Effectiveness of Visual inspection with acetic acid and Pap smear for early detection of Cervical Cancer among women attending Gynecology O.P.D of Tertiary Level Hospital, Gwalior (M.P), India.

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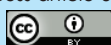
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CONFILICT OF INTEREST : None

ABSTRACT

Introduction: Cervical cancer is the fourth most common cause of cancer in women in the world and the second most common cancer among Indian women. About 23% of the global cervical cancer burden is beard by India alone. The screening of cervical cancer is commonly done by a pap smear, visual inspection of acetic acid, human papilloma virus DNA testing etc. These identify precancerous changes which when treated can prevent the development of cancer. The objectives of the study were to screen the patient at Gynecology OPD by visual Inspection with acetic acid (VIA) and Pap smear for early detection of cervical cancer and to evaluate the efficacy of visual inspection with acetic acid and Pap smear in the early detection of cervical cancer.

Methods: A descriptive cross-sectional study was conducted among 60 women attending Gynecology O.P.D of a Tertiary Level Hospital, Gwalior (India) by non-probability purposive sampling technique between 1st August to 30th August 2017. Pap smear was taken from each woman followed by VIA. Women with positive VIA and/or positive Pap smear were referred for colposcopy-directed cervical biopsy.

Results: After the application of 3% VIA among 60 women, 16 (26.67%) developed aceto white while 44 (73.33%) didn't. While the result of Pap smear shows, 22 (36.66%) had an inflammatory smear, 6(10%) shows benign smear, 9(15%) bacterial vaginosis, 1(1.66%) squamous metaplastic cells, 12 (20%) shows adenocarcinoma and 10(16.66%) normal pap smear.

Conclusions: The study concludes that VIA and pap smear were effective methods for the early detection of cervical cancer. Visual inspection of the cervix after acetic acid application (VIA) is widely recommended as the method of choice in cervical cancer screening programs in resource-limited settings and developing countries because of simplicity, cost-effectiveness and ability to link with immediate treatment.

INTRODUCTION

Cervical cancer is a disease that affects the cervix in the female reproductive system. The cervix is the lower portion of the uterus that connects the upper vagina to the uterus. The main risk factor for

developing cervical cancer is being infected with human papillomavirus. It is generally acquired by young women after the onset of sexual activity.[1]Other risk factors include early age at first pregnancy, smoking cigarettes, younger age at first sexual contact, having multiple sexual partners, sexually transmitted infection, having 4 or greater full term pregnancies, having a weakened immune system, oral pills user etc.[2]Poor women living in rural areas are prone to develop cervical cancer and die from it.[3]

Globally, cervical cancer is the fourth most common cancer in women, with an estimated 560,505 new cases and 284,923 deaths in 2015. In India, cervical cancer is the second most common cancer, with an estimated 1,32,314 new cases and 73,337 deaths in the year 2015.The poorscreening of cervical cancer in developing countries like India is due to lack of sufficient financial resources and a limited number of trained providers. This is the reason that most of the cases are present in advanced stages of the disease, thus leading to increased mortality.[4] In India nearly 70% of cervical cancer patients present at stage III and IV. 20% of cervical cancer patients die within first year of diagnosis while 50% within 5 years.[5]

If the disease is detected in this pre-invasive stage by screening, conservative treatment can be offered and progression to frank malignancy can be avoided. So regular screening is effective in reducing the incidence and mortality of advanced cervical cancer. [6] Cytology and Pap smear is standard screening test for precancerous lesions. Cytology screening has been used in all major hospitals since 1970s and has been used in government's cancer control programme services since 200. [7]In most developed countries, women are advised to have their first smear test soon after becoming sexually active and subsequently once every 1-5years.[8]

Visual Inspection of the cervix is an inexpensive cervical screening method to detect precancerous lesions. Since 1990s, various studies had been conducted on various visual inspection methods, with or without magnification, and after application of contrast chemicals such as acetic acid or iodine to highlight precancerous lesions. These methods do not need to be conducted by a medical professional. By 1999, visual inspection of the cervix after application with acetic acid (VIA) was considered a "promising approach in the detection of cervical neoplasia" for cancer prevention programmes. VIA was being advocated for inclusion in the cancer screening programme as early as 2001.[8]

