control trial design and assessed mobile application-based interventions to promote health conditions. adults. The most common topics were diet and physical activity (n equals 8) and improvement of an overall healthy lifestyle (n equals 4). The purpose of the app includes providing feedback on a person's health status (n equals 9) and monitoring an individual's health status or behavioral changes (n equals 9). All studies show that health outcomes prove to be better for mobile app users compared to non-users. Mobile application-based health intervention is an effective strategy to improve health promotion behavior in the general population without disease. This study shows that mobile app use is becoming commonplace for a variety of health-promoting behaviors beyond physical activity and weight control. Future research should discuss the feasibility and effectiveness of using mobile applications for health promotion in developing countries.

The Most Effective Strategy to Improve Screening Behavior for Cervical Cancer Early Detection

The results showed that based on the results of the test using Pearson chi square to determine differences in knowledge, attitudes, and behavior of early detection of cervical cancer between the control group, leaflets, and the GBKS application, it showed that based on the posttest results there were differences in the level of knowledge, attitudes, and behavior between the three groups. group. group. The type of intervention method given is associated with an increase in knowledge, attitude, and behavior with a p value of 0.0001 each (p less than 0.05). The test results with Mc Nemar showed that only the GBKS method was effective in increasing WUS behavior (p of 0.0001).

Table 16 shows that the GBKS strategy is the most effective for increasing WUS knowledge with 82.0 percent of WUS having good knowledge after being given the intervention, followed by the leaflet group as much as 66.0 percent, and the control group as much as 44.0 percent. The GBKS method was also the most effective for improving attitudes, where after the intervention 78.0 percent were positive, while in the leaflet group, 58.0 percent were positive, and only 40.0 percent in the control group. Behavior

improvement also showed the same results where the GBKS method was the most significant for improving behavior compared to other methods, 88.0 percent of WUS performed early detection of cervical cancer after receiving GBKS intervention, while in the leaflet group only 36.0 percent did, and in the control group only 26.0 percent did. It can be concluded that the GBKS method is the most effective method, both for increasing the knowledge, attitudes, and behavior of WUS towards early detection of cervical cancer.

Conclusion

Mobile application-based health intervention is an effective strategy to improve health promotion behavior. This study shows that the use of mobile applications can improve health with early detection measures, so as to reduce cervical cancer morbidity and mortality.

Recommendation

Researchers suggest recommending the use of the GBKS Application in WUS to improve behavior for early detection of cervical cancer.

REFERENCES

International Agency for Research on Cancer (IARC), "Global Cancer Data: GLOBOCAN 2018," IARC, 2018.

J. Ferlay et al., "Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012.," International journal of cancer, vol. 136, no. 5, pp. E359-86, Mar. 2015, doi: 10.1002/ijc.29210.

D. P. Sulistiya, D. Pramono, and D. Nurdiati, "Faktor-faktor yang berhubungan dengan kejadian kanker serviks di RSUP Dr. Sardjito Yogyakarta," Berita Kedokteran Masyarakat, vol. 33, no. 3, p. 125, Mar. 2017, doi: 10.22146/bkm.17160.

C. A. Fitrisia, D. Khambri, B. I. Utama, and S. Muhammad, "Analisis Faktor-faktor yang Berhubungan dengan Kejadian Lesi Pra Kanker Serviks pada Wanita Pasangan Usia Subur di Wilayah Kerja Puskesmas Muara Bungo 1," Jurnal Kesehatan Andalas, vol. 8, no. 4, Jan. 2020, doi: 10.25077/jka.v8i4.1147.

R. Riksani, Kenali Kanker Serviks Sejak Dini. Yogyakarta: Rapha Publishing, 2016.

M. D. L. Tobing, E. Sahiratmadja, M. Dinda, B. S. Hernowo, and H. Susanto, "Human Papillomavirus Genotypes Profile in Cervical Cancer Patients at Dr. Hasan Sadikin General Hospital, Bandung, Indonesia," Asian Pacific Journal of Cancer Prevention, vol. 15, no. 14, pp. 5781–5785, Jul. 2014, doi: 10.7314/APJCP.2014.15.14.5781.

