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Characteristics of cervical cancer screening using visual inspection with acetic acid and pap smear in the outpatient clinic at Prof. Dr I.G.N.G. Ngoerah Hospital Denpasar from January to December 2023

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ABSTRACT

Introduction: According to GLOBOCAN 2022, cervical cancer is the fourth leading cause of cancer-related morbidity and mortality among women worldwide, with 662,044 new cases and 348,709 deaths. In Southeast Asia, it ranks third in incidence and fourth in mortality. Indonesia contributes more than 50% of new cases (36,964) and deaths (20,708) in the region. Cervical cancer is largely preventable through early detection methods such as visual inspection with acetic acid (VIA) and Pap smear. However, differences in diagnostic accuracy between these screening methods highlight the need to identify patient characteristics appropriate for each modality. This study aimed to compare the characteristics of patients undergoing VIA and Pap smear screening at the outpatient clinic of Prof. Dr I.G.N.G. Ngoerah Hospital, Denpasar, from January to December 2023.
Methods: This observational analytical study used secondary data obtained from outpatient clinic registers and medical records of female patients who underwent VIA or Pap smear screening during the study period. Data were analysed using univariate analysis.
Results: Among 122 participants undergoing VIA, 24 (19.6%) had positive results. Pap smear examinations in 125 participants showed CIN I in 10 (8.0%), CIN II in 4 (3.2%), and CIN III in 5 (4.0%) participants. Vaginal discharge was reported in 7 VIA participants (5.7%) and 15 Pap smear participants (12.0%), while postcoital bleeding was reported in 2 participants (1.6%) in each group. Among VIA-positive cases, lesions were most commonly found in all four quadrants (45%).
Conclusion: Patient characteristics in VIA and Pap smear screening at Prof. Dr I.G.N.G. Ngoerah Hospital varied considerably, with a higher proportion of positive results observed in VIA compared to Pap smear screening.

Keywords: cervical cancer screening, visual inspection with acetic acid, pap smear.
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INTRODUCTION

Human Papillomavirus (HPV) infection is the leading risk factor for cervical cancer.[1] Based on GLOBOCAN 2022, cervical cancer ranks as the fourth most common cause of cancer morbidity and mortality among women, with an estimated 662,044 new cases and 348,709 deaths worldwide. Countries with a medium Human Development Index (HDI) contributed 200,389 cases (30.3%) and 123,222 deaths (35.3%). Most cases and deaths were concentrated in Asia and Africa. In South-Eastern Asia, cervical cancer ranks third in incidence (69,886 cases) and fourth in mortality (38,703 deaths).[2] Indonesia contribute more than 50% to new cervical cancer cases (36,964 cases) and deaths (20,708 deaths) in South-eastern Asia.[3] Cervical cancer occurs every year throughout the world, 85% of whom are in low and middle-income areas.[4] Cervical cancer is a preventable disease. A well-organised screening program that includes screening of the target population and treatment can reduce the incidence of cervical cancer by up to 80%.[5] The see and treat method via visual acetate inspection (VIA) is recommended as a primary screening test for cervical cancer by the WHO. Trained doctors and paramedics can carry it out.[6] In high-income countries, effective screening programs by performing cervical cytology examinations (Pap smear) can significantly reduce the number of cases of cervical cancer.[7] In 2020, only 9.3% of Indonesian women underwent cervical cancer screening with VIA or Pap smear. This low coverage is attributed to limited awareness and health literacy, financial and time constraints, difficulties in accessing health facilities, as well as insufficient availability of services and trained healthcare providers. As a

result, approximately 70% of Indonesian women are diagnosed at an advanced stage of cervical cancer, and more than half do not survive.[8] Therefore, regular screening examinations such as VIA and pap smear are needed to detect cases of cervical cancer and treat them immediately. However, there are differences in the accuracy of VIA and pap smear examinations. Further research is needed regarding the patient profile that can be examined with VIA or a pap smear to obtain more accurate results.

