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Effect of the SADIVA Digital Application on Knowledge, Counseling, and Screening Skills of Health Cadres for Early Breast and Cervical Cancer Detection: A Quasi-Experimental Study

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ABSTRACT

Breast cancer and cervical cancer are among the most common cancers affecting women. Health cadres play an important role in encouraging women to undergo visual inspection with acetic acid (VIA) and clinical breast examination (CBE) at healthcare facilities. The "SADIVA" app was developed as an educational tool to assist health cadres in promoting awareness about the early detection of breast and cervical cancer. This study aimed to determine the effect of the "SADIVA" digital media on improving the knowledge, counseling skills and screening skills of health cadres in conducting education and early detection for breast and cervical cancer among women of reproductive age. This study used a Two Group Pretest-Posttest design. The population included health cadres working in the jurisdiction of the Sesela Community Health Center. A total of 60 participants were selected through purposive sampling and divided into two groups, consisting of 30 participants in the intervention group and 30 participants in the control group. The intervention was conducted for four weeks. The intervention group received training on how to use the SADIVA app, while the control group received a booklet. The training was conducted for approximately 60 minutes. Following the training session, all respondents carried out independent practice at least three times per week and were monitored using a checklist and a WhatsApp group. The results of the Mann–Whitney test for the knowledge variable in the post-test showed a Z-score of -2.317, a p-value of 0.016 ($p < 0.05$), and an effect size of 0.30. Meanwhile, the screening skills variable demonstrated a Z-value of -6.318, a p-value of < 0.001 ($p < 0.05$), and an effect size of 0.82. And for the health education skills variable, a Z-value of -3.508 was obtained; p-value < 0.001 ($p < 0.05$); with an effect size of 0.46. Thus, it can be concluded that there are significant differences in the post-test scores for knowledge, screening skills, and counseling skills between the intervention group and the control group, with the effect sizes for each variable being moderate for the knowledge and counseling skills variables, and having a large effect on the improvement in the respondents' screening skills. The "SADIVA" digital media significantly enhanced the knowledge, counseling abilities, and screening skills of health cadres in supporting the early detection of breast and cervical cancer among women of reproductive age.

Keywords: Screening; Cancer; SADIVA; mHealth; cadres training

INTRODUCTION

According to the Global Cancer Statistics (Globocan) 2020 report, there were around 19.3 million new cancer cases worldwide, with an estimated 10 million deaths related to cancer. By 2040, the global incidence of cancer is expected to rise by 47%, reaching approximately 28.4 million new cases [12]. Cancer continues to be one of the major public health concerns affecting women worldwide, especially in developing countries such as Indonesia. Among Indonesian women, the most prevalent types of cancer are breast cancer and cervical cancer. The increasing incidence of these cancers is largely attributed to the limited implementation of effective screening measures, which are crucial for detecting precancerous conditions and early-stage cancers [3]

The incidence rate of breast cancer in Indonesia is reported at 42.1 per 100,000 population, with an average mortality rate of 17 per 100,000. Cervical cancer follows as the second most common cancer among women, with an incidence rate of 23.4 per 100,000 and an average mortality rate of 13.9 per 100,000 [4]. According to data from the Global Burden of Cancer (Globocan) 2022, breast cancer accounted for 66,271 new cases, representing 30.1% of the 220,266 total new cancer cases reported among women in Indonesia. Meanwhile, cervical cancer was identified as the second most common type of cancer, with 36,964 new cases (16.8%) [5].

In Indonesia, efforts to prevent and manage breast cancer and cervical cancer are carried out through early detection programs, as stipulated in Minister of Health Regulation No. 29 of 2017 regarding the Management of Breast Cancer and Cervical Cancer [6]. The main goals of this national program are to strengthen early detection efforts, speed up case identification, and improve follow-up treatment in order to lower mortality rates and enhance the quality of life of cancer patients. Early detection has an important role in preventing cancer progression and increasing the chances of successful treatment [7].

