

Original Research**Health Education on Cervical Cancer Early Detection among Women of Reproductive Age in Desa Kolam****Elisabeth Surbakti^{1*}, Lusiana Gultom¹, Hanna Sriyanti Saragih¹, Sri Juwarni¹**¹ Department of Midwifery, Politeknik Kesehatan Kementerian Kesehatan Medan, Indonesia 20137.**ABSTRACT**

Background: Cervical cancer remains a major contributor to morbidity and mortality among women in developing countries, despite being largely preventable through early detection. This study addresses the low uptake of screening in Desa Kolam, Deli Serdang Regency, where 92.07% of women of reproductive age have never undergone Visual Inspection with Acetic Acid, reflecting suboptimal use of available services. The primary objective was to analyze the effect of an educational intervention on cervical cancer screening on the knowledge and attitudes of women of reproductive age in Desa Kolam.

Methods: A quasi-experimental one-group pretest–posttest design was used involving 88 women of childbearing age selected through purposive sampling. Knowledge and attitudes were measured using structured questionnaires before and after a face-to-face educational intervention on cervical cancer and VIA screening. Data were analyzed using paired t-tests with a significance level of $p < 0.05$.

Results: The mean knowledge score increased from 52.03 ± 6.96 before the intervention to 85.60 ± 7.61 after the intervention, with a mean increase of 33.57 points ($p = 0.001$). The mean attitude score increased from 51.82 ± 12.46 to 84.32 ± 8.41 , with a mean increase of 32.50 points ($p = 0.001$).

Conclusion: In conclusion, education on cervical cancer and screening proved effective in improving knowledge and fostering more favorable attitudes among women of reproductive age, suggesting that structured educational programs can serve as an important strategy to enhance screening coverage in rural settings.

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cancer, detection, education, reproductive, women;

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INTRODUCTION

Cervical cancer is a significant health problem for women worldwide, including in Indonesia. In 2022, the WHO reported more than 342,000 deaths from cervical cancer globally, with the majority of cases occurring in developing countries (World Health Organization, 2022). In Indonesia, cervical cancer is one of the leading causes of morbidity and mortality among women of reproductive age. This is ironic because

cervical cancer is a preventable disease and can be detected early through effective and affordable screening programs (Ekawati et al., 2024; Eun & Perkins, 2020).

Early detection plays a key role in reducing morbidity and mortality from cervical cancer. One screening method recommended in primary healthcare facilities is Visual Inspection with Acetic Acid (VIA) (Lohiya et al., 2022; Pesola & Sasieni, 2019). The VIA test offers several advantages: it is a simple procedure that does not require sophisticated equipment, can be performed by trained healthcare professionals, is relatively inexpensive, and provides readily available results. These characteristics make VIA highly suitable for use in areas with limited resources, including rural areas (Azhari et al., 2025; Mulmi et al., 2022; Nuranna, 2022).

The Indonesian government has integrated VIA screening into the national cervical cancer early detection program and encouraged its implementation in community health centers (Puskesmas) and other primary healthcare facilities (Wahidin et al., 2022; World Health Organization, 2023). However, in practice, VIA screening coverage remains far from optimal. Reports indicate that many women, particularly in rural areas, have never been screened for cervical cancer. This gap between national policy and community-level practice highlights inhibiting factors that need to be understood and addressed through research (Wahidin et al., 2022; Wantini & Indrayani, 2019; Wardani & Wijaya, 2025).

A situational analysis in Desa Kolam, particularly in Hamlets X, XI, and XII of Deli Serdang Regency, showed that 92.07% of fertile couples had never undergone VIA screening, indicating very low utilization of cervical cancer early detection services. This condition may be related to limited knowledge and understanding of cervical cancer and VIA screening, misconceptions that the procedure is frightening or painful, feelings of shame and stigma, inadequate family support, particularly from husbands, and limited accessibility of screening services. These barriers may increase the risk of delayed cervical cancer detection and consequently contribute to higher morbidity, mortality, and economic burden on families, highlighting the need for systematic intervention (Islam et al., 2023; Rezapour et al., 2025).

