PAP Smear and Visual Inspection with Acetic Acid (VIA) Service Utilization and Associated Factor among Women in Bundelkhand Region

Dr. Sushila Kharkwal[1], Dr. Richa Sachan[2], Dr. Hema J. Shobhane[3]

[1]Professor & Head, Department of Obstetrics & Gynaecology, M. L. B. Medical College, Jhansi, Uttar Pradesh, India

[2]Junior Resident, Department of Obstetrics & Gynaecology, M. L. B. Medical College, Jhansi, Uttar Pradesh, India

[3]Professor, Department of Obstetrics & Gynaecology, M. L. B. Medical College, Jhansi, Uttar Pradesh, India

Abstract: *Introduction: Cancer of the cervix uteri is one of the most common cancers in developing countries and the third most common cancer among women worldwide. India alone accounts for one - fourth of the global cervical cancer burden. Material and methods: The crosssectional study was conducted on 200 women of age between 21 - 60 years. Priority was given to patients with the risk factors as multiparity, multiple sexual partners, Women with STI, leucorrhea and abnormal vaginal bleeding. The cases were divided into two groups according to screening type. Results: Majority of cases belonged to 41 - 50 yrs of age group followed by 31 - 40 yrs of age group.66.6% cases presented with complaints of discharge P/V. Sensitivity and specificity of PAP smear test was 52.0% and 95.0% respectively. Sensitivity and specificity of VIA test was 89.0% and 87.0% respectively. Conclusion: The results of this study showed that VIA has high sensitivity and lower specificity compared to Pap smear. VIA is feasible and acceptable screening method in the primary health care setting due to single visit see and treatment approach.*

Keywords: Cervical cancer, Pap smear, visual inspection with acetic acid, Screening

1. Introduction

Cancer of the cervix uteri is one of the most common cancers in developing countries and the third most common cancer among women worldwide, with an estimated 569, 847 new cases and 311, 365 deaths in 2018 as reported by Bruni et al. [1]. Overall, the mortality rates in developing countries are about four times higher than those in industrialised countries, with 80–85% of cervical cancer deaths occurring in developing countries according to Mupepi et al. [2] and Ferly et al. [3]. In 2010, cervical cancer killed 200, 000 women globally [4]. India alone accounts for one - fourth of the global cervical cancer burden. Although advanced cervical cancer cases have become very rare in developed countries, most cases in Assam are detected late (stage 3 or 4) due to lack of effective screening program.

It is well known that over 90% of human cancer arises from the epithelium, the superficial tissue covering the exterior of the body or lining organs and internal body cavities. The epithelial tissue favours the development of cancers because it is frequently exposed to various forms of physical and chemical damage. Many factors may influence the persistence of infection and progression to cancer, such as sexual behaviours, immunosuppression, high parity, cigratte smoking, nutritional factors. The nature history of cervical cancer after HPV infection. The cost for HPV testing in the Indian scenario is prohibitive presently and hence other screening modalities have to be employed.

The much higher incidence of cervical cancer in developing nations, as compared with that in developed nations, has been ascribed to the fact that it has been possible to maintain effective Pap smear screening programs in the developed world but not in the developing world [5]. An effective Pap smear screening program requires many consecutive steps, including (a) the collection in the clinic of cells from the transformation zone of the cervix and the endocervix, (b) smearing the cells on a slide and fixing them, (c) staining and reading the slide by a cytopathologist, (d) transmitting the cytology results to the health care provider, (e) communicating the cytology results to the woman and arranging for a second visit if the smear is abnormal, and (f) a second visit by the woman for additional tests (e. g., colposcopy and cervical biopsy) or for treatment.

Visual inspection of the cervix after acetic acid application (VIA) has long been regarded as the most promising method for screening in resource - limited settings [6, 7]. VIA is performed by a trained health care provider who applies a 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 [8]. The results are immediately available; and treatment, if needed, can be provided at the same visit. Several studies showed the advantages of VIA, including its simplicity, high sensitivity and instant results [9, 10, 11]. Little infrastructure is required and the cost of launching a VIA - based programme is low. The study will be conducted for screen the patient of age 21 - 60 yrs by doing pap smear, VIA (Visual Inspection with Acetic Acid) and to detect sensitivity and specificity for detecting CIN and early Ca Cervix in Bundelkhand region.