Increasing public awareness about cancer is an important part of prevention efforts. Better understanding of cancer risk factors and symptoms can support earlier detection. In addition, cancers diagnosed at an early stage generally have a much greater likelihood of successful treatment. Therefore, improving community awareness of

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cancer symptoms and risk factors is an essential step in encouraging appropriate preventive actions and participation in early screening programs[8]. Indonesia's national cancer prevention program currently focuses on early detection of cervical cancer using the Visual Inspection with Acetic Acid (Henceforth: VIA) method and Clinical Breast Examination (Henceforth: CBE) for breast cancer. [9][10][11].

In West Nusa Tenggara (NTB) Province, data from 2023 showed that 175,930 women (31.9%) underwent CBE screening, with 52 cases suspected of breast cancer. Meanwhile, 158,683 women (26%) participated in VIA screening, of whom 218 were found to have positive results. In West Lombok Regency, CBE screening was conducted among 17,779 women of reproductive age (15.59%) out of the total target population of 114,037, while VIA screening coverage reached 17,870 women (15.67%) [12]. At the Gerung Community Health Center, screening coverage reached only 4%, making it the third lowest among the 18 community health centers. A total of 265 screenings were carried out from the target population of 6,603 [13].

The low rates of early detection for breast and cervical cancer are affected by several barriers, including limited public knowledge, fear and embarrassment related to screening procedures, misconceptions about cancer, and restricted access to health services. In addition, support from family and the social environment also influences women's decisions to undergo screening. [14]

Various interventions have been carried out to enhance early cancer detection, including health education programs, training for community health workers, campaigns promoting breast self-exam (SADARI) and CBE, education on VIA examinations, as well as the use of leaflets, educational videos, and digital health media. These interventions aim to improve public knowledge, attitudes, and awareness regarding the importance of early cancer screening. [15][16]

Previous mHealth studies have been conducted to improve education on early cancer detection; however, most of these studies have focused on only one type of cancer, such as breast cancer or cervical cancer, separately [17][18]. In addition, existing digital interventions generally only evaluate improvements in user knowledge. Previous research has also been limited in measuring both counseling skills and screening skills simultaneously [19]. Therefore, SADIVA was developed as an integrated mHealth application that combines community health worker-led education on breast and cervical cancer, with the aim of improving knowledge, counseling abilities, and skills related to early cancer detection screening.

Community health workers have an important role as educators, motivators, community mobilizers, and companions in supporting the implementation of early cancer detection programs. Their close relationship with the community allows health information to be delivered more effectively, which in turn can improve the knowledge, attitudes, and participation of women of reproductive age in early detection screening for breast and cervical cancer [20][11].

As an innovative effort to enhance cadre performance, an Android-based digital application known as "SADIVA" has been developed. This application functions as a supporting tool for community health cadres in providing information, increasing awareness, and encouraging women of reproductive age to participate in early breast and cervical cancer screening at healthcare facilities [21][17]. The Sadiva application includes features such as a pocket book, breast and cervical cancer screening, and test results. The pocket book provides information and guidance related to breast and cervical cancer, including the procedures for screening. In addition, it contains information on cancer signs and symptoms, causes, risk factors, prevention strategies, recommended screening times, and screening skills for both breast and cervical cancer. The examination section contains explanations regarding cadre activities during VIA and BSE counseling, as well as guidance for performing Breast Self-Examination (BSE). The Sadiva application can be accessed by both health cadres and healthcare workers as part of the follow-up process after screening. Several other similar applications mainly focus on only one type of cancer, such as breast cancer screening or cervical cancer screening [22] [23], while the SADIVA app combines early detection of cervical and breast cancer into a single app that is very easy to use.

The intervention used in this study was based on the Health Belief Model and the Technology Acceptance Model. The Health Belief Model explains that health-related behaviors are influenced by individuals' perceptions of disease risk, the benefits of taking preventive action, existing barriers, and the motivation to act. Through the SADIVA app, community health workers receive education on the risks of breast and cervical cancer, the benefits of early detection, and guidelines for health education and screening, thereby enhancing their confidence and ability to conduct health education and early cancer detection in the community [24]. The Technology Acceptance Model explains that acceptance of the SADIVA application is influenced by users' perceptions of its ease of use and its usefulness in supporting health workers in carrying out their duties. Therefore, the use of the SADIVA application is expected to enhance the knowledge, attitudes, and skills of health workers related to the early detection of breast and cervical cancer [25].