Targeted, evidence-based health education is a crucial strategy for increasing knowledge and improving attitudes regarding early cervical cancer detection (Al-Oseely et al., 2025)(Bando et al., 2025). Good education is expected to dismantle myths and stigma, reduce fear and shame, and foster positive perceptions of VIA screening. At the same time, education can promote family and community support, making women feel better prepared and more motivated to undergo regular screening. However, empirical evidence on the effectiveness of education in shaping the knowledge and attitudes of women of childbearing age in rural contexts remains limited (Nadilah Zahra et al., 2024; Shehta Said Farag et al., 2024; Simanullang, 2018).

Desa Kolam, with its socio-cultural and economic characteristics, reflects the general conditions of rural areas, which face various limitations in accessing health information and services. This makes Desa Kolam a relevant location to examine how educational interventions can influence the knowledge and attitudes of women of childbearing age regarding VIA screening. Research in this setting is expected to provide a more concrete picture of the challenges and opportunities for implementing cervical cancer early detection programs in the community.

Previous studies have demonstrated that health education can improve women's knowledge and attitudes toward cervical cancer screening. However, evidence from rural Indonesian communities with very low previous uptake of VIA screening remains

limited. The novelty of this study lies in evaluating a structured VIA educational intervention among women of childbearing age in a rural community where 92.07% of eligible couples had never undergone VIA screening. By simultaneously assessing changes in knowledge and attitudes before and after the intervention, this study provides context-specific evidence regarding the potential role of community-based education in addressing cognitive and attitudinal barriers to cervical cancer screening in an underserved rural population.

Therefore, this study aimed to analyze the effect of education about Visual Inspection with Acetic Acid (VIA) on the knowledge and attitudes of women of childbearing age in Desa Kolam, Deli Serdang Regency. The findings are expected to provide evidence for the development of context-appropriate educational strategies to support cervical cancer early detection programs in rural communities with low screening participation.

Based on the above description, this study focused on analyzing the impact of VIA screening education on the knowledge and attitudes of women of childbearing age in Desa Kolam. This study aims to analyze the influence of education about Visual Inspection with Acetic Acid (VIA) on the knowledge and attitudes of women of childbearing age in Desa Kolam.

MATERIALS AND METHOD

This study used a quasi-experimental design with a one-group pretest–posttest approach. The knowledge and attitudes of women of childbearing age were measured before and after receiving an educational intervention about Visual Inspection with Acetic Acid (VIA) for early detection of cervical cancer.

The study population comprised all women of childbearing age residing in Hamlets X, XI, and XII of Desa Kolam, Deli Serdang Regency. A total of 88 women of childbearing age were included in the study. This number represented eligible participants who met the predetermined inclusion criteria, were willing to participate, and completed all stages of the study, including the pretest, educational intervention, and posttest. Participants were selected using purposive sampling based on the following inclusion criteria: residing in Desa Kolam, being a woman of childbearing age and part of a reproductive-age couple, being able to communicate effectively, and providing informed consent to participate in the study.

The study was conducted in Hamlets X, XI, and XII of Desa Kolam, within the working area of the Desa Kolam Community Health Center, Deli Serdang Regency. Data collection was conducted in 2025 in accordance with the education and VIA screening program schedule for the area. The independent variable in this study was education about VIA screening as an early detection method for cervical cancer. The dependent variable was women of childbearing age's knowledge and attitudes about early detection of cervical cancer through VIA screening, which were measured using a structured questionnaire before and after the education.

The instrument used was a knowledge and attitude questionnaire regarding cervical cancer and VIA screening, developed by the researchers based on a literature review and guidelines for cervical cancer early detection programs. The questionnaire underwent validity and reliability testing on respondents with characteristics similar to those of the study subjects. Validity and reliability testing was conducted on 30 respondents with characteristics similar to the study population. Validity was assessed using Pearson's product-moment correlation, while reliability was evaluated using

Cronbach's alpha. The knowledge and attitude questionnaires showed acceptable reliability, with Cronbach's alpha values of 0.739 and 0.799, respectively.

