

Evaluation of Cervical Cancer Screening System using Visual Inspection with Acetic Acid (VIA) Method in Bantul District 2023

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Abstract

Cervical cancer remains a significant public health challenge globally, particularly in Indonesia, where it disproportionately affects women of various age groups. This study aims to evaluate the cervical cancer screening surveillance system in Bantul District in 2023, a region chosen for its low cervical cancer screening coverage and its significance as a representative area for rural public health challenges in Indonesia. This descriptive study uses secondary data from the Visual Inspection with Acetic Acid (VIA) screening report conducted at Public Health Centers (PHCs) in Bantul District. The evaluation focuses on core functions (case detection, registration, reporting) and surveillance quality (completeness of data and reporting from PHCs). Data were analyzed descriptively using percentages and frequencies. There were 27 PHCs, and 92,59% reported screening results. Jetis II PHC reported the highest screening coverage (9.60%) and Kasihan II PHC recorded the highest positive cases (21,15%). 24 PHCs (96%) used the patient registration form provided by the Health Office. Of 2.321 screened women, 52 were reported positive with 51.9% of cases having no follow-up records. The completeness of reporting from PHCs reached 95.68%, while the completeness of data averaged 61.76%, with a range of 4.35%-100%. The study relied on secondary data, which limited the ability to explore in-depth contextual factors and stakeholder perspectives, emphasizing the need for qualitative follow-up to enhance understanding. Capacity building of health workers in screening and reporting is required along with the development and implementation of Standard Operating Procedures (SOPs), which is critical to improving the program.

Keywords: Cervical Cancer; VIA; Surveillance System; Bantul District

Introduction

Cervical cancer is the fourth most common cancer among women globally and remains a significant public health issue, particularly in low- and middle-income countries (LMICs). In 2022, it was the leading cause of cancer death in women in 36 countries, predominantly in sub-Saharan Africa, South America, and Southeast Asia (Arbyn et al., 2020). In Indonesia, cervical cancer is the second most common cancer among women, with 36,633 cases reported in 2021, accounting for 17.2% of all female cancers. The mortality rate is notably high, with 21,003 deaths or 19.1% of all cancer deaths (Information Centre on HPV and Cancer, 2023) Compared to 2008, there has been a twofold increase in cervical cancer incidence in Indonesia (FKUI, 2023).

The primary cause of cervical cancer is infection with the human papillomavirus (HPV), though genetic and socioeconomic factors also contribute to the disease burden. In Indonesia, significant risk factors include early marriage, high parity, and socioeconomic disparities, which lead to late-stage leading to late-stage diagnoses and high mortality rates (Robbers et al., 2021); (Parija et al., 2017). Unfortunately, screening programs are often insufficient or opportunistic resulting in delayed detection and treatment (Singh et al., 2023). Effective screening is essential for early detection and prevention, and the Visual Inspection with Acetic Acid (VIA) method has emerged as a cost-effective and feasible option in resource-limited settings. VIA is accessible and can be performed by trained healthcare workers, making it particularly valuable in rural and underserved areas.

In Bantul District, VIA screening has been widely adopted in community health centers as part of efforts to reduce the burden of cervical cancer (Lohiya et al., 2022). The target population for this screening includes women aged 30-50 years, the group most at risk of cervical cancer, with a particular focus on those who have not participated in previous screening. According to the 2023 District Health Office Bantul report, only 6% of the 2.161 women in the 30-50 age group participated in IVA screening. In 2023, VIA screening identified 51 positive cases and 4 suspicious cancer cases.

Despite the widespread adoption of the VIA method in various healthcare facilities, including the Public Health Center (PHCs) in Bantul District, a comprehensive evaluation of the cervical cancer screening surveillance system is urgently needed. This evaluation is crucial to ensure the program operates efficiently and achieves its intended outcomes. While the VIA method has successfully been a screening tool, gaps remain in evaluating its effectiveness within the surveillance system. Without systematic assessment, it becomes challenging to identify areas for improvement, address barriers to screening uptake, and enhance the overall quality of care provided to women. The VIA method holds particular significance in Indonesia due to its simplicity, affordability, and accessibility in rural and underserved areas.