The Indian government and WHO advocated the use of the Pap smear at district level, and a cheaper, simpler screening method i.e. VIA at the primary health centre level in 2006 (National Cancer Control Programme 2006).Visual inspection of the cervix (VIA) after application of 3-5% acetic is effective method of screening in resource-limited settings.[9] VIA is performed by a trained health care provider who applies 3% to 5% acetic acid solution to the cervix and then observes the transformation zone of the cervix for 1 to 2 minutes for acetowhite epithelium, which is thought to be indicative of abnormal cellular changes. [10] VIA requires less training and fewer clinic visits and using existing or minimal human resources.[11]

Cervical cancer can be prevented by tobacco cessation, delaying initiation of sexual intercourse, using condoms to prevent STDs, decreasing number of sexual partners, HPV vaccination to young girls etc. [12]Routine HPV vaccination of girls is recommended by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices(ACIP) at 11 to 12 years of age. Although HPV test like Pap smear, cytology etc. are available in India but these tests are very expensive and is not practical for screening in developing country like India.

In developed and high-income countries several screening programmes like cytology based screening is available for cervical cancer prevention. But in low to middle income countries (LMICs) there is lack of proper laboratory infrastructure, trained personnel, such as cyto-technicians and pathologists and continuous quality assurance processes.

METHOD

A descriptive cross-sectional research design

was used for the study. The study was conducted in women those who visited Gynecology OPD of Cancer Hospital and Research Center ((C.H.R.I), Gwalior, by using non-probability, total enumerative sampling technique in which every subject meeting the criteria of inclusion was selected. The study was conducted for the month of August 2017 for four weeks. Pap smear of 60 women was taken followed by application of acetic acid for detection of cervical cancer. All the sexually active and married women above 25 years and below 60 years were included in the study. Unmarried women, pregnant women and those who had undergone hysterectomy were excluded from the study.

The tool used for study consists of 3 parts. First part comprises of questions regarding demographic information,second part contains the application of 3% acetic acid and observing for appearance of aceto-white colour of lip of cervix and the third part consists of performing the Pap smear and observing its report from the lab for the presence of cervical cancer. Tool validation was done by consulting with experts. Pretesting of the tool was done to 10% of the total research participant, which were not included in the main study.

The collected data were stored and analyzed using both descriptive and inferential statistics. Descriptive statistics was used to describe the demographic characteristics of participants. Ethical clearance was taken from Institutional Review Committee (IRC) of Cancer Hospital and Research Institute (C.H.R.I), Gwalior,India. Respondents participations in the study were voluntarily and informed written consent were obtained. Anonymity and confidentiality of the participants were maintained throughout the study.

RESULTS

Total 60 women were involved in the study. The findings revealed that majority (36.67%) of the respondents were between the age group of 36-45 years. Majority of them (56, 93.33%) of the respondents were Hindu. Similarly, most of the respondents (34, 56.67%) were illiterate. Age of menarche of more than half of respondents (46, 76.66%) was at the age of 12-14 years. About

(25, 41.66%) respondents had regular menstrual history. Almost all (58, 96.66%) respondents were married. About (24, 40%) were married at the age between 12-15years. Majority (38, 63.33%) of respondents had 3-4 no of children. Almost half of respondents (29, 48.33%) belong to low middle income family with monthly income of nearly Rs.3000-5000/month.

After the application of 3% acetic acid on the lip of cervix, more than half of respondents (44, 73.33%) shows no any changes, while (16,26.67%) shows acetowhite positive. It shows 26.67% of respondents were prone to develop cervical cancer in future.