2. Material and Methods

The cross sectional study was conducted in the Department of Obstetrics and Gynecology, MLB Medical College, Jhansi on 200 women (21 - 60 years) who fulfill the selection criteria were randomly selected. Written and

informed consent was taking from all cases and their relevant history was taken, the study subject had a complete physical and pelvic examination. Patients in the age group of 21 - 60 years were included in the study and priority was given to patients with the risk factors as multiparity, multiple sexual partners, Women with STI, leucorrhea and abnormal vaginal bleeding. The cases was excluded were unmarried patients, patients below 21 years and above 60 years, patients with bleeding P/V and active infection at the time of examination and women with frank invasive cervical cancer.

The cases were divided into two groups according to screening type. Group A (100 cases) cases were screened via Visual Inspection with acetic acid (VIA) and Group B (100 cases) were screened via PAP smear.

Pap smears were collected by spatula and endocervical brush, smeared onto a glass slide and send to the histopathology department of MLB Medical College, Jhansi after fixation with ethanol for 30 minutes. A standardized data collection form was used to document results of the cervical cytology, including the final cytologic diagnosis based on the Bethesda System. A cytologic abnormality of atypical squamous cells - undetermined significance (ASC - US) or more severe diagnosis was considered to be a positive Pap screening result. Inflammatory changes were frequently present in Pap smears and were noted in the data form. The presence of inflammation in the Pap smears was evaluated as a risk factor for VIA positivity.

An acetic acid (5%) soaked cotton ball will be applied for 1 - 2 minutes on the cervix before naked eye evaluation of cervix under 100 - watt illumination. The test results will be divided in two categories as VIA negative and VIA positive. When any of the findings like a well defined dense opaque acetowhite lesion close to the squamo - columnar junction or acetowhite area touching the transformation zone was observed the result will reported as VIA positive. On the other hand if no acetowhite lesion, faint or a white line indicative of squamo - columnar junction was observed, the result will reported as VIA negative.

The results of VIA and Pap smear will be compared with histological diagnosis. The histology finding will be considered as gold standard against which the sensitivity and specificity of VIA and Pap smear will be calculated using standard statistical methods. A P value of <0.05 was considered significant. All analyses will be conducted using SPSS software

3. Results

Table 1: Demographic Profile

Age group (yrs)	No. of cases	Percentage
21 - 30	42	14.0
31 - 40	102	34.0
41 - 50	108	36.0
51 - 60	48	16.0
Marital Status		
Married	300	100
Unmarried	0	0
Parity		
P1	18	6.0
P2	27	9.0
P3	200	66.67
P4	55	18.33
Place of Residence		
Rural	180	60.0
Urban	120	40.0
Smoking		
Yes	35	11.67
No	265	88.33
Education		
Illiterate	156	52.0
Literate	144	48.0
Occupation		
Working	120	40.0
Not working	180	60.0
Socioeconomic status		
Low	108	36.0
Middle	180	60.0
High	12	4.0
Age at marriage (in yrs)		
<21	215	78.33
>21	65	21.67
Duration of marriage (in yrs)		
<10	21	7.0
10 - 20	129	43.0
>20	150	50.0

Table 2: Presenting symptoms

Symptoms	No. of cases	Percentage
Abnormal uterine bleeding	18	6.0
Discharge P/V	198	66.6
Lower abdomen pain	60	20.0
Post coital bleeding /PMB	24	8.0
Total	300	100

Majority of 198 (66.6%) cases presented with complaints of discharge P/V, 60 (20.00%) cases presents with lower abdominal pain, 24 (8.0%) cases with post coital bleeding/PMB and 18 (6.0%) cases with abnormal uterine bleeding.

Table 3: VIA and PAP smear test

	VIA		PAP smear	
Result	No. of cases	Percentage	No. of cases	Percentage
Positive	52	17.33	22	7.33
Negative	248	82.66	278	92.66
Total	300	100	300	100

248 (82.66%) cases have negative on VIA test only 52 (17.33%) cases were positive in VIA test while in PAP smear test 78 (92.66%) cases have negative on PAP smear test only 22 (7.33%) cases were positive.

Table 4: Histology Test result with positive VIA and PAP smear

Histology result	Positive VIA		Positive PAP smear	
	No.	%	No.	%
Positive	17	5.5	10	3.33
Negative	35	11.5	12	4.0
Total	52		22	

Out of 52 VIA positive cases, 17 (5.5%) cases were positive by histology result and 35 (11.5%) cases were negative. Out of 22 positive PAP smear test, 10 (3.33%) cases were positive by histology and 12 (4.0%) cases were negative.

