

ORIGINAL ARTICLE

Effects of Health Education Intervention on Health Literacy Regarding Breast and Cervical Cancer Screening Among Women in Prison

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ABSTRACT

Background: Woman inmate faces significant health literacy gaps, especially in breast and cervical cancer awareness. Moreover, 55.4% of incarcerated women are at risk of HPV. Almost 10% of women in the Martapura prison were screened as high risk of cancer. Inclusive, gender-sensitive health education interventions are urgently needed to address this issue. **Objective:** To determine the effectiveness of health education using a booklet on health literacy of BSE (Breast Self-Examination) and VIA (Visual Inspection with Acetic Acid) in Martapura prison, Indonesia. **Method:** The study used a one-group pre-post design involving 208 incarcerated women from Martapura Prison. A health education booklet on breast and cervical cancer was used to improve health literacy, measured through validated BSE and VIA questionnaires. Data were analyzed descriptively and using a paired T-test ($\alpha \leq 0.05$) to assess differences. Ethical approval was obtained, and strict confidentiality measures were taken to ensure participant anonymity and data security. **Results:** The study found a significant difference in health literacy for BSE and VIA after the booklet intervention. The pre-intervention average health literacy score was 20,89 (SD $\pm$ 2,5). The post-intervention score increased to 21,17 (SD $\pm$ 3). The mean improvement was 0.28 (SD $\pm$ 0,5). The T-test yielded a p-value of 0.070, indicating that the educational intervention effectively improved health literacy regarding BSE and VIA among the inmates. **Conclusions:** The study concludes that booklet-based health education effectively improves BSE and VIA literacy among woman inmates. In clinical settings, increased health literacy may encourage regular BSE and VIA screening, reducing late-stage cancer risks in marginalized women in prison.

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INTRODUCTION

Approximately 10% of female inmates in Martapura Prison are considered at high risk for cancer. Despite this, only 3 out of 10 women routinely undergo health check-ups [1]. Current correctional service standards (PAS-14.OT.02.02/2014) do not cover cancer treatment, limiting inmates' access to appropriate care [2]. Referrals to external health facilities are further constrained by the need for approval from supervisory authorities, which is not always guaranteed. In response, periodic cancer screenings, such as ultrasound (USG) examinations have been conducted through collaborations with private healthcare providers, although these efforts remain limited [3,4].

Therefore, it is crucial to improve health awareness

among inmates by enhancing their health literacy [5–7]. Greater awareness will encourage them to recognize changes in their health and actively seek medical examinations, particularly for cancer, which can have serious consequences if detected late [7,8]. Early awareness also facilitates the coordination of health services in the correctional system, which often involve complex procedures [8].

Health literacy programs need to be inclusive, as inmates often receive inadequate healthcare education. These women are particularly left behind, receiving less information about crucial health issues, such as breast and cervical cancer [9–11]. Female inmates face barriers to accessing proper healthcare due to inadequate prison facilities and unhealthy lifestyles. Compared to men, women in prison suffer more from chronic or preexisting health conditions that needs medical attention [10]. However, the period of isolation reduced the woman's capacity to make knowledgeable health decisions and take appropriate actions. This trait tends to develop a poor health outcome and higher healthcare costs [12–

14]. Many inmates have experienced abuse, reducing their awareness and willingness to seek gynecologic care [10,15]. Inmates need enhanced health literacy on cancer awareness that is inclusive and gender-sensitive to improve their well-being and in the long run increase their self-esteem [16].

The number of women suffering from breast and cervical cancer keeps increasing, since those two cancers are the first and the second most common cancers in woman [17]. Approximately every year, around 2 million women are diagnosed with breast and cervical cancer [17]. A systematic review found that among 53,533 imprisoned women from 10 countries, the prevalence of HPV (human papillomavirus) ranged from 10.5% to 55.4%, and the prevalence of CIN (cervical intraepithelial neoplasia) diagnosed by cytology ranged from 0% to 22% [18]. Report of global burden of disease 2019 showed that from 1990 to 2019, breast cancer cases per 100,000 women increased from 40 to 46, while deaths fell from 18 to 16. Conversely, cervical cancer cases and deaths both decreased annually by 0.38% and 0.93%, respectively [17]. The decline in incidence and mortality rates over the years is attributed to improved awareness, prompting women to utilize early detection, treatment, diagnosis, and screening programs [12,17,19].