H. Mirghani, A. C. Jung, and C. Fakhry, "Primary, secondary and tertiary prevention of human papillomavirus-driven head and neck cancers.," European journal of cancer (Oxford, England : 1990), vol. 78, pp. 105–115, 2017, doi: 10.1016/j.ejca.2017.03.021.

World Health Organization, "Training of Health Staff in VIA, HPV detection Test and Cryotherapy-Trainees's Handbook," World Health Oragnization, 2017.

N. A. Pangesti, Cokroaminoto, and Nurlaila, "Gambaran Karakteristik Wanita Usia Subur (WUS) yang Melakukan Pemeriksaan Inspeksi Visual Asam Asetat (IVA) di Puskesmas Karanganyar," Jurnal Ilmiah Kesehatan Keperawatan, vol. 8, no. 2, pp. 81–94, 2012.

Kemenkes RI, "Profil Kesehatan Indonesia 2019," Jakarta: Kementerian Kesehatan RI, 2019.

L. A. Sahr and T. A. I. Kusumaningrum, "Persepsi dan Perilaku Wanita Usia Subur dalam Melakukan Tes Inspeksi Visual Asam Asetat," Jurnal Promosi Kesehatan Indonesia, vol. 13, no. 2, p. 114, Oct. 2018, doi: 10.14710/jpki.13.2.114-128.

K. L. Saraswati, "Pengaruh Promosi Kesehatan Terhadap Pengetahuan Tentang Kanker Serviks dan Partisipasi Wanita Dalam Deteksi Dini Kanker Serviks ," Surakarta, 2011.

I.M. Sunarsih Sutaryo, Rendra Widyatama, and Ismarwati, "Promosi Kesehatan dalam meningkatkan Pengetahuan, Sikap dan Perilaku Deteksi Dini Kanker Serviks pada Ibu-Ibu Anggota Pengajian," Berita Kedokteran Masyarakat, vol. 27, no. 2, pp. 66–74, 2011.

S. S. Coughlin, "Epidemiology of Breast Cancer in Women.," Advances in experimental medicine and biology, vol. 1152, pp. 9–29, 2019, doi: 10.1007/978-3-030-20301-6_2.

W. Fridayanti and L. Budi, "Keefektifan Promosi Kesehatan Terhadap Pengetahuan, Sikap dan Perilaku Tentang Tes IVA pada Wanita Usia 20-59 Tahun," Public Health Perspective Journal, vol. 2, no. 2, pp. 124–130, 2017.

O. A. Abiodun, O. O. Olu-Abiodun, J. O. Sotunsa, and F. A. Oluwole, "Impact of health education intervention on knowledge and perception of cervical cancer and cervical screening uptake among adult women in rural communities in Nigeria.," BMC public health, vol. 14, p. 814, Aug. 2014, doi: 10.1186/1471-2458-14-814.

S. Mulyati, O. Suwarsa, and I. F. Desy Arya, "PENGARUH MEDIA FILM TERHADAP SIKAP IBU PADA DETEKSI DINI KANKER SERVIKS," Jurnal Kesehatan Masyarakat, vol. 11, no. 1, p. 16, Sep. 2015, doi: 10.15294/kemas.v11i1.3401.

R. Collado-Borrell et al., "Oncology Patient Interest in the Use of New Technologies to Manage Their Disease: Cross-Sectional Survey," Journal of Medical Internet Research, vol. 20, no. 10, p. e11006, Oct. 2018, doi: 10.2196/11006.

S. Torkian, F. Mostafavi, and A. Pirzadeh, "Effect of a mobile application intervention on knowledge, attitude and practice related to healthy marriage among youth in Iran," Journal of Education and Health Promotion, vol. 9, no. 1, p. 312, 2020, doi: 10.4103/jehp.jehp_444_20.