However, its effectiveness depends on a robust surveillance system that ensures accurate case detection, thorough data recording, and timely reporting. This descriptive study, utilizing secondary data from VIA screening reports at PHCs in Bantul District, will evaluate these core surveillance functions—focusing on case detection rates, data completeness, and reporting quality. By assessing these elements, the study aims to offer insights into the current state of the screening surveillance system and identify opportunities for improvement, ultimately contributing to better cervical cancer prevention and control efforts in Indonesia.

Methods

This study employs a descriptive research design to evaluate the cervical cancer screening surveillance system in Bantul District, in 2023. This design is appropriate for assessing the current state of the screening program and identifying areas for improvement based on secondary data. The research is conducted in Bantul District, Yogyakarta. The population for this study consisted of all 27 PHCs that conducted cervical cancer screening with the VIA method during the specified period. Data were collected from the VIA screening reports submitted by these PHCs to the Health Office from January to December 2023. The study's variables include:

1. Registration: This variable assesses the use of patient registration forms provided by the Health Office. It evaluates whether the PHCs are adhering to standardized procedures for documenting screening results.
2. Reporting Quality: This variable examines the completeness of data reported by the PHCs, including the

percentages of PHCs that reported screening results and the completeness of follow-up records for positive cases.

3. **Screening Coverage:** This variable calculates the percentages of the target population that has been screened at each PHC, allowing for an assessment of the reach of the screening program.
4. **Follow-up:** This variable tracks the number of positive cases that received appropriate follow-up care, highlighting the effectiveness of referral systems in place.
5. **Case Detection:** This variable measures the number of women screened and the number of positive cases detected. It provides insight into the effectiveness of the screening program in identifying at-risk individuals.

Data were analyzed descriptively using percentages and frequencies to summarize key variables (e.g., the percentage of PHCs using the registration form and the percentage of positive cases receiving follow-up care, etc.). Since the study focuses on descriptive analysis, the results were reported as simple frequencies and percentages. No complex statistical testing was conducted, as the aim of this study was to describe the existing conditions of the cervical cancer screening program in Bantul District. The study primarily aimed to assess the current state of the screening system, including the completeness of data reporting, screening coverage, and follow-up care, rather than making statistical inferences or comparisons. As such, the descriptive statistics, including frequencies and percentages, were sufficient to summarize and present the data comprehensively.

The results were presented in various formats, including tables and bar charts. Tables provided detailed breakdowns of the data for each PHC, while bar charts were used to visually illustrate differences in screening coverage and follow-up care across PHCs in Bantul District.