The Pap smear result of majority of respondents shows (22,36.66%) had inflammatory smear, (12,20%)shows Adeno carcinoma, while (10,16.66%) shows normal Pap smear, (9, 15%) shows Bacterial vaginosis, (6, 10%) shows benign smear and (1,1.66%) shows squamous metaplastic cells

**TABLE 1:** Result of Visual Inspection of acetic acid(VIA) n=60

SNo.	Application of Acetic Acid	Frequency	Percentage
1.	No. of women with aceto white positive	16	26.67%
2.	No. of women with aceto white negative	44	73.33%

TABLE 2: Result of Pap smear

n=60

S.No	PAP REPORTS	PERCENTAGE	NO OF PT.
1	Inflammatory Smear	36.66%	22
2	Benign Smear	10%	6
3	Adeno Carcinoma	20%	12
4	Bacterial Vaginosis	15%	9
5	Squamous Metaplastic Cells	1.66%	1
6	Normal Pap Smear	16.66%	10

The above Table shows that out of 60 women of which Pap smear was taken,

22(36.66%) shows inflammatory smear, 6(10%) shows benign smear, 9(15%) bacterial vaginosis, 1(1.66%) squamous metaplastic cells,12(20%) shows adeno carcinoma while only 10(16.66%) women had normal Pap smear.

Legend:
- 1 INFLAMMATORY SMEAR
- 2 BENIGN SMEAR
- 3 ADENO CARCINOMA
- 4 BACTERIAL VAGINOSIS
- 5 SQUAMOUS METAPLASTIC CELLS
- 6 NORMAL PAP SMEAR
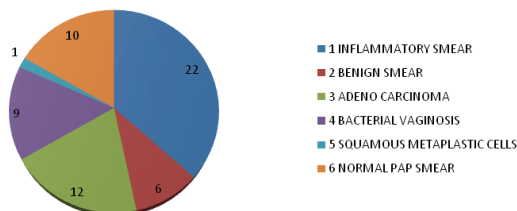
TABLE NO. 3 Distribution of women according to education

Education	No. of women Percentage	Percentage (%)	VIA positive cases	Percentage (%)
Illiterate	34	56.67	12	75
Primary	17	28.33	3	18.75
Secondary	8	13.33	1	6.25
Graduation	1	1.67	-	
Total	60	100	16	100

34% of women in this study group were illiterate and out of which 75% shows VIA positivity.

TABLE NO. 4 Distribution of cases according to income

Income (in Rupees)	No. of Cases	Percentage (%)	VIA positive cases	Percentage (%)
1000-3000	14	23.33	1	6.25
3000-5000	29	48.33	12	75
5000-10,000	13	21.67	3	18.75
>10,000	4	6.67		
Total	60	100	16	100

Majority of women (48.33%) in this study had monthly income between 3000-5000 per month and belong to low middle class out of which 75% were VIA positive.

TABLE NO. 5 Distribution of parity and VIA test results in the population Parity

Parity	No. of Cases	Percentage (%)	VIA positive cases	Percentage (%)
1-2 children	12	20	2	12.5
3-4 children	38	63.33	11	68.75
Above 4 children	10	16.67	3	18.75
Total	60	100	16	100

VIA positive cases were common in women with three or four children.

TABLE NO:6 Distribution of cases according to age of marriage

Age of marriage	No. of Cases	Percentage (%)	VIA positive cases	Percentage (%)
<11 years	10	16.67	4	25
11-15 years	24	40	9	56.25
16-20 years	22	36.67	2	12.5
>20 years	4	6.66	1	6.25

VIA positive cases were common in early marriage (between 11-15 years).

TABLE NO.7 Distribution of cases according to presenting complaints and correlation with VIA

VIA	Complaints										Total
	1	2	3	4	5	6	7	8	9	10	
Positive	6	1	4	1		1	3				16
Negative	5	7	11	8	3	1	1	5	3	-	44
Total											60

1) White discharge
2) Pain in lower abdomen
3) Backache
4) Irregular menses
5) Urinary complaints
6) Blood mixed discharge.
7) Post menopausal bleeding
8) Itching in private parts
9) Pain during sexual contact
10) Any STDs

(Frequency of micturition, burning micturition)

Majority of VIA positive cases had white discharge, backache andpost menopausal bleeding as their presenting complaints.