Despite the known benefits of cervical cancer screening in reducing incidence and mortality, screening coverage remains suboptimal in Indonesia, with participation rates reported as low as 12% in some regions due to limited awareness, access barriers, and inadequate health literacy among women of reproductive age.[9] Furthermore, although VIA and Pap smear are widely used screening modalities, their relative accuracy and clinical utility can vary by population, healthcare setting, and patient characteristics, and evidence suggests that factors such as knowledge, socioeconomic status, and accessibility influence uptake and performance of screening tests.[10] However, there is a paucity of locally relevant data evaluating how patient sociodemographic and clinical characteristics correlate with VIA versus Pap smear findings in the outpatient setting. This gap limits the ability of clinicians and health program planners to tailor screening strategies to the population served. Therefore, it is essential to describe the characteristics and outcomes of women undergoing VIA and Pap smear screening in a real-world clinical context to inform more effective, context-specific cervical cancer screening policies and practices. Therefore, this study seeks to describe the characteristics and outcomes of cervical cancer screening using VIA and Pap smear among women in an outpatient clinic at Prof. Dr I.G.N.G. Ngoerah Hospital, Denpasar, for the period January - December 2023.

METHODS

Design Study

This research is an observational analytical study which aims to assess the diagnostic value of acetate visual inspection and Pap smear in screening for pre-cancerous cervical lesions at the outpatient clinic, Prof. Dr I.G.N.G. Ngoerah Hospital, Denpasar, for the period 1 January – 31 December 2023.

Participants

The sample for this study was all women who underwent cervical cancer screening at the outpatient clinic at Prof. Dr I.G.N.G. Ngoerah Hospital, Denpasar, during the period 1 January - 31 December 2023. Inclusion criteria consisted of women aged 21–65 years who attended the outpatient clinic for cervical cancer screening, were sexually active, had no prior history of cervical cancer, and provided informed consent. Women were excluded if they were pregnant, had active vaginal bleeding during the examination, presented with clinically suspicious malignant lesions, had undergone hysterectomy, had a history of treatment for cervical neoplasia, or declined to participate.

Research Procedure

Visual Inspection with Acetic Acid (VIA) Procedure

The VIA test was performed by trained clinicians. After positioning the patient in the lithotomy position, a sterile speculum was inserted to visualise the cervix. A 3–5% acetic acid solution was applied evenly to the cervical surface using a cotton swab. After waiting for approximately one minute, the cervix was inspected under adequate light. The test was considered positive if distinct, well-defined acetowhite areas appeared near the squamocolumnar junction. If no acetowhite changes were observed, the result was recorded as negative.

Pap Smear Procedure

For cytology, the Pap smear was performed before acetic acid application to avoid interference with cellular morphology. After exposing the cervix with a speculum, a cytobrush was used to collect exfoliated cells from the ectocervix and endocervical canal. The specimen was immediately smeared onto a clean glass slide, fixed with 95% ethanol, and sent to the pathology laboratory for cytological examination using the Bethesda system.

Data Collection and Analysis

Demographic data, clinical characteristics, and screening results were recorded. VIA and Pap smear findings were compared and analysed descriptively. All collected data is entered into a data extraction sheet. Once the minimum sample size has been reached, the data is sorted and coded before proceeding to the data analysis stage.

Statistical Analysis

Data were processed using SPSS 25 for Windows software. All the data were analysed descriptively, with results presented as frequencies, percentages, and cross-tabulations.

RESULTS

There were 247 research subject patients, namely 122 women who underwent VIA screening and 125 women who underwent Pap smear screening for cervical cancer at the outpatient clinic at Prof. Dr I.G.N.G. Ngoerah Hospital, Denpasar. The results obtained from the distribution of the characteristics of the research subjects are according to the table below.

Based on the results of research on the characteristics of patients who underwent visual inspection of acetate, it was generally found that out of 122 respondents, the age characteristics of participants who underwent VIA were mostly >51 years, with 40 people (32.8%), followed by the age group 41-50 years and 31- 40 years old with 36 people (29.5%) and 33 people (27.0%).

