Comparison of Visual Inspection of Cervix with Acetic Acid with Conventional Pap smear in the detection of Colposcopic Biopsy proved Cervical Intraepithelial Neoplasia in women presenting in Tertiary Care Hospital

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Abstract

Background: Cervical cancer grows in cervix, and infection from the Human Papillomavirus (HPV) is a must for the occurrence of cervical cancer. If a Pap test result is abnormal, the patient will have more tests to rule out or diagnose a precancerous condition. Visual Inspection with Acetic Acid (VIA) is a visualization of the female cervix with the naked eye after the application of acetic acid is a non-invasive procedure.

Objective: To compare Visual Inspection with Acetic Acid (VIA) with Papanicolaou (Pap) smear in the diagnosis of premalignant conditions of the cervix in women of reproductive age.

Methodology: This comparative study was carried out at the outpatient department of Gynae & Obstetrics, Services Hospital, Lahore from 30th June to 29th December 2022. The Non-probability convenient sampling technique was used. After taking the informed consent the acetic acid was applied and after 1 minute the entire cervix was examined for significant findings like thick and opaque areas and acetowhite having clearly demarcated edges. Colposcopic biopsy was also taken, taking histological diagnosis as gold standard. The collected data was entered and analysis was done using version 22 of SPSS.

Results: The mean age of the patients was 41.8±13.7 years; and mean duration of marriage was 22.2±2.6 years. The sensitivity, specificity, PPV, and NPV of VIA for the detection of premalignant condition were 86.67%, 99.05%, 92.86%, and 98.11% respectively vs 66.67%, 98.09%, 83.33%, 95.37% respectively for Pap smear taking colposcopic biopsy as the gold standard.

Conclusion: According to our study naked-eye examination of the cervix with acetic acid (VIA) is more accurate in detecting premalignant conditions of the cervix.

Keywords: Pap smear, VIA, Colposcopy, Cervical cancer, Premalignant

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Introduction

Cancers of the female genital tract are of much concern worldwide, and after breast cancer, the second most common cancer is cervical cancer in women.[1] It is a source of great concern and anxiety among females and it also affects their quality of life.[2] This disease is unique in the sense that it can be prevented at the premalignant stage as it can be detected by cheap and cost-effective screening methods it is a need of hours that these methods be employed in health care facilities so that the life of a maximum women suffering from cervical malignancy can be saved.[3] Literature shows that around 530,000 women were affected by cervical cancer in 2008 and 85% of these were diagnosed in developing countries comprising 13% of total female malignancies. After the introduction of successful screening programs in developed countries, new cases and death rates caused by cancer of the cervix have reduced by over 80%. However, this trend has not been observed in developing countries. Pakistan was initially a low-risk country but now it is a moderate-risk country for cancer of the cervix.[4] The number of affected females was doubled from 2002 to 2008. It was 9 per 100,000 women in 2002 but was 19.5 per 100,000 women in 2008.[4] Cervical cytology by conventional method is being widely used for the detection of cervical carcinoma worldwide. Cervical screening programs by cytology have been implemented in developed countries which have led to markedly reduced incidence of cervical cancer. For diagnosing all stages of changes in the cervix and

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vagina, the Papanicolaou smear also known as a Pap smear is an effective method. It is also a simple, safe, and non-invasive method.[5] Colposcopy is a globally renowned procedure to detect cervical cancer at its early stage.[6] But because of the following commonly encountered problems i.e., increased cost, less expertise, problems in interpretation, less willingness for the procedure, and unable to follow standard diagnostic protocol is not frequently available in less developed countries. The death rate attributed to this cancer in developing countries is a major burden on the health care delivery system. Young women are also affected by it although it is more common in the old age group.[7]

Among developing countries, VIA is replacing Papanicolaou smear as an alternative. One study found that recently, cytology is the standard screening test to detect cancer of the cervix. However, in developing countries, where screening programs based on cytology are not available, VIA is an alternative with promising effects.[8] The advantages of VIA lie in its being simple, rapid, cost-effective, and in ease of administration. It does not require much infrastructure. Its accuracy is comparable to a good quality Papanicolaou smear, and its results are available without any delay. After finding the test result positive, further planning regarding investigations and treatment can be carried out in the same setting.[7] The objective of this study was to compare Visual Inspection with Acetic Acid (VIA) with conventional Pap smears in the detection of premalignant conditions of the cervix so as to detect them in their early stages and treat them accordingly.

Methodology

This comparative study was done in the OPD of Gynaecology & Obstetrics Unit of Services Hospital, Lahore from 29th June to 29th December 2022. Non-probability convenient sampling technique was used. All women aged 15 to 65 years were included in this study. Women who were having vaginal bleeding, Pelvic Inflammatory Disease, Pregnant women, Women >65 years of age, and women who were unwilling to participate in the study were excluded. One hundred and twenty women of reproductive age, who meet the inclusion criteria, reporting in the Outpatient Department were enrolled. After obtaining informed consent and approval from the Institutional Review Board in addition to the Head of the department (Ref. No. 15/KEMU/IRB Dated: 19-01-2020), patients' demographic data like age, and gestational age were recorded according to proforma. After obtaining the consent and explaining regarding study and procedure was done according to standard operating procedure. After taking the informed consent the acetic acid was applied and after 1 minute the entire cervix was examined for significant findings like thick and opaque areas and acetowhite having clearly demarcated edges. Those females who had these findings and turned positive on smear were enrolled for colposcopy. Biopsy was taken from acetowhite-positive areas and the specimen was sent for cytological examination. Colposcopic biopsy was also taken taking histological diagnosis as gold standard. The collected data was entered and analysis was done using version 22 of SPSS.

