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Pap smear and colposcopy results among women attending Al-Yarmoke Teaching Hospital

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Abstract

Introduction: Cervical cancer remains a significant global health concern, and early detection through screening methods plays a pivotal role in reducing its incidence and mortality. Among the various screening tools, Pap smear and colposcopy are effective diagnostic measures for identifying precancerous and cancerous lesions in the cervix.

Objectives: To compare Pap smear results with those of subsequent colposcopy findings.

Methods: This cross-section study was conducted at Al Yarmouk Teaching Hospital between 1/9/2023 and 1/3/2024. One hundred women attended Al Yarmouk Teaching Hospital and underwent Pap smear and colposcopy examinations. Demographic data: Age, age at marriage, parity, or oral contraceptive pills. Relevant information, including cytological findings and histopathological findings, was extracted from medical records. Colposcopy assessments, including any identified abnormalities or lesions, were recorded. Statistical analyses will make a comparison relationship between Pap smear and colposcopy outcomes, and the collected data were coded and entered into SPSS 20.0 (Statistical Package for the Social Sciences (SPSS) 20.0 by IBM) (SPSS for Windows, Rel. 20.0.2016, SPSS Inc., Chicago, IL, USA).

Results: The outcomes of the visual examination of acetic acid in conjunction with histological examination, with CIN2 as the reference standard. The sensitivity, specificity, positive, and negative predictive values were 100%, 60.00%, 20.00%, and 100%, respectively, resulting in an accuracy of 63.00%. The differences resulted in pap smear compared to the values obtained from visual inspection with acetic acid; precisely, the sensitivity, specificity, positive predictive value, and negative predictive value were measured at 100.00%, 40.00%, 14.00%, and 100.00%, respectively, resulting in an overall accuracy of 45.00%.

Conclusion: In conclusion, the significance of visual inspection with acetic acid (VIA) and Pap smear in detecting cervical cancer is paramount. This diagnostic approach proves valuable in identifying existing cases and facilitating early intervention, as it enables the detection of pre-cancerous conditions before they progress to full-fledged cancer.

Keywords: Pap Smear; Visual Inspection; Cervical Cancer; Acetic acid

1. Introduction

Cervical cancer holds the position of the second most common gynecologic cancer globally, accounting for 13% of all female cancer cases in developing countries (1). In 2008, there were an estimated 530,000 new cases and 275,000 deaths from cancer of the uterine cervix worldwide. Cervical cancer is the third most common female cancer, ranking after breast (1.38 million cases) and colorectal cancer (0.57 million cases). The incidence of cervical cancer varies widely

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among countries, with age-standardized rates ranging from <1 to >50 per 100,000. The highest incidence rate is observed in Guinea, with approximately 6.5% of women developing cervical cancer before the age of 75 years(2). No other human carcinoma occurs, on average, so early in life, affects women who are younger than 45 years of age as often as older women, and if leading to death, results in a more significant loss of life expectancy. Cancer of the uterine cervix is a largely preventable disease. As the current screening programs cannot be afforded in low-resource settings, incidence rates are highest in sub-Saharan Africa, Latin America, and Melanesia, where cervical cancer is the leading cause of cancer-related death in women(2). In developing nations, cervical cancer can constitute up to 25% of all cancers affecting women, establishing it as a predominant health concern for females. The year 2012 witnessed the diagnosis of 528,000 new cases of cervical cancer, with 123,000 reported in India alone. Tragically, 266,000 women succumbed to this disease in 2012, with 67,000 fatalities occurring in India (3,4). Cervical cancer risk factors encompass engaging in unprotected intercourse, practicing polygamy, experiencing low socioeconomic status, entering into early marriages, having inadequate education, early onset of menstrual cycles, undergoing multiple pregnancies, smoking, co-infections, HPV infections, alterations in hormones, and possessing a weakened immune system. Notably, high-risk human papillomavirus (HPV) types 16, 18, and 31, which are sexually transmitted infections (STIs), are identified as carcinogenic agents contributing to the development of cervical cancer (5). It has been discovered that carcinogenic human papillomavirus (HPV) infection is linked to the majority of cervical cancer incidences (3,6). Early detection of cervical cancer (CC) has significantly reduced both mortality and morbidity associated with the disease. Both organized and opportunistic pap smear examinations have proven effective in lowering cervical cancer incidence rates (7). Implementing successful screening programs plays a crucial role in preventing cervical cancer. Strategies to prevent HPV infection, including condom usage, sexual education for young individuals, and the administration of the HPV vaccine, constitute primary measures for averting the development of this neoplasm (8). Various screening methods are now accessible for the early identification of cervical cancer and its precursor lesions. The timely detection of precancerous lesions through conventional screening and diagnostic approaches such as cervical cytology, colposcopy, cervical biopsy, and endocervical curettage enables the treatment of these lesions before they progress to invasive cancers. Pap smear screening has significantly reduced mortality rates associated with cervical cancer in developed nations. The Papanicolaou (PAP) smear presents a simple, safe, non-invasive, and effective means for detecting precancerous, cancerous, and noncancerous alterations in the cervix and vagina (9). Despite the effectiveness of the PAP smear, maintaining a high-quality cytology-based program proves challenging in low-resource settings due to the intricate process involving collection, sample preparation, staining, reading, reporting, and the delay between screening and the provision of test results. Therefore, in these regions, efforts should be directed toward cost-effective, more affordable, and reliably trusted strategies (10). A substitute examination is the visual inspection of the cervix with acetic acid (VIA), which has been recommended as an alternative screening approach to PAP smears in developing nations (11). The appealing aspects of VIA encompass its affordability, straightforward application, immediate result assessment, and accuracy on par with high-quality PAP smears. Given the constraints of resources in developing countries, VIA, being a visual screening test independent of laboratory services, emerges as a viable and promising alternative for the early detection of cervical cancer (12,13).