Many participants who underwent VIA had a parity > 3, with 45 people (36.9%), followed by a parity of 3, with 35 people (28.7%). Of all 122 participants, there were 24 people with positive VIA results (19.7%) who experts had assessed. Most participants who underwent VIA had a high school education, with a distribution of 65 people (53.3%) and 37 who had bachelor's degrees (30.3%).

Based on complaints, participants who underwent VIA included vaginal discharge and postcoital bleeding, with seven people (5.7%) and two people (1.6%). Where most participants who participated in the examination had no complaints, 113 people (92.6%). Regarding domicile characteristics, participants

Table 1. Characteristics of the VIA Examination

Characteristics	Frequency	%
Age (years)		
21 – 30	13	10,7
31 – 40	33	27,0
41 – 50	36	29,5
≥ 51	40	32,8
Parity		
P0	10	8,2
P1	17	13,9
P2	15	12,3
P3	35	28,7
P>3	45	36,9
VIA Results		
Positive	24	19,7
Negative	98	80,3
Education		
University	37	30,3
Senior Highschool	65	53,3
Junior Highschool	10	8,2
Elementary School	10	8,2
Symptom		
Leukorrhea	7	5,7
Postcoital bleeding	2	1,6
No symptom	113	92,6
Residency		
Bali		
Badung	22	18,0
Tabanan	13	10,7
Denpasar	46	37,7
Bangli	4	3,3
Jembrana	1	0,8
Klungkung	8	6,6
Gianyar	16	13,1
Karangasem	1	0,8
Buleleng	2	1,6
Nusa Tenggara	6	4,9
Jawa	3	2,5
Total	122	100

who underwent VIA were dominated by Denpasar and Badung, numbering 46 people (37.7%) and 22 (18.0%), respectively.

Based on the location of the lesions in VIA participants, they included quadrant 1 (9-12 o'clock direction), quadrant 2 (12-3 o'clock direction), quadrant 3 (3-6 o'clock direction), and quadrant 4 (6-9 o'clock direction). Below are shown the results of positive VIA in 24 participants out of a total of 122 respondents. Of all participants with positive VIA (24 people), 11 participants had lesions in all quadrants (45%), followed by 8 participants who had lesions in quadrants 3 and 4 (33.3%), and 5 participants who had lesions in quadrant 1 and 2 (20.8%).

Based on the results of research on the characteristics of Pap smear, in general, it was found that as many as 125 participants, the age characteristics of participants who underwent pap smear were mostly >51 years old, with a total of 58 people (46.4%), followed by the age group 41-50 years and 31-40 years, with 30 people (24.0%) and 27 people (21.6%).

Many participants who underwent a pap smear had parity 2 with 38 people (30.4%), followed by parity 3 with 30 people (24.0%) and parity 0 with 28 people (22.4%). Of all the 125 pap smear participants, there were ten people with LSIL (CIN I) (8.0%) and HSIL (CIN II and CIN III) results, respectively four people (3.2%) and five people (4 .0%), which experts have assessed.

Most of the participants had a high school education, with a total of 69 people (55.2%), followed by middle school and elementary school, with a distribution of 27 people (21.6%) and 25 people (20.0%). Complaints from participants who underwent a pap smear included vaginal discharge and postcoital bleeding, with 15 people (12.0%) and two people (1.6%). Most participants had no complaints from 108 people (86.4%). Regarding domicile characteristics, participants who underwent VIA were dominated by Denpasar and Badung, numbering 34 people (27.2%) and 24 (19.2%), respectively.

DISCUSSION

Based on respondents' age, increasing age was associated with higher participation in VIA and Pap smear examinations. This association may reflect greater cognitive maturity, accumulated life experience, and increased exposure to health-related information, which together enhance health awareness and preventive decision-making.

Our findings are consistent with previous studies demonstrating that age is significantly associated with perceived susceptibility to cervical cancer and screening behaviours, with older women being more likely to recognise risk and engage in preventive actions.[11] Rahman et al. further emphasised that age plays a critical role in shaping knowledge, interest, and preventive health behaviours related to VIA screening, as it reflects differences in cognitive maturity, health awareness, and access to information. [12] However, age-related patterns are not always linear; women aged 15–44 years, who are in their productive years, may demonstrate greater health awareness than older age groups due to more active engagement with health information and services.