Results

Overall 120 total patients were included in the study, the mean age was 41.8±13.7 Minimum age was 20, and the maximum age was 65. In this study, the mean duration of marriage was 22.2±2.6 years with minimum and maximum marriage years of 18 and 28 years respectively. Out of 120 cases, the patients with one marriage were 109 (90.83%) and the patients with twice marriage were 11(9.17%).

The study results showed that a total of 18 patients turned out to be positive on both screening tests i-e VIA and Pap smear. Of these 18, Pap smears alone were positive for premalignant condition in 4 (3.33%) patients while VIA alone was positive in 6 (5%) patients. Both VIA and Pap smear were positive in 8 (6.67%) patients. Colposcopic biopsy results of these 18 screening positive patients showed 15 positive while 3 were negative.

Table I: Frequency distribution of the results on VIA, Pap smear, and Colposcopic biopsy

Test	Result	Frequency	Percentage
PAP smear only	**Positive**	4	3.33
VIA	**Positive**	6	5
Pap smear + VIA	**Positive**	8	6.67
Colposcopic Biopsy	**Positive**	15	12.5
	Negative	105	87.5
Total	**Positive**	18	100

In this study, the colposcopic biopsy diagnosed positive premalignant condition in 15 (12.5%) patients and it diagnosed negative premalignant condition in 105 (87.5%) patients. In this study, specificity, sensitivity, NPV, and PPV of VIA and pap for detection of premalignant condition were 99.05%,86.67%,98.11%,92.86% (Table-I), and 98.09%, 66.67%, 95.37%, 83.33% (Table-II) respectively taking colposcopic biopsy as the gold standard. A statistically significant difference was noted between VIA and colposcopic biopsy i.e. p-value=0.000.

Table I: Comparison of VIA with Colposcopic Biopsy

	Positive	Negative	Total	P-Value
Positive	13	1	14	0.000
Negative	2	104	106	
Negative	15	105	120	

Table II: Comparison of Colposcopy with PAP smear

	Positive	Negative	Total	P-Value
Positive	10	2	12	0.000
Negative	5	103	108	
Negative	15	105	120	

Discussion

This study was carried out to compare VIA with conventional Pap smear in the detection of premalignant conditions of the cervix in 20-65-year-old women presenting in tertiary care hospitals to detect in its early stages and treat accordingly. Cervical cancer remains a major public health problem of the female population worldwide. Acetic acid causes proteins to coagulate that are why acetowhite areas are seen on naked eye examination.[8] Only a few organized cervical screening programs exist in our country, even though the disease burden is high. Premalignant lesions of the cervix take about 5 to 15 years to progress to advanced cancer.[9] If timely identified, pre-invasive disease has an almost 100% cure rate with simple surgical treatment, while the survival rate is <35% in the case of invasive disease. In this study, specificity, sensitivity, NPV, and PPV of VIA and pap for detection of premalignant condition were 99.05%, 86.67%, 98.11%, 92.86% and 98.09%, 66.67%, 95.37%, 83.33% respectively taking colposcopic biopsy as gold standard. A statistically significant difference was noted between VIA and colposcopic biopsy i.e. p-value=0.000.

Some of the previous studies found the following findings including VIA accuracy studies have resulted in a range varying approximately 60-90 % of sensitivity and specificity values.[9,10] This clearly shows the high sensitivity of VIA and points out that VIA may be valuable in the detection of early staged lesions of the cervix. This shall result in a decreased workload on the pathology unit which is engaged in giving cytology reports that if patients are negative on naked eye examination, they are considered not having disease and do not undergo biopsy and histopathology.[10]

The wide range of results between the comparison of Pap smear and VIA can be due to the fact that these depend to a large extent on the person performing it and also there is the inability to follow a standard protocol for labeling results to be positive.[10-12] Adequate training of healthcare personnel and a standard system for these procedures should be developed.[11] One study found that recently, cytology is the standard screening test to detect cancer of the cervix. However, in developing countries, where screening programs based on cytology are not available, VIA is an alternative with promising effects.[12] One earlier study concluded that the VIA is not only useful for detecting early staged lesions of the cervical canal in poorly developed countries.[12] Jose Jeronimo et al presented that the VIA is not only useful for detecting early staged lesions of the cervical canal in poorly developed countries but it is also in well-developed countries. The positive predictive value of VIA has values comparable to a Pap smear, but it has the benefit of reaching the diagnosis earlier.[13] The ability of naked eye examination of the cervix after application of acetic acid to detect cases that actually have disease is 86.67%while that of Pap smear is 66.67% showing VIA is more accurate than pap smear in detecting actually diseased subjects.

In the United Kingdom, screening programs and vaccination is started at 11-12 years of age, and Cervirax and Gardasil are also available on a mass level.[14] The capacity of VIA in detecting those groups of patients who actually do not have the disease is 99.05% while that of cytology is 98.09% and the negative predictive value of both above tests is comparable, so VIA is the easiest and effective

method of diagnosis of premalignant conditions and it can aid in patient management and treatment accordingly.[14]

Conclusion

According to our study Visual Inspection with Acetic Acid (VIA) has more sensitivity, specificity, and diagnostically accurate in the detection of premalignant conditions of cervix presenting in tertiary care hospital to detect in its early stages and treat accordingly.

Authors Contribution: MF: Conception of work, Acquisition and Analysis of data and Drafting. **AK:** Acquisition and Analysis of data, Interpretation of data and revising. **MA:** Design of work, Acquisition and Analysis of data and revising. **MM:** Interpretation of data and revising. **AM&ZA:** Acquisition and Analysis of data and drafting. **:** Design of work and drafting.
All authors critically revised and approve its final version.

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