The data collection procedure was carried out in several stages. First, respondents who met the criteria were selected and given an explanation and an informed consent form. Second, a pretest was conducted on knowledge and attitudes using a questionnaire. Third, respondents were provided with structured education about cervical cancer and the VIA examination through face-to-face counseling using presentations and leaflets. Supporting media, such as leaflets, were provided as visual aids to clarify the material. The leaflets contained information about cervical cancer, risk factors, and easy-to-follow VIA examination procedures. Fourth, after the education was completed, a posttest was administered to assess knowledge and attitudes using the same questionnaire.

The collected data were processed through editing, coding, entry, and cleaning stages, then analyzed statistically. Univariate analysis was used to describe the characteristics of the respondents and to report the mean and standard deviation of knowledge and attitude scores before and after the education. Bivariate analysis used a paired t-test to determine the difference in the mean knowledge and attitude scores before and after the educational intervention, with a significance level of $p < 0.05$.

All respondents were informed about the purpose, benefits, procedures, and their rights, then asked to sign an informed consent form before completing the questionnaire. Confidentiality of personal data was ensured by not including respondents' identities in the research results. The ethical code number used in this study is No. 01.26.2636/KEPK/POLTEKKES KEMENKES MEDAN 2026.

RESULTS

In this section, it is explained the results of research and at the same time is given the comprehensive Respondent Characteristics Results. Data collection from 88 respondents who participated in the VIA education and screening program at the Desa Kolam Community Health Center yielded information on various demographic characteristics and health histories. The following is a breakdown of the results by respondent characteristics:

Table 1. Respondent Characteristics

Characteristics	n	Percentage
Age		
21-28	1	1.14
29-36	42	47.73
37-44	37	42.05
45-52	8	9.09
Religion		
Islam	81	92.05
Christian	7	7.95
Ethnic group		
Java	80	90.91
Batak	8	9.09
Examination Results		
Negative	88	100.00
Positive	0	0.00

Characteristics	n	Percentage
Age of Marriage		
17-22	61	69.32
23-28	20	22.73
28-33	7	7.95
Married to-		
0	0	0.00
1	88	100.00
2	0	0.00
Age of onset of menstruation		
11-12	9	10.23
13-14	52	59.09
15-16	27	30.68
Early Pregnancy Age		
17-22	34	38.64
23-28	46	52.27
28-33	8	9.09
Birth control history		
Implant	6	6.82
PILL	18	20.45
Spiral	5	5.68
Inject	44	50.00
There isn't any	15	17.05
Total	88	100

The Table 1 shows that 88 respondents who participated in the VIA education and screening program at the Desa Kolam Community Health Center in Deli Serdang Regency had diverse demographic and reproductive health characteristics. The majority of respondents were aged 29–36 years (47.73%), followed by those aged 37–44 years (42.05%), indicating that most participants were within the productive age group with potential risk for cervical cancer. Most respondents were Muslim (92.05%) and Javanese (90.91%), reflecting the dominant demographic characteristics of the Desa Kolam community. The VIA examination results showed that all respondents (100%) had negative results, indicating that no cervical abnormalities or suspected cervical cancer lesions were detected during the screening.

This finding highlights the importance of VIA screening as an early detection method for cervical cancer and emphasizes the need for continuous periodic screening. Regarding reproductive characteristics, most respondents married at the age of 17–22 years (69.32%), and all respondents (100%) reported their first marriage. The majority experienced menarche at the age of 13–14 years (59.09%) and had their first pregnancy at the age of 23–28 years (52.27%). In terms of contraceptive use, injectable contraception was the most commonly used method (50%), followed by other contraceptive methods. These characteristics provide an overview of the reproductive health profile of women participating in the VIA education and screening program.