TABLE NO.8: Comparison and correlation of VIA with pap smear

Age of marriage	Column1	Column3	Column4
	Pap Smear		Total
VIA	positive	negative	
Positive	A(10)	B(6)	16
Negative	C(2)	D(42)	44
Total	12	48	60

12 cases were positive on Pap smear and 16 cases were positive by VIA. Only 2 cases positive in Pap smear were missed by VIA.

A=both acetic acid and pap smear positive

B= acetic acid positive and pap smear negative

C= acetic acid negative pap smear positive

D= both Acetic acid and pap smear negative

Sensitivity=True positive/ Disease positive

$$= (A/A+C) *100$$

$$=(10/10+2) *100$$

$$=83.33\%$$

Specificity= True negative/Disease negative

$$= (D/D+B) *100$$

$$= (42/42+6) *100$$

$$= 87.50\%$$

Prevalence of the disease= Total disease/Total

$$*100= 12/60*100$$

$$=20\%$$

The sensitivity and specificity of pap smear and VIA together was 83.33% and 87.50% respectively.

DISCUSSION

In this 21st century, in spite of the availability of HPV vaccines and different affordable and effective methods like VIA, Pap smear etc. for early detection of cervical cancer and even treatment of cervical cancer precursor lesions is available but still cervical cancer continues to be a public health problem in India. The high burden of cervical cancer in India and other developing countries is due to limited availability of infrastructure, trained manpower, poor to moderate living standards, a high prevalence of HPV (more than 10% in women aged more than 30 years) and due to lack of screening.

In this study majority of respondents (56, 93.33%) were Hindu which is supported by [13] which is contradictory to.[14] Similarly age of majority of respondents was between 25-60 years which is similar to other studies.[10,15,16] Majority of respondents were illiterate (34,56.67%) which is similar to other studies.[13,15] Majority of respondents (24,40%) got married between 12-15 years which is contradictory to the study.[17] About half of the respondents (29,48.33 %) belongs to low middle class which is supported by.[15] More than half of respondents (38,63.33%) had 3-4 children which is supported by.[18,19]

Present study shows most of respondents whose VIA shows acetowhite (positive) majority of them were illiterate, belong to low middle income, were married at the early age of 12-15 years (had their first sexual contact at early age), were multigravida (had 3-4 children). So, illiteracy, low socio economic status, early age of marriage or early age of sexual contact, multigravida are some of risk factors of cervical cancer. This result is supported by various other studies of Bhutan,[11] Pakistan[20] and Bangladesh. [19]

The results of the current study and other reported studies indicate that blood spots or bleeding following periods, menstrual bleeding that is longer and heavier than usual, bleeding after intercourse or pelvic examination, increased vaginal discharge, pain during sexual intercourse, bleeding after menopause, and unexplained, persistent pelvic and back pain are some of symptoms of cervical cancer. [18]

The sensitivity and specificity of pap smear and VIA together was 83.33% and 87.50% respectively. It showed the use of both of these two tests (pap smear and VIA) was effective in early detection of cervical cancer. VIA is a simple objective test. The result of this procedure either positive or negative is available immediately, allowing for further investigations to be carried out for the identification of cervical lesions. It has been shown that follow up colposcopy and treatment of pre invasive lesions can be performed immediately which not only avoids recall but also increases compliance to diagnostic investigation and treatment. The test is not expensive and it is possible to train providers to detect acctowhite lesions with the naked eye examination.

CONCLUSIONS

VIA is a simple, inexpensive, attractive, low cost technology test in low resource settings. It is comparable to cytology in detecting low as well as high grade lesions. The majority of women in India, who belongs to the low socio economic status, remain devoid of any screening test, as Pap smear in unaffordable to them. The time has come, to integrate VIA based screening programmes at the primary care level of health servicesas the primary screening tool, and to downstage cancer cervix in developing country like ours. VIA can replace Pap smear as the primary screening tool for universal screening. However, for opportunistic screening, with high incidence of cervical cancer, VIA may be used in combination with Pap smear due to high accuracy of the combined test.

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