The objective of this study is to examine the impact of the digital media application "SADIVA" on improving cadres' knowledge, counseling skills, and screening skills in providing cancer education and conducting early detection of breast and cervical cancer among women of reproductive age. "SADIVA" serves as an assistive

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educational medium designed to improve the efficiency and effectiveness of information delivery, facilitate the identification of target populations, and encourage women to participate in early cancer screening. Through these roles, the application is expected to contribute to increasing national cancer screening coverage [26] [17].

MATERIALS AND METHODS

This study applied a quasi-experimental design with a pre-test and post-test approach involving both intervention and control groups. The study population included health cadres who worked within the service area of Sesela Community Health Center (Puskesmas Sesela). The sampling technique used was purposive sampling, involving 60 health cadres as respondents divided into 2 groups (30 people in the intervention group and 30 people in the control group). The inclusion criteria for this study were active health workers in the study area who were willing to participate as respondents, owned an Android-based smartphone, were capable of operating simple digital applications, and agreed to take part throughout the entire study period until completion. Meanwhile, the exclusion criteria included participants who experienced technical problems that prevented them from using the SADIVA application.

The sample size was determined based on a quasi-experimental pretest-posttest design with a control group, aimed at comparing changes in knowledge and skills between groups. The minimum required sample size was calculated using a 95% confidence level ($\alpha = 0.05$), 80% statistical power, and a moderate effect size. An 80% power and α of 0.05 are standard in experimental and quasi-experimental research. Based on these considerations, a sample size of 30 respondents in each group was considered adequate to identify the effect of the SADIVA intervention on knowledge, health education skills, and breast and cervical cancer screening skills among health cadres [27].

Before the intervention was conducted, all respondents completed a pre-test to assess their knowledge, counseling skills, and breast and cervical cancer screening skills. The intervention was carried out over a period of 4 weeks, during which each group participated in face-to-face training sessions lasting approximately 60 minutes. The intervention group received training on the use of the SADIVA application, while the control group received training using a booklet. The intervention was delivered by researchers with a background in midwifery and experience in reproductive health education. To ensure intervention fidelity, all respondents were provided with the same materials, training duration, and application usage instructions in accordance with the research SOP. After training, intervention respondents were asked to use the SADIVA application independently, while control respondents were asked to read and study the booklet independently at least three times per week during the intervention period. Researchers monitored participants through a monitoring checklist and routine communication conducted via a WhatsApp group. Following the intervention period, all respondents completed a post-test using the same instrument administered during the pre-test. Since this study applied a quasi-experimental design, full blinding procedures were not feasible. Nevertheless, standardized instruments and consistent data collection procedures were used to reduce the potential for bias.

The research instruments used in this study included a questionnaire and checklists. The questionnaire was designed to assess the knowledge variable and consisted of 20 items related to the concepts, signs and symptoms, risk factors, prevention, and treatment of breast cancer and cervical cancer. The checklist used to assess screening skills consisted of seven procedural steps, with each step evaluated using a three-point scoring system. Meanwhile, the counseling skills checklist contained nine procedural steps using the Sadiva digital media, also assessed with a three-point scoring scale for each activity (Score 1 = not performed ; Score 2 = performed but not properly; Score 3 = performed correctly)

Both the questionnaire and the checklists had been tested for validity and reliability among participants who shared similar characteristics with the actual study subjects. The Cronbach's alpha results for each variable are as follows: Knowledge questionnaire with Cronbach's alpha= 0.861, Counseling checklist $\alpha = 0.872$, and screening checklist with Cronbach's alpha= 0. 922.

In addition, this study developed the SADIVA digital media as a supportive tool to improve the effectiveness of health education activities. The media was designed to be user-friendly, practical, and efficient in providing targeted information. Through the use of Sadiva, health cadres are expected to perform more effectively and efficiently in conducting public education, disseminating information, and raising awareness about breast and cervical cancer screening. Furthermore, the media is intended to support cadres in identifying and encouraging target groups to undergo cancer screening conducted by health professionals, thereby contributing to the improvement of cancer screening coverage [21].