1.1. Aim of Study

To identify demographic factors associated with abnormal Pap smear and colposcopy results and to compare between Pap smear results and colposcopy findings.

2. Materials and Method

This cross-section descriptive study was conducted at Al Yarmouk Teaching Hospital between 1/9/2023 and 1/3/2024, which included 100 women who attended Al Yarmouk Teaching Hospital and underwent Pap smear and colposcopy examinations within a specified time frame. Demographic data: Age, socio-economic status, and other relevant demographic information were collected. Pap Smear Results: Relevant information, including cytological findings and histopathological findings, was extracted from medical records. Colposcopy assessments, including any identified abnormalities or lesions, were recorded. Descriptive statistics will be used to summarize the prevalence of abnormal results. Statistical analyses will make a comparison relationship between Pap smear and colposcopy outcomes, and the collected data were coded and entered into SPSS 20.0 (Statistical Package for the Social Sciences (SPSS) 20.0 by IBM) (SPSS for Windows, Rel. 20.0.2016, SPSS Inc., Chicago, IL, USA).

3. Results

In Table (1), the study sample, comprising 100 participants aged between 25 and 59 years, was characterized. The largest age group was in the 30-39 years category, accounting for (40%) of the participants, while the age at marriage fell within the >23 category for (80%) of them. Furthermore, (71%) of the participants had a parity rate of <3. Similarly,

approximately (78%) of the participants were using contraception, while (22%) of the participants did not use any form of contraception, as shown in the table.

Table 1 General characteristics of the study sample, n=100

Characteristics	**n**	**%**
Age:		
21-29	14	14.00
30-39	40	40.00
40-49	30	30.00
50-59	16	16.00
Total	100	100%
Age at marriage:		
≤21	20	20.00
>23	80	80.00
Total	100	100%
Parity:		
<3	71	71.00
≥3	29	29.00
Total	100	100%
OCCP:		
Yes:	78	78.00
Duration:		
(> 5) years	38	38.00
(< 5) years	40	40.00
No	22	22.00
Total	100	100%
OCCP= (Oral Combine Contraceptive Pills).		

In Table 2, which indicates the prevalence of risk factors among the participants, we observe that 15% of patients have a family history of cancer as follows: (10%) of patients have a family history of breast cancer, (2%) have a family history of cervical cancer, and (3%) have a family history of uterine cancer, and (85%) have not family history of cancer. Also (1%) of participants had a history of breast cancer. Just 2% of all 100 participants were smokers. To (19%) of them with Extra Marital Relationship.