Results

Completeness and Reporting

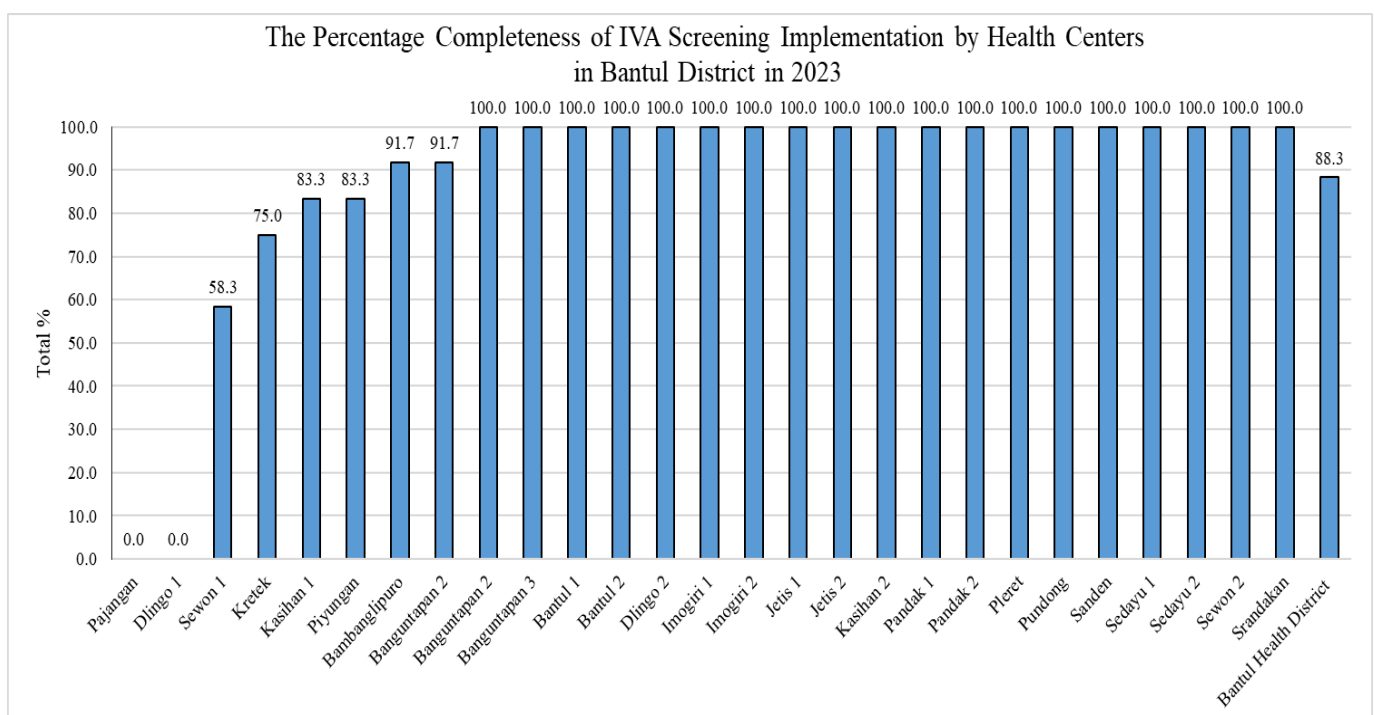


Figure 1. The Percentage Completeness of VIA Screening in Bantul District 2023

Figure 1. presents the percentage completeness of VIA screening implementation across PHCs in Bantul District in 2023. It highlights differences in performance, showing which centers did well and which one needed to improve. Importantly, two PHCs Pajangan and Dlingo I did not carry out any screening in 2023. Among the PHCs that conducted screenings, Sewon I recorded the lowest achievement in screening completeness at 58,3%.

Registration

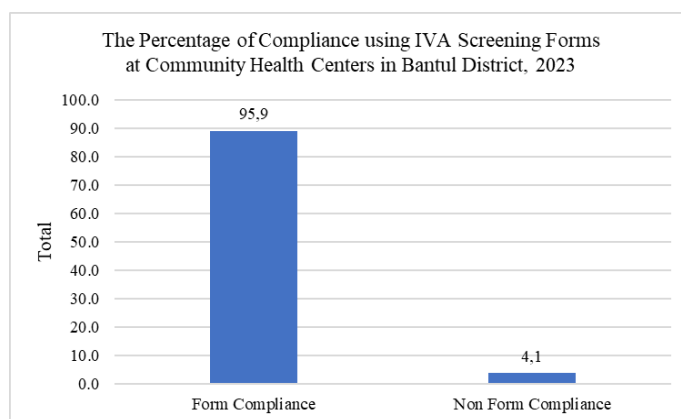


Figure 2. The Number of Compliance using VIA Screening Forms at PHCs in Bantul District, 2023

Figure 2. shows the number of PHCs in Bantul District that complied with using the VIA screening form in 2023. Out of all the PHCs, 95,9% (24) PHCs followed the proper procedure, while 4,1% (1) PHCs did not use the required forms.