The primary objective of developing this digital media is to provide comprehensive information and support for the early detection of breast and cervical cancer. The content covers signs and symptoms, etiological and risk factors, preventive measures, as well as practical screening skills. The booklet contains the same information provided in the SADIVA application, including signs and symptoms of cancer, causative and risk factors, prevention methods, examination schedules, and screening skills for both breast and cervical cancer, as well as the steps of SADARI. The SADIVA application has also been validated by health professionals and programmers.

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Data analysis included univariate analysis using frequency distributions and bivariate analysis. The results of the normality test showed that the data were not normally distributed. Therefore, the Wilcoxon Signed-Rank Test was used to assess differences between pre-test and post-test scores within the same group, while the Mann–Whitney U Test was applied to examine differences between the intervention and control groups. Statistical significance was determined based on a p-value < 0.05 with a 95% confidence level. This study obtained ethical clearance from the Ethics Committee of the Health Polytechnic of the Ministry of Health, Mataram, under the ethical approval number: DP.04.03/F.XL.26/431/2025.

RESULTS

All respondents completed the study through to the final stage, and therefore no data loss or participant drop out occurred. The characteristics of the health cadres who participated as respondents in this study included variables such as age, educational background, and length of service as a cadre, as presented in the following table:

Table 1. Characteristics of Respondents

Variable	Intervention		Control		P value
Age	**n**	**%**	**n**	**%**	
20 - 35	10	33.3	14	46.6	0.190*
>35	20	66.7	16	53.4	
Length of Service	**n**	**%**	n	%	
< 5 years	9	30.0	5	16.7	0.311*
5-10 years	11	36.7	15	50.0	
>10 Years	10	33.3	10	33.3	
Education Level	**n**	**%**	n	%	
Primary	6	20	7	23.3	0.670*
Secondary	15	50	16	53.4	
Tertiary	9	30	**7**	23.3	
Total	**30**	**100**	**30**	**100**	

** Chi-square test*

Based on the data presented in the table above, it can be seen that most of the respondents in the intervention group were over 35 years old, accounting for 20 people (66.7%), and the control group, most of whom were over 35 years old, namely 16 people (53.4%). Regarding the variable of length of service as a cadre, the largest proportion was in the 5–10 years category, with 11 respondents (36.7%) in the intervention group and 15 respondents (50%) in the control group. In terms of educational background, most respondents in both groups had a secondary education level, consisting of 15 people (50%) in the intervention group and 16 people (53.4%) in the control group. The results of The Chi-square test showed that there were no differences in the characteristics of respondents between the intervention and control groups based on age, education, and length of work (p > 0.05), so that both groups were considered homogeneous.

Table 2. Pre–Post Comparison Using the Wilcoxon Signed-Rank Test

No	Variabel Knowledge	Pre-test	Post-test	Z	Effect size (r)	P value
1.	Intervention Median (Q1-Q3)	15.5 (13.8-17.0)	17(15.0-18.3)	-2.549	0.47	0.011
2.	Control Median (Q1-Q3)	15.0 (12.8-16.0)	15.5(14-17)	-2.804	0.51	0.005
No	**Screening Skill**	**Pre-Test**	**Post-test**			**P value**
1.	Intervention Median (Q1-Q3)	8.0 (7-8)	20.0(18.8-21)	-4.659	0.85	< 0.001
2.	Control Median (Q1-Q3)	8.0 (7-8)	16.0(11-19)	-4.692	0.85	< 0.001
No	**Counseling Skill**	**Pre-Test**	**Post-test**			**P value**
1.	Intervention Median (Q1-Q3)	9.0(7-8)	27.0(26-27)	-5.061	0.92	< 0.001
2.	Control Median (Q1-Q3)	9.0(9-9.3)	25.0(23-26)	-4.804	0.88	< 0.001