Overall, the respondent characteristics data provide an in-depth picture of the demographic and health profile of women of childbearing age in Desa Kolam. These findings indicate that the VIA education and screening program is highly relevant for

productive-age groups and women who marry at a young age, and provide a strong foundation for developing better public health programs in the future. VIA screening, despite all negative results in this study, remains vital as a first step in early cervical cancer detection and in raising awareness of the importance of regular screening for women of childbearing age.

Table 2. Results of the Measurement of Mothers' Knowledge and Attitude Levels

Variables	Pretest		Posttest	
	N	Percent	N	Percent
Knowledge				
Good	0	0.00	84	95.45
Enough	65	73.86	4	4.55
Not enough	23	26.14	0	0.00
Attitude				
Good	4	4.55	80	90.91
Enough	23	26.14	8	9.09
Not enough	61	69.32	0	0.00

Table 2 shows the results of the knowledge and attitude measurements for fertile women in the pretest and posttest. In terms of knowledge, in the pretest, the majority (73.86%) of participants were in the "Sufficient" category, 26.14% in the "Poor" category, and none in the "Good" category. However, after participating in the intervention, there was a significant improvement: 95.45% of participants were in the "Good" category, 4.55% in the "Sufficient" category, and none in the "Poor" category.

For attitudes, in the pretest, the majority of participants (69.32%) had attitudes categorized as "Poor," and 26.14% were in the "Sufficient" category, with only 4.55% showing a "Good" attitude. After the intervention, results showed significant improvements: 90.91% of participants now have "Good" attitudes, 9.09% are in the "Sufficient" category, and no participants are categorized as "Poor." These changes illustrate the intervention's positive impact on the knowledge and attitudes of fertile women regarding the tested topics.

Table 3. Average distribution of knowledge and attitudes of fertile women (n=88)

Characteristics	Mean±SD	Mean Change ± SD	p-value*
Knowledge			
Before	52.03±6.960	33.57±0.646	0.001
After	85.60±7.606		
Attitude			
Before	51.82±12.461	32.5±4.047	0.001
After	84.32±8.414		

Based on Table 3, there was a very significant increase in women of childbearing age's knowledge and attitudes after the intervention. The average knowledge score before the intervention was 52.03±6.96 and increased to 85.60±7.61 after the intervention. The average Change in knowledge was 33.57±0.65 (p=0.001), indicating a statistically significant increase. Similarly, the average attitude score before the intervention was 51.82±12.46 and increased to 84.32±8.41 after the intervention. The

average attitude change was 32.50 ± 4.05 ($p=0.001$), indicating a statistically significant change in women of childbearing age after the intervention.

DISCUSSION

The results of this study indicate that VIA screening education significantly improved the knowledge and attitudes of women of childbearing age in Desa Kolam. The increase in the average knowledge score from a lower to a higher category after the intervention indicates that respondents well understood the material presented. This aligns with the concept that structured health education can fill information gaps and correct misconceptions related to cervical cancer and early detection (Azlina et al., 2021; Basoya & Anjankar, 2022).

This increase in knowledge was supported by significant changes in respondents' attitudes after the education. More positive attitudes toward VIA testing indicate that respondents not only learned new information but also began to accept and value the test as essential and beneficial (Bando et al., 2025; Basoya & Anjankar, 2022). This is crucial because knowledge alone is often insufficient to drive health behavior change. These findings indicate that the educational approach used addressed both cognitive and affective aspects (Romli et al., 2020; Sumarmi et al., 2021).

The highly significant p-values for the mean changes in knowledge and attitudes indicate that the differences before and after education were not coincidental. Practically, this means that education plays a key role in improving the readiness of women of childbearing age for cervical cancer early detection (Basoya & Anjankar, 2022; Islam et al., 2023). Given that 92.07% of fertile couples had never undergone a VIA test, this improvement in knowledge and attitudes is a fundamental first step in encouraging them to shift from ignorance and doubt to readiness for screening.