Table 2 Distribution of risk factors among participants, n=100

Risk factors	**n**	**%**
F.H. of cancer:	15	15.00
Yes:		
Breast:	10	10.00
Cervix:	2	2.00
Uterine:	3	3.00
No:	85	85.00
Total:	100	100%
Patient H. of breast cancer:		
Yes:	1	1.00

No: Total:	99 100	99.00 100%
Women with smoking: Yes: No: Total:	 2 98 100	 2.00 98.00 100%
Extra-Marital Relationship: Yes: No: Total:	 19 81 100	 19.00 81.00 100%
H= history		

From Table 3, we observe the complaints of the participants, with the highest percentage at 53.0% for postcoital bleeding, 3.00% for vaginal discharge, 18.00% for recurrent infections, then irregular bleeding at 5.00%, followed by asymptomatic screening at 18.00%, and finally vaginal bleeding and genital wart at 3.00%.

Table 3 Complaints of patients

Chief complaint	**Number**	**%**
Asymptomatic (screening)	18	18.00
Vaginal discharge	3	3.00
recurrent infections	18	18.00
Irregular bleeding	5	5.00
Post-coital bleeding	53	53.00
Genital Wart:	3	3.00
total	100	100%

Table (4) provides information on Pap smear characteristics and cytological examination results. 78 were cervicitis, 12 were normal or benign change, and others were (4 were ASCUS, zero was ASCH, 2 were LSIL, zero was HSIL, and 3 were cervix atrophy).

Table 4 Distribution of Pap smear and pathology results.

PAP	**n**	**Pathology**		**Diagnostic match rate between Pap and pathology. (%)**
		Benign changes	CIN2	
Normal/ Benign change	12	12	0	0.00
cervicitis	78	78	0	0.00
ASCUS	4	4	0	0.00
ASCH	1	0	1	100
LSIL	2	2	0	00.00
HSIL	0	0	0	00.00
Cervix atrophy	3	3	0	00.00

Total	100	99	1	100%

Table 5 displays the distribution of histopathological examination compared to the results of Pap Smear and Visual Inspection with Acetic Acid (VIA) based on the screening test.

Table 5 Distribution of histopathological findings based on screen test findings

Histopathological findings		**VIA +ve PAP +ve**	**VIA +ve PAP -ve**	**VIA -ve PAP +ve**	**VIA –ve PAP -ve**	**N**	**%**
Negative biopsy	Normal or inflammatory	0	7	0	86	93	92.00
CIN I		0	0	6	0	6	6.00
CIN II		1	0	0	0	1	1.00
CIN III		0	0	0	0	0	0.00
Total		1	7	6	86	100	100%

Table 6 displays the outcomes of the visual examination of acetic acid in conjunction with histological examination, with CIN2 as the reference standard. The sensitivity, specificity, positive, and negative predictive values were 100%, 60.00%, 20.00%, and 100%, respectively, resulting in an accuracy of 63.00%.

Table 6 VIA and histopathological results

Histologic VIA	**CIN 2**	**CIN 3**	**Negative**	**Total**
VIA (+)	1	0	4	5
VIA (-)	0	0	6	6
Total	1	0	10	11

Table 7 indicates differences in results in pap smear compared to the values obtained from visual inspection with acetic acid. Specifically, the sensitivity, specificity, positive, and negative predictive values were measured at 100.00%, 40.00%, 14.00%, and 100.00%, respectively, resulting in an overall accuracy of 45.00%.

Table 7 Results of Pap smear and pathology.

Histological / Pap smear	**Pathology (+)**	**Pathology (–)**	**Total**
Pap (+)	1	6	7
Pap (–)	0	4	4
Total	1	10	11

4. Discussion

In developing countries such as Iraq, universal screening remains unattained, with the primary screening method (Pap smear) accessible to only a small fraction of the population; a limited participant sample size constraints this study and, due to resource constraints, included individuals who underwent a vaginal biopsy for histological examination or had a positive VIA test, excluding those with negative test results to enhance accuracy. Organizing cytology-based screening programs in these regions is challenging due to restricted infrastructure, trained personnel, and financial limitations (14). In Table (1), the study sample, comprising 100 participants aged between 21 and 59 years, was characterized. The largest age group was in the 30-39 years category; this is closely similar to the study conducted by Ashish et al., which focused on participants aged between 18-60 years (15). Also, studies in Iraq by Yasamin and Rasha agreed with our