Early detection, including screening programs for breast and cervical cancer, poses significant challenges in developing nations like Indonesia due to ineffective, high costs, low early detection rates, and limited public awareness [20,21]. Those barriers result in low follow-up screening of Indonesian women. Early detection of breast cancer is recommended by the Indonesia Ministry of Health by applies the BSE (Breast Self-Examination), which is also endorsed by WHO, which is capable of detecting nearly 85% of breast lumps [22,23]. Cervical cancer early detection is also vital, with effective prevention methods including pap smears, colposcopy, biopsies, and the affordable VIA (Visual Inspection with Acetic Acid) [20,23,24]. Educating women about BSE and VIA is essential for early detection efforts. However, implementation is challenging in prison due to limited social access. Nevertheless, booklet education can be effective, providing comprehensive information that can be easily recalled by participants [6,15,22]. Research is needed to determine the effectiveness of inclusive booklet-based health education on BSE and VIA health literacy among incarcerated women.

METHOD

Design

The research was pre-experimental with one group and pre- and post-test observation. The research subjects were only assigned to the treatment group and measured twice, before and after intervention. The research hypothesis was that there is a difference in the health literacy of BSE (Breast Self-Examination) and VIA (Visual

Inspection with Acetic Acid) on women inmates before and after booklet intervention.

Population and sample

The research population consisted of female inmates at Martapura Prison, South Kalimantan Province, Indonesia, during the period of May to June 2023, totaling approximately 565 individuals. The sample size was determined using the Slovin formula, resulting in 208 participants selected through purposive sampling. Inclusion criteria included being between 18 and 55 years old, and having been incarcerated for at least the past year. The sample recruited by requesting the prospective inmates who met the criteria to the prison warden and then they were requested give consent personally.

Variables

The study variables were health literacy about breast and cervical cancer self-screening awareness. The health literacy about breast and cervical cancer screening awareness was treated by a health promotion using a booklet. The health literacy about BSE and VIA was reported descriptively during the pre- and post-measurement. Finally, to find the health literacy improvement in the health literacy between pre- and post-measurement was compared.

Intervention and Instrument

The intervention was health literacy material in a booklet in Bahasa Indonesia that contained information on cancer definition, risk factor, cause, sign, symptom, diagnosis method, the BSE tutorial, and the VIA tutorial. The booklet was developed through a literature review and 3 expert consultations (2 nurses with experience in cancer and 1 prison nurse). The S-CVI was 0,92 (> 0.90) which is considered excellent (Table 1).

Table 1

Table I: The CVI of Booklet

Item	Content	Experts Agreement (1 Not relevant– 4 Highly relevant)	I-CVI
1	Definition	3 / 3	1,00
2	Risk factor	2 / 3	0,67
3	Cause	2 / 3	0,67
4	Sign	3 / 3	1,00
5	Symptom	3 / 3	1,00
6	Diagnosis method	3 / 3	1,00
7	BSE tutorial	3 / 3	1,00
8	VIA tutorial	3 / 3	1,00
		$\frac{1.00 + 0.67 + 0.67 + 1.00 + 1.00 + 1.00 + 1.00 + 1.00}{8}$	0,92
S-CVI			

The intervention was conducted over one month and consisted of four weekly group-based meetings. The pre-test was administered in early May, and the post-test at the end of June 2023, allowing a two-month interval. The first meeting included an introduction and pre-test, followed by booklet distribution. The second session covered breast and cervical cancer education, while the third and fourth sessions focused on BSE and VIA tutorials. Throughout June, participants kept the booklet for independent reading. Prison clinic nurse and prison officer reminded them daily to review the material. The post-test was conducted at the end of June.

The health literacy was measured using a questionnaire that had been developed and then proved valid and reliable ($n = 10$) with the Cronbach's Alpha of VIA was 0,42 and BSE was 0,74. The health literacy questionnaires of VIA contains 15 items, and the BSE contains 10 items.

Analysis

The data was analyzed descriptively and inferentially. The descriptive was minimal, maximal, median, and mean. This analysis was to describe the nature of the data, and the paired T test ($\alpha \leq 0,05$) was used to find the difference in health literacy between the pre and post intervention.