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Based on the analysis of the intervention group, the respondents' median knowledge score before the intervention was 15.5 (Q1–Q3: 13.8–17), which increased to 17 (Q1–Q3: 15–18.3) after the intervention. The results of the Wilcoxon Signed-Rank Test showed a Z-value of -2.549 with a p-value of 0.011 ($p < 0.05$), indicating a significant difference between pre-test and post-test scores. An effect size of 0.47 indicates that the intervention had a moderate effect on improving respondents' knowledge. In the control group, the respondents' median knowledge score before the intervention was 15 (Q1–Q3: 12.8–16), which increased to 15.5 (Q1–Q3: 14–17) after the intervention. The Wilcoxon Signed-Rank Test results showed a Z-value of -2.804 with a p-value of 0.005 ($p < 0.05$), indicating a significant difference between the pre-test and post-test scores. In addition, an effect size of 0.51 suggests that the intervention had a large effect on improving the respondents' knowledge.

For the screening skills variable in the intervention group, the median pre-intervention score of 8 (7–8) increased to 20 (18.8–21) after the intervention. With a Z-score of -4.659 and a p-value of < 0.001 ($p < 0.05$), this indicates a significant difference between the pre-test and post-test scores. An effect size of 0.85 indicates that the intervention had a large effect on improving screening skills. Similarly, in the control group, the median score increased from 8 (7–8) before the intervention to 16 (11–19) after the intervention. The analysis produced a Z-score of -4.692 with a p-value of < 0.001 ($p < 0.05$), demonstrating a significant difference between the pre-test and post-test scores. Furthermore, an effect size of 0.85 suggests that the intervention had a strong effect on enhancing screening skills.

The counseling skills variable in the intervention group showed a median score of 9 (Q1–Q3: 7–8) before the intervention, which increased to 27 (Q1–Q3: 26–27) after the intervention. The Wilcoxon Signed-Rank Test results produced a Z-value of -5.061 with a p-value of < 0.001 ($p < 0.05$), indicating a significant difference between the pre-test and post-test scores. An effect size of 0.92 indicates a large-effect intervention on the improvement of extension skills. In the control group, the median score before the intervention was 9 (Q1–Q3: 9–9.3), increasing after the intervention to 25 (Q1–Q3: 23–26). The results of the Wilcoxon Signed-Rank Test showed a Z-value of -4.804 with a p-value of < 0.001 ($p < 0.05$), indicating a significant difference between the pre-test and post-test results. In addition, an effect size of 0.88 suggests that the intervention had a large effect on improving counseling skills.

Table 3. Mann-Whitney U Test Results

No	Variable	Z	Effect size (r)	*P value*
1.	**Knowledge**			
	Pre-Test	-1.021	0.13	0.091
	Post-test	-2.317	0.30	0.016
2.	**Screening Skill**			
	Pre-Test	-0.681	0.09	0.870
	Post-test	-6.318	0.82	< 0.001
3.	**Counseling Skill**			
	Pre-Test	-0.087	0.01	0.911
	Post-test	-3.508	0.46	< 0.001

The Mann–Whitney test results for the knowledge variable at the pre-test stage showed a Z-value of -1.021 with a p-value of 0.091 ($p > 0.05$), indicating no significant difference between the two groups being compared. Furthermore, an effect size of 0.13 suggests that the magnitude of the effect or difference between the groups was categorized as small. Meanwhile, during the post-test, the Mann–Whitney test showed a Z-value of -2.317 with a p-value of 0.016 ($p < 0.05$), indicating a significant difference in post-test knowledge scores between the intervention group and the control group. An effect size of 0.30 indicates that the intervention effect of the Sadiva application was categorized as moderate.

The Mann–Whitney test results for the pre-test screening skills showed a Z-score of -0.681 with a p-value of 0.870 ($p > 0.05$), indicating that there was no significant difference between the intervention group and the control group before the intervention was administered. An effect size of 0.09 indicates that the difference between the groups was categorized as small. In the post-test results, a Z-value of -6.318 with a p-value of < 0.001 ($p < 0.05$) was obtained, demonstrating a significant difference between the intervention group and the control group after the intervention. In addition, an effect size of 0.82 suggests that the Sadiva app intervention had a large effect on improving the screening skills of the respondents.