Completeness and Reporting

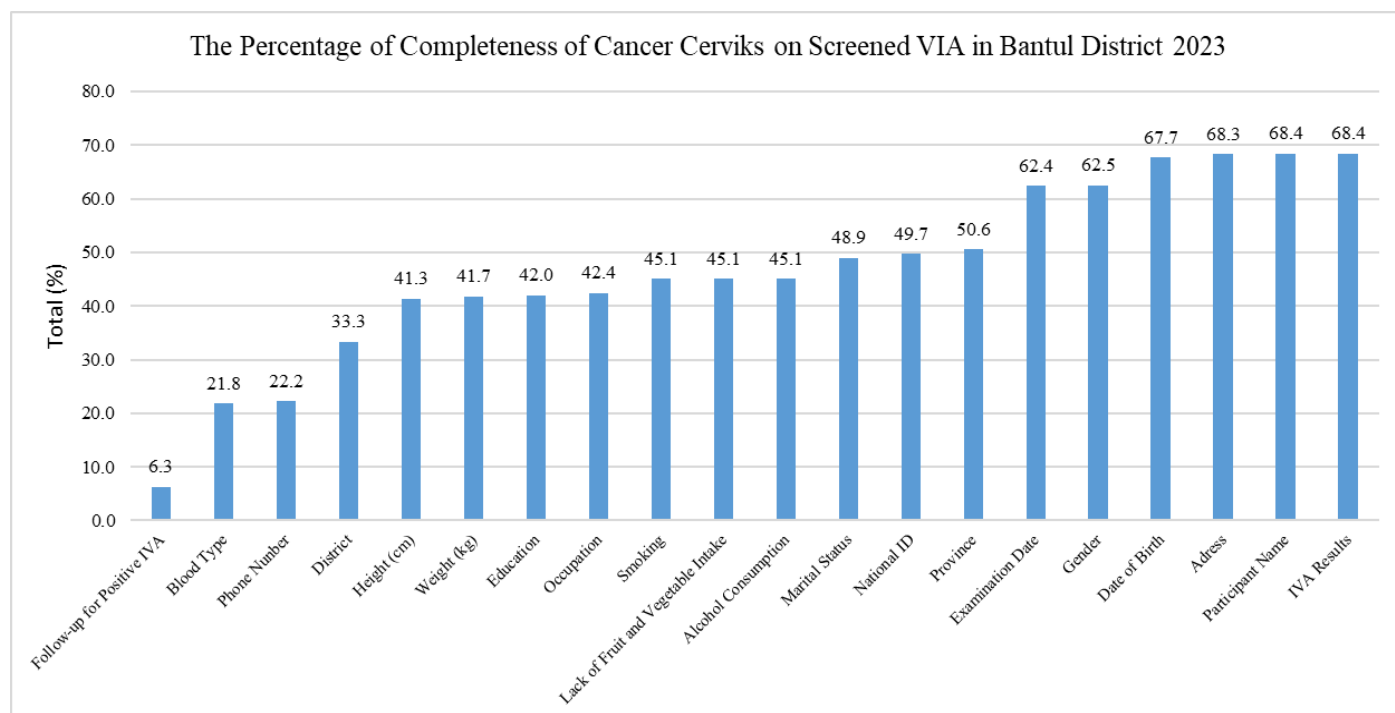


Figure 3. The Percentage of Completeness of Cancer Cervix on Screened VIA in Bantul District 2023

Figure 3. Shows the percentage of completeness in reporting cervical cancer screening results using the VIA method in Bantul District for 2023. This figure reflects how effectively health centers documented and reported their screening outcomes. A higher percentage indicates that more of the required information was accurately recorded and submitted, while lower percentages reveal gaps in data reporting. Notably, the follow-up for positive VIA screening was below 10%, suggesting that many patients did not receive the necessary follow-up care after their screenings.