Ethical consideration

This study received ethical approval from the Universitas Muhammadiyah Banjarmasin Ethics Review Board (No. 448/UMB/KE/VI/2023). All participants provided informed consent, and data confidentiality was strictly maintained. Research permission was granted by the Head of Martapura Prison (No. W.19.UM.01.01-891, dated February 13, 2023) following submission of an official request letter. The approval was granted with the condition that the data would be used solely for academic purposes and not published otherwise.

RESULT

The research succeeded in recruiting 208 respondents, and no dropouts were reported. All of the respondents were female (100%), the average age was 34,1 (20 – 55), the highest education is high school (31%) and the lowest is university (1%). Most of the inmates originated from City of Banjarmasin (17%), and 1 inmate originated from Aceh, which is outside of South Kalimantan Province. The details are shown in Table 2.

Table II: Characteristics of respondent demography data

	Characteristics	n	%	Average	Min - Max
Sex	Female	208	100		
	Male	0	0		
	Total	208	100		
Age				34,1	20 - 55
	No formal education	45	22		
	Elementary school	40	19		
Education	Middle highschool	56	27		
	Senior highschool	64	31		
	Higher education	3	1		
	Total	208	100		
Place of origin	City of Banjarmasin	42	20		
	Banjar Regency	22	11		
	Tapin Regency, Banjarmasin	22	11		
	Tanah Bumbu Regency, Banjarmasin	18	9		
	Kota Baru Regency, Banjarmasin	14	7		
	Hulu Sungai Utara Regency, Banjarmasin	15	7		
	Hulu Sungai Tengah Regency, Banjarmasin	16	8		
	Hulu Sungai Selatan Regency, Banjarmasin	21	10		
	Tanah Laut Regency, Banjarmasin	15	7		
	Tabalong Regency	22	11		
	Aceh	1	0		
	Total	208	100		

The results of the research on the effectiveness of health education through a booklet on BSE (Breast Self-Examination) and VIA (Visual Inspection with Acetic Acid) regarding health literacy in the Martapura prison can be seen in Table 3.

Table III: The Effectiveness BSE and VIA education module on health literacy

No	Health literacy	n	Min	Max	Median	Mean	Std Deviation	Paired Differences	95% CI	Sig (p value)
1	Pre	208	15	25	21.00	20.89	1.828	0.28	-0.580-	0.070
2	Post	208	13	25	21.00	21.17	2.059		0.22	

Table 3 shows the average health literacy score of respondents before the health education intervention was 20.89 points, with the lowest score being 15 points and the highest being 25 points. After the intervention, the average health literacy score was 21.17 points, with a minimum of 13 points and a maximum of 25 points.

The research data was further analyzed using the T-test, which is suitable for determining the effectiveness of the intervention. A prerequisite for using the T-test is that the data must be normally distributed. Normality testing was performed on the collected data, yielding a Kolmogorov-Smirnov test result of 0.159, which is greater than 0.005, indicating that the data are normally distributed. The results of the T-test can be seen in Table 3.

The data in Table 3 indicates that the average health literacy score of respondents before the health education intervention using a booklet was 20.89. After the intervention, there was an increase in the average score to 21.17, with a mean difference (paired differences) of 0.28. The p-value of 0.070, which is less than the significance level $\alpha = 0.05$, suggests that the health education intervention using a booklet about BSE and VIA was effective among female inmates at the Martapura prison.

DISCUSSION

The 208 female inmates were provided with health education on BSE (Breast Self-Examination) and VIA (Visual Inspection with Acetic Acid) through a booklet. Health literacy enables vulnerable and isolated women to make informed decisions about their health, particularly in relation to cancer [25,26]. Inmates represent a particularly vulnerable group due to their limited access to health information and services. A study in Malaysia has shown that vulnerable communities are more likely to have high Catastrophic health expenditures [27]. The findings revealed a modest but statistically significant increase in health literacy post-education, highlighting the potential of targeted health interventions in improving health literacy among this population. The study's results align with recent research, emphasizing the importance of accessible, tailored educational materials in raising awareness and promoting preventive health behaviors among marginalized groups [28,29].