For the counseling skills variable, the results of the Mann–Whitney test on the pre-test showed a Z-score of -0.087 with a p-value of 0.911 ($p > 0.05$), indicating that there was no significant difference between the intervention group and the control group prior to the intervention. An effect size of 0.01 suggests that the difference between the groups was categorized as very small. In the post-test analysis, a Z-value of -3.508 with a p-value of < 0.001 ($p < 0.05$) was obtained, indicating a significant difference between the intervention group and the control

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group following the intervention. Furthermore, an effect size of 0.46 showed that the Sadiva app intervention had a moderate effect on improving the counseling skills of the respondents.

DISCUSSION

This study demonstrates that the SADIVA digital platform has a positive effect on improving the knowledge and skills of health cadres in providing health education and conducting breast and cervical cancer screening among women of reproductive age. Among the two groups of health cadres studied, the group that received the intervention using the SADIVA app showed a higher post-test score compared to pre-intervention scores and compared to the control group that used conventional media. These results suggest that the use of mHealth-based digital media can enhance the knowledge and skills of health cadres in providing health education and supporting the early detection of breast and cervical cancer, particularly in recognizing signs, symptoms, and risk factors among women of reproductive age. As noted by previous study, the effectiveness of health education is strongly influenced by the quality of the media used. Therefore, the use of technology-based media, such as Android applications, can substantially enhance the delivery process and outcomes of health education [28].

This study demonstrates a significant difference in knowledge scores before and after the intervention. These findings are in line with the study by Sari et al., which reported that educational interventions had a significant impact on improving the knowledge of health cadres, as indicated by a p-value of 0.003 (<0.05) [29]. Similarly, Rahmayani et al. reported an increase in knowledge and attitudes regarding Visual Inspection with Acetic Acid (VIA) screening following the use of the Sidik Serviks application [8].

The level of knowledge possessed by health cadres plays an important role in determining their effectiveness in community health activities, including Posyandu (integrated health posts). Cadres who are actively involved generally show higher levels of knowledge and motivation. The development of cadre knowledge is influenced by both internal and external factors. One of the external factors affecting comprehension is exposure to information related to breast cancer and cervical cancer [30-31].

Previous studies have also shown that the role of cadres has a significant influence on early detection behaviors related to cervical cancer among women of reproductive age. The active involvement of cadres within the community contributes positively to public health behaviors. Therefore, continuous and systematic training for health cadres is essential to enhance their competencies and maintain their performance [32]. As the front line of community health empowerment, cadres are expected to work collaboratively with healthcare professionals in addressing community health problems and encouraging public participation to achieve optimal health outcomes [33].

The SADIVA Application as a health education tool offers several advantages over booklets. Booklets are printed materials that present information in the form of text and images in a way that is easy for community health workers to understand. However, booklets have several limitations, as they are static, non-interactive, and depend on the availability of physical copies for reading. In contrast, the digital SADIVA application delivers information in a more engaging format through the integration of text, images, and videos, which may enhance users' interest in learning the provided material. Additionally, the app can be accessed anytime and anywhere via a smartphone, making it easier for users to repeatedly access health information without having to carry printed materials. Therefore, the use of the SADIVA application as a health education tool is considered more effective in improving users' knowledge and understanding, as well as enhancing the counseling and screening skills of community health workers, since the information is delivered in a more interactive, engaging, and accessible format compared with booklets.

In the context of current technological advancement, the integration of information technology has become increasingly important to ensure that various activities, including public health initiatives, are carried out effectively and systematically. Health cadres need to develop basic information technology skills to support communities in accessing healthcare services, including activities related to recording, self-assessment, and monitoring. Consequently, it is essential for health cadres to have sufficient knowledge, competence, and proficiency in using technological tools before introducing them to the wider community. Such preparedness helps ensure that communication, information dissemination, and health education for individuals, families, and communities are delivered accurately and effectively. [21].