In this context, knowledge emerges as a key mediating factor linking age and screening behaviour. Previous studies

Table 2. Characteristics of Pap Smear Examination

Characteristics	Frequency	%
Age (years)		
21 – 30	10	8
31 – 40	27	21,6
41 – 50	30	24
≥ 51	58	46,4
Parity		
P0	28	22,4
P1	18	14,4
P2	38	30,4
P3	30	24
P>3	11	8,8
Pap Smear Result		
LSIL		
CIN I	10	8,0
HSIL		
CIN II	4	3,2
CIN III	5	4,0
NILM	106	84,8
Education		
University	25	20,0
Senior Highschool	69	55,2
Junior Highschool	27	21,6
Elementary School	4	3,2
Symptom		
Leukorrhea	15	12,0
Postcoital bleeding	2	1,6
No symptom	108	86,4
Residency		
Bali	111	88,8
Badung	24	19,2
Tabanan	10	8
Denpasar	34	27,2
Bangli	4	3,2
Jembrana	7	5,6
Klungkung	4	3,2
Gianyar	11	8,8
Karangasem	9	7,2
Buleleng	8	6,4
Nusa Tenggara	8	6,4
Jawa	6	4,8
Total	125	100

consistently report inadequate knowledge of cervical cancer and Pap smear testing as a major barrier to screening uptake, with knowledge levels being significant predictors of Pap test utilisation.[13] Evidence from Indonesian settings further supports this relationship, showing that adequate knowledge significantly increases IVA utilisation (p = 0.001). Nonetheless, knowledge alone is insufficient; screening readiness is also shaped by enabling and reinforcing factors, including husband support, health worker encouragement, and geographic accessibility to health services.[14]

Importantly, implementation-level evidence indicates that targeted audio-visual health education can effectively translate awareness into action, leading to significant improvements in knowledge, interest, and screening behaviour.[12] The observed increase in screening completion from 0% pre-intervention to 67.9% post-intervention underscores the potential of context-appropriate educational strategies to bridge the intention-to-action gap in low-resource settings.

Based on the results of this study, looking at all participants with positive VIA (24 people), four quadrants were evaluated according to the schematic diagram in Figure 1. About 11 participants had lesions in all four quadrants (45%), followed by 8 participants who had lesions in the four quadrants, where quadrants 3 and 4 (33.3%), and 5 participants had lesions in quadrants 1 and 2 (20.8%).

Chu et al. conducted research using colposcopy, where the cervix was first cleaned with normal saline and examined under a colposcope. Acetic acid is then applied to the cervix, and the presence of acetowhite lesions and abnormal vascular patterns is marked. Lugol's iodine is also applied as an adjunct to colposcopic examination. After that, document the findings in a standard proforma, including acetowhite lesions and details, surface roughness, or mosaicism. The colposcopist then draws the lesion on a diagram, provides a colposcopic impression, and states the site where the colposcopy-directed biopsy was taken. Cervical biopsies were then taken from the most suspicious areas. Still, more than one biopsy site was permitted in patients with multifocal lesions, and four-quadrant biopsies at 3, 6, 9, and 12 o'clock and endocervical curettage were also taken in all cases. If the suspicious area falls into one of the four-quadrant biopsy sites, the result is a colposcopy-directed biopsy and a 4-quadrant cervical biopsy.[15]

According to Chu et al., 91 cases of CIN II or CIN III were diagnosed in the group with positive colposcopy. Colposcopy-directed biopsy of abnormal areas detected only 60 of 91 cases (65.9%), with another 26 cases (28.6%) diagnosed using four-quadrant cervical biopsy and the remaining 5 cases (5.5%) from endocervical curettage. In the negative colposcopy group, more than one-fifth of CIN II or III (27 cases, 22.9%) were diagnosed using four-quadrant cervical biopsy in women with average or unsatisfactory colposcopy.[15]

This study has several limitations.