The initial low levels of health literacy about BSE and VIA observed in this study can be attributed to the limited exposure to health education material for breast and cervical cancer among incarcerated women. Similar findings have been reported in other studies, where isolated or underserved populations demonstrated lower health literacy levels due to restricted access

to information [28–30]. In this context, the use of educational booklets proved to be effective tools for bridging this information gap. Booklets are particularly advantageous in settings like prisons, where digital resources may be scarce or non-existent. By providing clear, visual, and easily digestible content, booklets cater to the learning needs of women who may have not had the opportunity to engage with more complex health information previously. Research suggests that in environments with limited access to digital tools, printed materials like booklets play a critical role in health education by offering accessible, straightforward information that can be easily understood by individuals with varying levels of health literacy [31]. The booklet proved effective in the Martapura prison setting due to limited access to external information. With no internet and minimal health resources in the prison library, the booklet served as the most practical tool to improve health literacy, encouraging inmates to read and practice BSE and VIA.

Despite the quantitative improvement in health literacy is relatively modest (an increase from 20.89 to 21.17). The statistical significance means that the change is unlikely due to chance. However, the small mean difference and the minimal improvement in maximum scores suggest low clinical significance unless this minor increase is associated with meaningful behavioral changes. Health literacy are foundational element in the behavior change process, and even slight improvements can lead to better health outcomes over time [32,33]. For incarcerated women, who may face numerous barriers to accessing healthcare, increased health literacy of BSE and VIA can empower them to take proactive steps in monitoring their health [34,35]. Health education interventions significantly improved health literacy and subsequent health behaviors related to early detection of breast and cervical cancers [7]. The ability to understand and act on health information is particularly critical in a prison setting, where inmates have limited opportunities for regular medical check-ups [8]. A follow-up on long-term impact (screening adherence, self-exam practices, early detection rates) would provide stronger evidence for clinical significance.

The effectiveness of booklets as a medium for health education in this study is consistent with broader research on health promotion strategies. Booklets offer several practical benefits: they are inexpensive to produce, easy to distribute, and can be referred to multiple times by the reader, reinforcing learning [7,36,37]. Moreover, booklets allow for the inclusion of visual aids, which can be particularly helpful in explaining complex procedures like BSE and VIA

to individuals with low health literacy. This visual reinforcement is crucial, as it enhances comprehension and encourages women to engage in these preventive practices independently [7,34]. Booklets significantly improved health literacy about cervical cancer among women, leading to increased participation in preventive screening. Therefore, the findings of this study suggest that booklets are not only effective but also a practical solution for health education in resource-limited settings like prisons [7,37–39].

LIMITATION

This study has several limitations. Technically, the research team had limited access during data collection, which was fully delegated to prison officers serving as health cadres to remind the prison to read and engage with the booklet. As a result, the implementation of the intervention may not have been consistent across all participants. Methodologically, the study used a one-group pretest-posttest design without a comparison or control group, limiting the ability to determine whether observed changes were solely due to the intervention or influenced by confounding factors. Additionally, because the data were self-reported, there is a potential for social desirability bias, where participants may have responded, they believed were expected or favorable, rather than reflecting their true knowledge or behaviors.

IMPLICATION

The implications of these findings extend beyond the prison environment. They underscore the importance of targeted, accessible health education for improving health literacy and promoting preventive behaviors in underserved populations. As the global burden of breast and cervical cancer continues to rise, particularly in low-resource settings, and there is a growing need for effective educational interventions that can be implemented at scale. The modest increase in health literacy observed in this study may represent just the beginning of a broader impact on health behaviors among women in prison. Over time, with high health literacy, the women, although in prison, will continue the exposure to health education and reinforced learning. These women may be more likely to engage in regular BSE and seek out VIA screenings, thereby reducing their risk of late-stage cancer diagnosis. Furthermore, the success of this intervention suggests that similar strategies could be applied in other isolated or marginalized communities, where health literacy remains a significant barrier to preventive care.

CONCLUSION

In conclusion, this study highlights the critical role of health education in improving health literacy and promoting preventive behaviors among women inmates. The use of educational booklets to increase

knowledge about BSE and VIA proved effective, even in environments with limited access to health information. These findings reinforce the value of accessible, low-cost, and visually engaging materials in enhancing knowledge retention and empowering women to take control of their health. For sustainable implementation in correctional facilities, partnerships with healthcare providers and the integration of trained inmate health cadres can support ongoing education efforts. Routine scheduling of group sessions, combined with printed materials that require minimal resources, offering a feasible model for long-term health promotion in prison. This study provides valuable insight into how targeted, practical interventions can create meaningful improvements in the well-being of incarcerated women and other underserved populations.

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