SADIVA's digital media allows cadres to access visual information and step-by-step guidance, which makes the learning process more effective compared with conventional lecture-based methods or printed manuals. Additionally, the use of the mobile app supports self-directed learning and boosts cadres' confidence in conducting health education in the community. The findings of the SADIVA study are also supported by a systematic scoping review which reported that technology-based continuous training can enhance the competencies, motivation, and performance of health cadres in low- and middle-income countries. The use of digital media enables cadres to carry out repeated learning and supports the application of knowledge in public health practice. [34]

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The study results indicate that the SADIVA app yields greater improvements in knowledge, health education skills, and screening skills compared to the booklet. Mechanistically, this can be explained through several theoretical frameworks of learning and health behavior. The Technology Acceptance Model explains that technology is more likely to be accepted when it is perceived as useful and easy to use. The SADIVA application offers flexible access to information, can be utilized repeatedly, and supports community health workers in conducting health education and screening activities within the community. This accessibility and interactivity may contribute to better retention of information and skills compared with print media. [25]

Greater improvements in counseling and screening skills compared to knowledge gains are possible because the SADIVA app not only provides information in text form but also offers visual aids, simulations, and practical steps that help volunteers learn these skills directly. Multimedia and interactive learning approaches are considered more effective in enhancing practical skills compared with conventional educational methods. This is supported by Social Cognitive Theory, which states that observation, practice, and self-efficacy have an important role in shaping behavioral and skill changes. [35]

Several systematic reviews and meta-analyses have shown that mHealth interventions are effective in improving the capacity and performance of community health workers (CHWs), particularly in training, supervision, decision-making, and access to health information. A systematic review by Winters et al. confirms that mobile technology holds great potential for supporting the education and training of community health workers in low- and middle-income countries. The review found that mHealth applications can improve CHWs' access to learning materials, work guidelines, and communication with healthcare professionals in a faster and more flexible manner [36]

In addition, another systematic review reported that the use of mHealth applications by CHWs can improve service efficiency, enhance the quality of data documentation, strengthen communication with health facilities, and increase access to health information and job training. The study also highlighted that mobile applications assist community health workers in delivering faster and more standardized services that are integrated within the public health system [37] [38] [39].

However, this study has several limitations. First, the possibility of a Hawthorne effect may exist, in which respondents demonstrate improved behavior because they are aware of being observed during the study. Second, the assessment of skills may be affected by social desirability bias, where respondents tend to show their best performance while under observation. Third, the relatively short follow-up duration of the study 4 weeks cannot yet illustrate the long-term sustainability of behavioral changes and the skills of community health workers.[40]

Furthermore, this study has not yet examined broader implementation aspects, including the readiness of health facilities, organizational support, the sustainability of app utilization, and the integration of the SADIVA application into the public healthcare system. In practice, the success of digital interventions is influenced not only by the effectiveness of the educational media but also by the readiness of the health system and the level of user acceptance toward the technology. From the perspective of implementation science, factors such as the ease of use of the application, stakeholder support, ongoing monitoring, and integration with community health center programs play an important role in the successful implementation of community-based digital interventions.

CONCLUSION AND RECOMMENDATIONS

The findings of this study indicate that the SADIVA digital media exerts a significant influence on enhancing the knowledge, counseling skills and screening skills of community health cadres in conducting health education and early detection for breast and cervical cancer among women of reproductive age. The study findings suggest that the Sadiva application can serve as a supportive educational tool in healthcare services, particularly in breast cancer and cervical cancer screening programs.

These findings may provide a basis for expanding knowledge and skills related to health screening through digital media, supporting capacity building among community health workers in health education and counseling, and improving cancer screening coverage at the community level.

Future research is recommended to include long-term follow-up studies, involve a larger sample size, and assess the implementation as well as the sustainability of the SADIVA application in community-based early detection programs for breast and cervical cancer.

AUTHOR'S CONTRIBUTION STATEMENT

Syajaratuddur Faiqah : Conceptualization, Methodology; Fitra Arsy NurCory'ah : Writing, Project administration; Mutiara Rachmawati : Writing- Reviewing and Editing; Endah Wijayanti : Reviewing

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CONFLICTS OF INTEREST
No conflicts of interest are disclosed by the authors.

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