These results are consistent with health behavior theory, which states that increased knowledge influences perceptions of susceptibility, disease severity, and the benefits of preventive measures, thereby shaping more positive attitudes toward these measures. The education provided likely helped respondents understand that cervical cancer is preventable and better managed when detected early, and that VIA testing is relatively simple, quick, and affordable (Basoya & Anjankar, 2022; Faradisa et al., 2020; Paripurna, 2024). The reduction in fear and embarrassment reflected in improved attitudes is an essential asset in reducing psychological barriers that previously prevented them from utilizing VIA services (Bando et al., 2025; Haloho et al., 2022; Robbers et al., 2021).

Contextually, the results of this study also demonstrate that educational interventions in rural areas with limited access to health information and services can still have a substantial impact if implemented in a well-planned manner and involving local health workers. The involvement of local leaders and primary health care facilities is likely instrumental in increasing respondents' trust in the material presented. Therefore, this educational model has the potential to be replicated in other villages with similar socio-cultural characteristics and resources to increase cervical cancer screening coverage.

The results of this study showed that VIA screening education significantly improved the knowledge and attitudes of women of childbearing age in Desa Kolam. The mean knowledge score increased from 52.03 before the intervention to 85.60 after the intervention, while the mean attitude score increased from 51.82 to 84.32. These

findings are consistent with (Abuzeyad et al., 2026), who reported that health education improved women's knowledge and attitudes toward cervical cancer screening.

Similar findings were also reported by (Devi & Joshi, 2023; Romli et al., 2020), who demonstrated the effectiveness of a health education program in improving knowledge and attitudes toward cervical cancer and screening. In the Indonesian context, (Sung et al., 2021) also found that health education increased women's knowledge regarding cervical cancer prevention. Furthermore, (Shehta Said Farag et al., 2024) reported improvements in knowledge, attitudes, and preventive practices following an educational intervention on cervical cancer. Collectively, these findings support the present study and indicate that structured health education is consistently associated with improvements in women's cognitive and attitudinal responses toward cervical cancer prevention and early detection.

The present study found significant improvements in both knowledge and attitudes following VIA education ($p=0.001$). These findings are consistent with (Azlina et al., 2021; Mili et al., 2025), who reported significant improvements in knowledge ($p<0.001$) and attitudes ($p=0.003$) following a cervical cancer health education intervention. However, improvements in knowledge and attitudes do not always translate directly into screening behavior. This contrasting finding suggests that increased knowledge and positive attitudes alone may not be sufficient to ensure screening behavior, as other factors such as accessibility of services, family support, social norms, and perceived barriers may also influence women's decisions to undergo screening. Therefore, educational interventions should be integrated with accessible VIA services and continuous support from families, health workers, and local authorities to promote sustainable cervical cancer screening behavior.

A limitation of this study is that it used a one-group pretest–posttest design without a comparison group; therefore, changes in knowledge and attitudes cannot be fully attributed to the educational intervention alone. The sample was limited to women of reproductive age in one village in Deli Serdang Regency and selected using non-random sampling, which restricts the generalizability of the findings to other areas and populations. The outcomes were measured only shortly after the education session, so the study did not evaluate long-term retention of knowledge or the translation of improved attitudes into actual cervical cancer screening behavior.

Future research should include control or comparison groups and use probability sampling to strengthen internal and external validity. Studies with longer follow-up periods are needed to assess whether educational effects on knowledge and attitudes are sustained and lead to increased uptake of cervical cancer screening. Subsequent work could also test multi-component interventions that combine education with easier access to screening services, involvement of families and community leaders, and support from health workers to encourage regular and continuous screening practices in rural settings.

CONCLUSION

This study concluded that education on Visual Inspection with Acetic Acid (VIA) significantly improved the knowledge and attitudes of women of childbearing age in Desa Kolam, Deli Serdang Regency. Education was shown to improve respondents' understanding of cervical cancer and the importance of early detection, while also fostering a more positive attitude toward VIA testing as a preventative measure. These findings suggest that structured educational interventions can be an effective strategy to address low VIA screening coverage among fertile couples, particularly in rural areas

with limited access to health information and services. Education needs to be combined with accessible VIA services and support from families and healthcare professionals to ensure that improved knowledge and attitudes translate into routine and sustainable screening behavior.

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