Follow-up

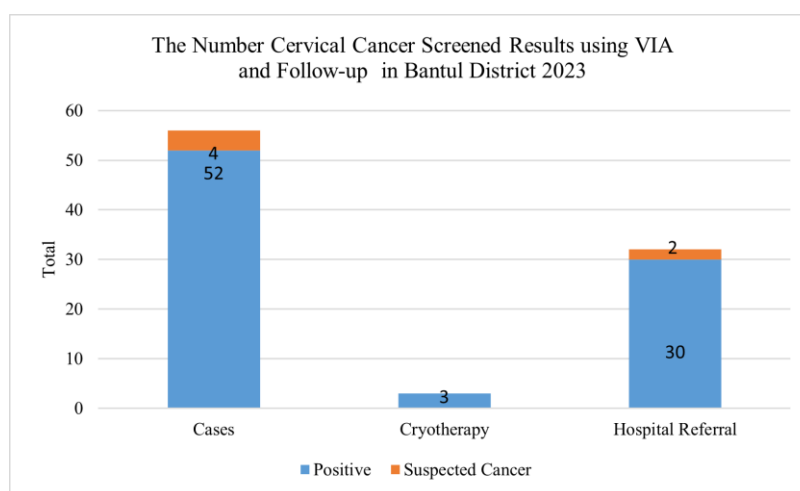


Figure 4. The Number Cervical Cancer Screened Results Using VIA and Follow-up in Bantul District 2023

Figure 4. shows the results of cervical screening using VIA method in Bantul District, 2023. Out of 2.321 women screened, 52 tested positives representing approximately 2.24%. However, follow-up care was provided for less than 10% of those positive cases, indicating a critical need for improved referral processes.

Case Detection and Screening Coverage

Public Health Center	Target 2023	Screened		Normal		Positive		Suspected Cancer	
		f	%	f	%	f	%	f	%
Kasihani I	2702	181	6.7	170	93.9	11	6.7	3	1.7
Sewon II	2685	126	4.7	126	100	0	0.0	0	0.0
Piyungan	2665	252	9.5	242	96.0	10	4.0	0	0.0
Kasihani II	2655	71	2.7	67	94.4	4	5.6	0	0.0
Pleret	2482	60	2.4	60	100	0	0.0	0	0.0
Sewon I	2413	51	2.1	46	90.2	5	9.8	0	0.0
Banguntapan III	2102	66	3.1	66	100	0	0.0	0	0.0
Banguntapan I	2022	72	3.6	70	97.2	2	2.8	0	0.0
Bambang Lipuro	1960	162	8.3	159	98.1	3	1.9	0	0.0
Pajangan	1788	0	0.0	0	0.0	0	0.0	0	0.0
Banguntapan II	1775	63	3.6	63	100	0	0.0	0	0.0
Jetis I	1690	78	4.6	78	100	0	0.0	1	1.3
Pundong	1690	60	3.6	60	100	0	0.0	0	0.0
Bantul II	1657	40	2.4	39	97.5	1	2.5	0	0.0
Imogiri II	1617	30	1.9	30	100	0	0.0	0	0.0
Bantul I	1495	127	8.5	123	96.9	4	0.0	0	0.0
Imogiri I	1475	65	4.4	64	98.5	1	1.5	0	0.0
Sanden	1453	95	6.5	95	100	0	0.0	0	0.0
Srandakan	1432	105	7.3	105	100	0	0.0	0	0.0
Kretek	1420	56	3.9	54	96.4	2	3.6	0	0.0
Pandak I	1280	105	8.2	102	97.1	3	2.9	0	0.0
Pandak II	1218	60	4.9	60	100	0	0.0	0	0.0
Jetis II	1208	116	9.6	116	100	0	0.0	0	0.0
Sedayu II	1197	104	8.7	98	94.2	6	5.8	0	0.0
Sedayu I	1158	104	9.0	104	100	0	0.0	0	0.0
Dlingo II	1033	72	7.0	72	100	0	0.0	0	0.0
Dlingo I	822	0	0.0	0	0.0	0	0.0	0	0.0
Bantul Health District	47094	2321	4.9	2099	98.1	52	2.24	4	0.2

Table 1. Target, Screened and Results VIA Screening Program in Bantul District

Table 1. provides an overview of the targets, screening coverage, normal results, positive cases, and suspected cancer cases from various PHCs in Bantul District. The screening achievement did not exceed 10% when compared to the actual targets. Jetis II PHC achieved the highest screening coverage at 9.6%, while Kasihan I PHC reported the highest number of positive cases at 6.7% and the highest suspected cancer cases at 1.7.