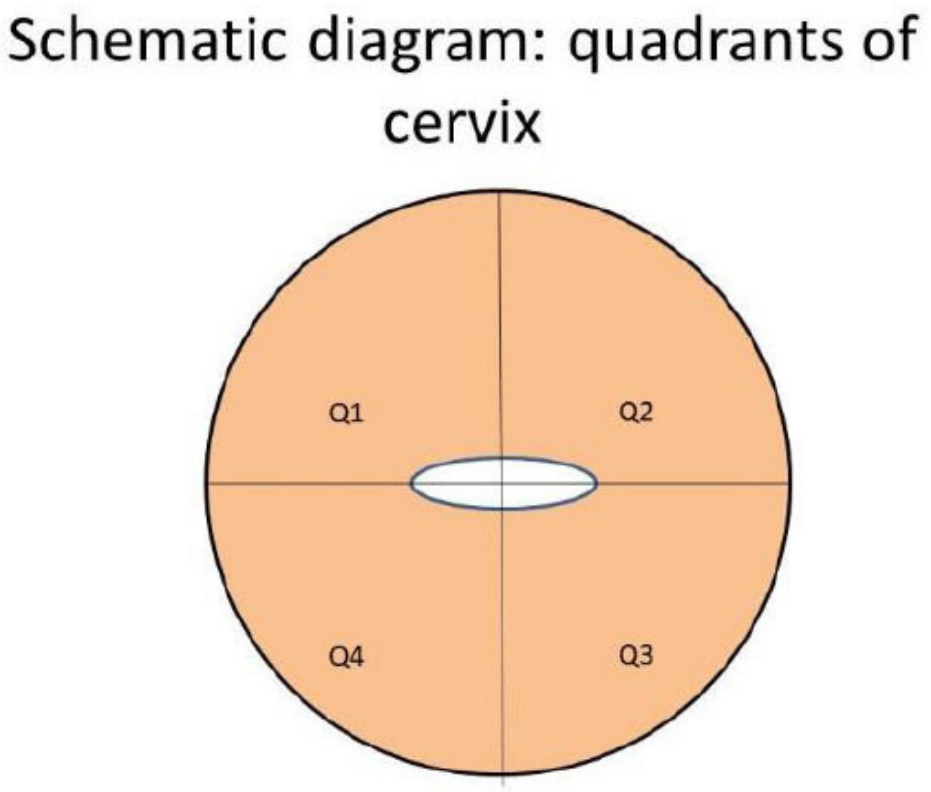

Figure 1. Schematic Diagram of the Four Quadrants of the Cervix.

First, the VIA and Pap smear samples were obtained from different individuals at different times, which may limit the comparability and synchronisation of the findings. Second, the observational analytical design restricts the ability to evaluate long-term outcomes among screened women. Third, VIA is highly operator-dependent and subject to inter-observer variability, while Pap smear has inherent sensitivity limitations, both of which may have affected the results. Finally, constraints in time and data availability prevented a comprehensive follow-up of all participants, thereby limiting the assessment of treatment outcomes and loss to follow-up cases.

CONCLUSION

The analysis demonstrated a diverse range of findings in cervical cancer screening using visual inspection with acetic acid (VIA) and Pap smear at the outpatient clinic of Prof. Dr I.G.N.G. Ngoerah Hospital, Denpasar, from January to December 2023, with VIA yielding more positive results than Pap smear. Public awareness and participation in both VIA and Pap smear screening remain low, underscoring the need for strengthened health promotion efforts to encourage early detection of cervical cancer in both government and private healthcare facilities.

DISCLOSURE

Ethical Statement

This research has been approved by the ethics committee.

Author's Contribution

All authors contributed to the review of the manuscript. The study concept was developed by the first and second authors. Data acquisition was carried out by the first, fifth, sixth, and seventh authors, while data analysis was performed by the first and fourth authors. Statistical analysis was conducted by the first, second, third, and fourth authors.

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None.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this manuscript.

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