O. Oktaviani and M. Hariteluna, "Linking ASI-Mobile Android-Based App on Mothers' Attitude and Behavior on Exclusive Breastfeed," Jurnal Kesehatan Masyarakat, vol. 16, no. 3, pp. 348–355, Mar. 2021, doi: 10.15294/kemas.v16i3.24636.

M. Adrizal, Guntur, and D. M. Pahlifi, "The use of android media in improving students' motivation in learning sports physiology," Journal of Physics: Conference Series, vol. 1440, no. 1, p. 012075, Jan. 2020, doi: 10.1088/1742-6596/1440/1/012075.

A. S. Sari, E. D. Hapsari, and W. Widyawati, "EFFECT OF USING AN ANDROID-BASED MODULE ON KNOWLEDGE AND ATTITUDE OF NURSING STUDENTS ABOUT THE PROVISION OF TRANSCULTURAL NURSING," Belitung Nursing Journal, vol. 6, no. 1, pp. 8–13, Feb. 2020, doi: 10.33546/bnj.783.

S. Ningsih and A. Adesti, "Android-Based Mobile Learning: Its Effect on Students' Learning Achievement," 2020. doi: 10.2991/assehr.k.200323.099.

M. Ghazisaeedi, A. Safari, A. Sheikhtaheri, and H. Dalvand, "The effect of an android-based application on the knowledge of the caregivers of children with cerebral palsy.," Medical journal of the Islamic Republic of Iran, vol. 30, p. 456.

H. M. Froome et al., "The Effectiveness of the Foodbot Factory Mobile Serious Game on Increasing Nutrition Knowledge in Children," Nutrients, vol. 12, no. 11, p. 3413, Nov. 2020, doi: 10.3390/nu12113413.

L. L. Fuadah, R. H. Safitri, and Y. Yuliani, "Factors Influencing Sustainability Reporting and Financial Performance in Indonesia," SRIWIJAYA INTERNATIONAL JOURNAL OF DYNAMIC ECONOMICS AND BUSINESS, vol. 3, no. 1, p. 53, Mar. 2019, doi: 10.29259/sijdeb.v3i1.53-72.

Aditya R.S, Ah Yusuf, Fitriana K.S, and Setyo B.K, "Pandemic Covid-19: Android Application 'Mh Mobile' Is A Solution Foe Leprosy Patients," Turkish Journal of Coputer and Mathematics Education (TURCOMAT), vol. 12, no. 10, pp. 5303–5307, 2021.

R. S. Saraswati, A. Kartini, and F. Agushybana, "Pengaruh Aplikasi Android Aneminfo terhadap Pengetahuan dan Sikap Remaja Putri terkait Anemia Defisiensi Besi," Jurnal Promosi Kesehatan Indonesia, vol. 15, no. 2, pp. 65–69, Jun. 2020, doi: 10.14710/jpki.15.2.65-69.

A. Latif, Tri Krianto, and Ririn Arminingsih, "Aplikasi Irene Donut: Penerimaan dan Perubahan Sikap Orang Tua dalam Mencegah Karies Gigi Murid TK di Kota Serang," Jurnal Kesehatan Gigi, vol. 7, no. 1, pp. 21–28, 2020.

V. R. D. M. Herbuela, T. Karita, M. E. Francisco, and K. Watanabe, "An Integrated mHealth App for Dengue Reporting and Mapping, Health Communication, and Behavior Modification: Development and Assessment of Mozzify," JMIR Formative Research, vol. 4, no. 1, p. e16424, Jan. 2020, doi: 10.2196/16424.

E. Y. Ginting, "Pengaruh Edukasi Melalui Whatsapp Terhadap Dukungan Suami Pada Istri Dalam Melakukan Deteksi Dini Kanker Serviks di Desa Cingkes Kecamatan Dolok Silau Kabupaten Simalungun," Medan, 2020.

M. Lee et al., "Mobile App-Based Health Promotion Programs: A Systematic Review of the Literature," International Journal of Environmental Research and Public Health, vol. 15, no. 12, p. 2838, Dec. 2018, doi: 10.3390/ijerph15122838.