Discussion

The evaluation of cervical cancer screening using the Visual Inspection with Acetic Acid (VIA) method in Bantul District provides critical insight into public health interventions in low- and middle-income countries (LMICs). Via is a cost-effective and accessible screening method, well-suited for resource-limited settings, providing a practical approach to addressing the high cervical cancer burden in these regions (Ayu & Hadi, 2024). Various studies underscore the effectiveness of VIA, while also identifying challenges and areas for improvement, which are essential for strengthening cervical cancer prevention strategies in LMICs.

In 2023, two PHCs in Bantul District, Pajangan and Dlingo I, did not conduct any VIA screening. This highlights a systematic issue where some PHCs were unable to perform the screening program, reflecting challenges such as limited resources (e.g., lack of medical equipment or staff) and poor infrastructure in these areas. These issues need to be addressed in order to ensure equitable access to screening services across the district. The primary barriers identified include a lack of training for healthcare providers, leading to inconsistent screening and follow-up. Insufficient resources, such as limited staff and equipment, affect the ability of PHCs to properly implement the screening program. Socio-cultural factors, like low awareness and stigma, limit participation in screening. Addressing these barriers requires targeted capacity building, adequate resource allocation, and community education to improve screening and follow-up.

Case Detection and Screening Coverage

The data from Table 1. Highlight a critical issue with the cervical cancer screening program's performance, with overall screening rates falling below 10% of the set targets. Notably, Jetis II PHC, which reported the highest coverage of 9,6%, demonstrated that even the best-performing center in the district is unable to meet the target, indicating systemic challenges that need to be addressed. This underperformance raises concerns about the effectiveness of the current screening strategies and the need for a comprehensive evaluation of the program's implementation.

Furthermore, Kasihan I PHC reported the highest number of positive cases (6,7%) and the most suspected cancer cases (1,7%). These figures underscore the importance of timely follow-up care and effective treatment for women identified through screening. The literature consistently emphasizes that prompt follow-up and treatment are crucial for reducing cervical cancer morbidity and mortality rates (Farajimakin, 2024). The follow-up rates observed in this study suggest a significant gap in the referral process, which could lead to adverse health outcomes for women diagnosed with cervical cancer.

Additionally, barriers such as limited awareness, inadequate healthcare provider training, and socio-cultural beliefs may hinder screening participation. Addressing these challenges through community-based interventions can significantly enhance the uptake of cervical cancer screening (Tubassum et al., 2024). Therefore, targeted outreach and education initiatives are essential to raise awareness about the importance of cervical cancer screening.

Implementation and Compliance

Figure 1. illustrates the VIA screening coverage across various PHCs in Bantul District, 2023. A notable finding from this evaluation is the disparity in data reporting completeness, with some PHCs reporting incomplete or inconsistent data. For example, while Jetis II and Kasihan I PHCs showed relatively high screening and reporting completeness, others such as Pajangan and Dlingo I did not conduct any screenings at all. This disparity reflects unequal access to resources, healthcare worker training, and community awareness, which directly impacts the reliability of program data and ability to implement targeted interventions. Incomplete or inconsistent data hinders accurate assessments of the program's reach impact, weakening the ability to identify and address gaps effectively.