	PAP Smear test	VIA test
Sensitivity	52.0	89.0
Specificity	95.0	87.0
Positive predictive value	45.0	32.0
Negative predictive value	96.0	99.0

Sensitivity and specificity of PAP smear test was 52.0% and 95.0% respectively. Positive predicted value was 45.0% and negative predictive value was 96.0%. Sensitivity and specificity of VIA test was 89.0% and 87.0% respectively. Positive predicted value was 32.0% and negative predictive value was 99.0%.

Table 5: Outcome

Histology result	VIA test		PAP smear	
	No.	%	No.	%
CIN	48	16.0	18	7.6
Ca cervix	4	1.3	4	1.3
Total	52	17.33	22	7.33

4. Discussion

Screening for cervical cancer has resulted in the reduction of incidence of cancer cervix and its complications. Pap smear has been used for the screening purpose since 1940's but studies have shown that the sensitivity of a single Pap test is low and it has high false negative rate. This is said to be due to improper sampling and ineffective interpretation. In Pap smear only 20% of the scraped cells in the Ayer's spatula are transferred to the slide while smearing, which is done manually. Therefore alternative screening methods which overcome these pitfalls in Pap smear were developed. One such method is Liquid Based Cytology where all the scraped cells in the cyto brush are transferred in the liquid transport medium to the laboratory where it is processed and a uniform thin layer of smear is prepared in the laboratory than manually. The study was conducted for screen the patient of age 18 - 60 yrs by doing pap smear, VIA (Visual Inspection with Acetic Acid) and to detect sensitivity and specificity for detecting CIN and early Ca Cervix in Bundelkhand region.

Study shows that 42 cases (14%) cases were 21 - 30 years of age group, 102 (34.0%) cases were 31 - 40 yrs of age group, 108 (36.0%) cases were 41 - 50 yrs of age and 48 (16.0%) cases were in 51 - 60 yrs of age group and the finding is similar to those of other studies [12 - 15] that demonstrated increasing age was strongly associated with utilization of cervical cancer screening. This could be as a result of older women having frequent contact with reproductive health services due to their longer fertility history [13].

In our study 198 (66.6%) of cases presented with complaint of discharge P/V, 60 (20.00%) cases presented with lower abdominal pain, 24 (8.0%) cases presented with post coital bleeding/PMB and 18 (6.0%) cases with abnormal uterine bleeding. Similar findings were found by Sherwani RK et al [16] and Robert ME et al [17] in which cases presented with complaint of post coital bleeding or discharge per vagina.

60.0% of cases were belongs to rural area while remaining 40.0% were belongs to urban area. In India women of low socio economic class and rural women showed higher incidence of cancer cervix (Vallikad, Kurkure AP, Yeole BB) [18, 19]. This is due to lack of access to screening and health services and poor knowledge about the risk factors of cancer cervix.

156 (52.0%) cases were illiterate while 144 (48.0%) cases were literate. In the study by Ashish Kumar Bhattacharyya et al [20], 2015, 52% cases were illiterate while 144 cases were literate. a finding similar to the study by Sherwani RK etal, [16] Christopherson and Parker [21]. In their studies prevalence of cancer cervix cases were more in low socio economic class women with younger age of marriage and child bearing.

180 (60.0%) cases were not working while only 120 (40.0%) cases were working.180 (60.0%) cases belonged to middle class socioeconomic status, 108 (36.0%) cases in low socioeconomic status and 12 (4.0%) cases belonged to high socioeconomic status. In the study by Ashish Kumar Bhattacharyya et al [20], 2015 found that the incidence of CIN was higher in lower socio economic class (30%) along with increased incidence of carcinoma cervix in this group (3%).

150 (50.0%) cases had duration of marriage more than 20 years age, 129 (43.0%) cases had marriage duration of 10 - 20 years of age and 21 (7.0%) cases had marriage duration of <10 years. A study by Ashish Kumar Bhattacharyya et al [20], 2015, 21 cases were married for less than 10 years, 129 cases were married for 10 - 20 years, while 150 cases were married for more than 20 years. The highest number of CIN (30%) and cervical cancer (6%) are in the group married for more than 20 years.

The factors responsible for higher incidence of CIN and ca cervix in lower economic group include poor personal hygiene, poor living condition, Illiteracy, unstable marriage, early age at first intercourse. Duration of marriage and duration of exposure to sexual intercourse has an important role in the genesis of cervical dysplasia [20].