study based on demographic information; the study included 200 women (31.55 ± 6.66 years old). Parity was in the range of 1–5 with a mean of 2.38 ±1.12. Only three women admitted to be active smokers, and only a single woman was married two times. The clinical presentation and Pap smear results of women enrolled in the current study are shown in Table 2. Most patients were asymptomatic (82.5%), PCB was seen in 34 (17.0%), and IMB was seen in a single case (0.5%). A history of sexually transmitted disease (STD) was seen in five cases (2.5%). Pap smear results were as follows: no remarkable pathology was seen in 72 (36.0%), inflammation was seen in 64 (32.0%), ASCUS was seen in 38 (19.0%), LSIL was seen in 15 (7.5%), and HSIL was seen in 11 (5.5%). Regarding human papillomavirus (HPV), infection was negative in 190 (95.0%) (16,17). Table 1 accounts for (40%) of the participants, while the age at marriage falls within the >23 category for (80%) of them. Furthermore, (71%) of the participants had a parity rate of <3. Similarly, approximately (78%) of the participants were using contraception, while (22%) of the participants did not use any form of contraception, as shown in the table. Additionally, being a descriptive study reliant on demographic information, it shares similarities with the research conducted by Fentie et al. in 2020 (18). In Table 2, which indicates the prevalence of risk factors among the participants, we observe that 15% of patients have a family history of cancer as follows: (10%) of patients have a family history of breast cancer, (2%) have a family history of cervical cancer, and (3%) have a family history of uterine cancer, and (85%) have not family history of cancer. Also, (1%) of participants had a history of breast cancer, and (99%) of them had no history of breast cancer. Just 2% of all 100 participants were smokers. To (19%) of them with Extra Marital Relationship. Table 6 displays the outcomes of the visual examination of acetic acid in conjunction with histological examination, with CIN2 as the reference standard. The sensitivity, specificity, positive, and negative predictive values were 100%, 60.00%, 20.00%, and 100%, respectively, resulting in an accuracy of 63.00%. while the values were obtained from visual inspection with acetic acid. Specifically, the sensitivity, specificity, positive, and negative predictive values were measured at 100.00%, 40.00%, 14.00%, and 100.00%, respectively, resulting in an overall accuracy of 45.00%., as shown in table 7. The sensitivity and specificity findings of the pap smear in our study, as presented in Table 7, differ from those reported in a study in Iraq by Rasha et al., who observed that the diagnostic accuracy of the pap smear was evaluated based on the histopathological results (gold standard). The sensitivity and specificity of pap smear were found to be 66.6% and 96.7%, respectively. In the same way, the PPV and NPV of the pap smear were calculated to be 67.6% and 95.9%, respectively. The overall diagnostic accuracy of the pap smear was found to be 93.9% (17). It's also aligned with a study by Agrawal et al. on VIA. Their study observed a sensitivity of 94.7% and a specificity of 48.3% for VIA, while cytological examination demonstrated a sensitivity of 84.2% and a specificity of 62%. Additionally, the results of our study correlated with what was indicated by Cronje et al (19), where the sensitivity scale was 78.9%, and the specificity was 48.9%, as the biopsy was taken according to the standard scale. The sensitivity and specificity of our study are comparable to that of Sankaranarayanan et al. (20), where the sensitivity of VIA ranges from 54.4% to 78.7%, and the specificity varies between 88.6% and 90.9% in different centers. Basu et al. (21). In a comparative study, Mejvand et al. found that VIA had a sensitivity of 57.7% and specificity of 82.1%, detecting 54% of high-grade lesions. They suggested VIA as a viable alternative in settings with limited cytopathologist access. Consul et al. reported that VIA and VILI had similar sensitivity to Pap smear, proposing them as potential alternatives or adjunct tests applicable in poorly resourced and well-equipped centers (22,23). Yadav et al. observed VIA's sensitivity and specificity as 80% and 67% and VILI's as 80% and 87%, respectively. Ghosh et al. recommended visual methods like VILI as substitutes in resource-constrained environments, boasting high sensitivity (100%) and specificity (93.3%) for detecting dysplasia (24). Our study aligns with research in Ethiopia and Sudan, showing a VIA positivity rate of 10.3%, slightly lower than previous studies (25,26).

5. Conclusion and Recommendations

In this concise summary of the study's findings, it is evident that both (visual inspection using acetic acid) and (Pap smear tests) play a crucial role in the early detection of cervical cancer, a prevalent disease worldwide. Moreover, these screening methods contribute significantly to facilitating recovery by identifying cases before they advance to a cancerous stage. As a result, we recommend that health departments prioritize enhancing women's educational levels and establishing specialized centers for the screening and early detection of this form of cancer. This proactive approach aims to reduce the incidence of the disease, given that the economic expenses associated with awareness and guidance are considerably lower than the costs incurred in combating the disease at advanced stages.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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