Some PHCs demonstrated high reporting completeness, reflecting their ability to document and report screening results accurately. However, others experienced low reporting completeness, highlighting challenges such as limited resources, inadequate training, or low community awareness that hinder the effectiveness of the screening program (WHO, 2021). Arora and Gupta (2021) identified similar barriers to participation in rural areas, including lack of awareness and social stigma. This disparity underscores the urgent need for targeted interventions, such as increasing resources, improving training, and raising awareness, to address underperforming PHCs and ensure consistent and accurate data reporting across the district. Tsu and Jeronimo (2022) emphasize the importance of training healthcare workers to improve screening quality in resource-limited areas, ultimately leading to better patient outcomes. By enhancing screening training, improving healthcare workers' understanding of the screening protocol, and addressing community barriers, such as socio-cultural beliefs and stigma, the overall effectiveness of cervical cancer screening programs in the Bantul District can be improved.

Registration

Figure 2 illustrates the compliance of PHCs in the Bantul District with VIA screening the form during cervical cancer. Out of the 27 PHCs, 25 PHCs conducted screening and adhered to the popper procedures by utilizing the required VIA screening forms, indicating a compliance rate of approximately 92,6%. However, 1 PH, specifically Piyungan PHC did not use the mandated form by Standard Operating Procedures (SOP), which raises concerns about data consistency and the overall effectiveness of the screening program. The high level of compliance indicator of the commitment to standardized screening practices. This adherence is essential for ensuring that the data is collected (WHO, 2021). Conversely, the non-compliance of PHC Piyungan gaps in training or resources that may need to be addressed to ensure uniformity in data collection practices (Arora & Gupta, 2021).

Data Completeness and Reporting

Figure 3. illustrates the percentage of completeness in reporting cervical cancer screening results using the VIA method. While some PHCs demonstrated high levels of data completeness, the average across all PHCs was only 61,76%, with some centers reporting as low as 4,35%. This variation in data completeness complies with the evaluation of the screening program's effectiveness and weakens the ability to implement targeted interventions to address gaps in screening outcomes. Incomplete or inconsistent data can hinder accurate assessments of disease burden and limit the capacity to implement necessary interventions (Arora & Gupta, 2021).

The higher reporting rate observed in some PHCs reflects good practices that should be standardized across the Bantul District. Ensuring uniform and accurate data reporting is crucial for enhancing program management and ensuring that all women in need receive appropriate care. By improving data management practices, the overall effectiveness of the cervical cancer screening program can be significantly enhanced (Smith et al, 2022; Sing et al, 2023).

Follow-Up

One of the most critical findings, presented in Figure 4, is that less than 10% of women who tested positive for cervical abnormalities received appropriate follow-up care, indicating a significant gap in the referral and treatment systems. This gap may be attributed to logistical barriers, such as limited access to transportation and referral facilities, particularly in rural areas.

Additionally, healthcare provider engagement is another key factor, as some healthcare providers may not consistently follow up on positive cases due to workload constraints or lack of established follow-up protocols. To address these issues, it is essential to enhance coordination between PHCs and referral hospitals, ensuring timely treatment for women identified as at risk. Strengthening referral pathways and improving follow-up processes are crucial to improving health outcomes and reducing cervical cancer mortality through early detection (WHO, 2021).

Conclusion

The study highlights both strengths and weaknesses in the cervical cancer screening program in Bantul District. While VIA remains a cost-effective and essential tool for cervical cancer detection in resource-limited settings, its implementation faces significant training, limited resources, and socio-cultural barriers. Addressing these issues requires a comprehensive approach, including targeted training programs for healthcare providers, improving data management systems, and conducting community outreach to raise awareness.

Future studies should explore the impact of improved training on screening outcomes and evaluate the cost-effectiveness of the VIA method in the Bantul District. Investigating logistical barriers in the referral systems and understanding socio-cultural factors influencing screening participation are also for enhancing the program. Improving these areas will significantly strengthen the VIA program, leading to better health outcomes for women in the Bantul District. Continuous monitoring and evaluation will be essential to adapt the program to the community's needs.

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Author Contribution and Competing Interest

All authors were involved in each phase of the research, including data collection, analysis, interpretation, and the preparation of the manuscript. Each author has reviewed and approved the final content of the manuscript, and there are no competing interests to disclose.

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