VIA was positive in 52 women out of 300 cases. Sensitivity of VIA was found to be 89% compared to specificity, which was 87%. Positive results obtained from Pap were 22 (7.3%) cases. Sensitivity of Pap smear was found below 52% compared to specificity which was 95%. This was attributed to high number false negative smear.

Strength of the study

- Comparison of VIA and Pap smear study has relatively large sample size and its findings can be generalized to the study population in the study area.
- The study provided some evidence about new risk factors for positive VIA test which may be risks for cervical cancer if they are proved by well - designed by case - control studies in the future.
- The study used a new method of screening by VIA for cervical cancer and it found that it had high sensitivity in the detection of cervical cancer compared to Pap smear in the primary health care setting.

5. Conclusion

The results of this study showed that VIA has high sensitivity and lower specificity compared to Pap smear. Combination of VIA/Pap increased sensitivity and specificity of detection of cervical cancer. The findings of study indicate that VIA is useful for screening of cervical cancer in primary health care setting and it is also a feasible and acceptable screening method in the primary health care setting due to single visit see and treatment approach. More efforts are needed to develop and to adapt new strategies for promotion and improvement of cancer prevention methods

References

[1] L. Bruni, G. Albero, B. Serrano, M. Mena, D. Gómez, and J. Muñoz, "ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre), " Human papillomavirus related diseases in the world. Summary Report, 2019.

[2] S. C. Mupepi, C. M. Sampselle, and T. R. B. Johnson, "Knowledge attitudes, and demographic factors influencing cervical cancer screening behavior of Zimbabwean women, " Journal of Women's Health, vol.20, no.6, pp.943–952, 2011.

[3] J. Ferlay, H. - R. Shin, F. Bray, D. Forman, C. Mathers, and D. M. Parkin, "Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008, " International Journal of Cancer, vol.127, no.12, pp.2893–2917, 2010.

[4] C. L. Chapman Lambert, "Factors influencing cervical cancer screening in women infected with HIV: a review of the literature, " Journal of the Association of Nurses in AIDS Care, vol.24, no.3, pp.189–197, 2013.

[5] Denny L, Quinn M, Sankaranarayanan R. Chapter 8: Screening for cervical cancer in developing countries. Vaccine 2006; 24: S71–77.

[6] Visual inspection with acetic acid for cervical - cancer screening: test qualities in a primary - care setting. Lancet 1999; 353: 869–73.

[7] Denny L, Kuhn L, Pollack A, Wright TCJR. Direct visual inspection for cervical cancer screening: an analysis of factors influencing test performance. Cancer 2002; 94: 1699–707.

[8] Sankaranarayanan R, Wesley R. A practical manual on visual screening for cervical neoplasia. France: IARC; 2003.

[9] Singh V, Sehgal A, Parashari A, et al (2001). Early detection of cervical cancer through acetic acid application an aided visual inspection. Singapore Med J, 42, 351 - 54.

[10] Ghaemmaghami F, Behtash N, Gilani MM, et al (2003). Visual inspection with acetic acid as a feasible screening test for cervical neoplasia in Iran. Int J Gynecol Cancer 14, 465 - 69.

[11] Goel A, Gandhi G, Batra S, et al (2005). Visual inspection of the cervix with acetic acid for cervical intraepithelial lesions. Int J Gynaecol Obstet, 88, 25 - 30.

[12] Park H. Factors Associated with Utilization of Uterine Cervical Cancer Screening Services by Korean Women using the Andersen Behavioral Model. Life Science Journal.2014; 11 (3).

[13] Perng P, Perng W, Ngoma T, Kahesa C, Mwaiselage J, Merajver SD, et al. Promoters of and barriers to cervical cancer screening in a rural setting in Tanzania. International Journal of Gynecology & Obstetrics.2013; 123 (3): 221 - 5.

[14] Kahesa C, Kjaer S, Mwaiselage J, Ngoma T, Tersbol B, Dartell M, et al. Determinants of acceptance of cervical cancer screening in Dar es Salaam, Tanzania. BMC public health.2012; 12 (1): 1093.

[15] Ncube B, Bey A, Knight J, Bessler P, Jolly PE. Factors associated with the uptake of cervical cancer screening among women in Portland, Jamaica. North American journal of medical sciences.2015; 7 (3): 104.

[16] Sherwani R. K, T. Khan, Akhtar K. Zeba, F. A. Siddiqui, K. Rahman and N. Afsan, 2007. Conventional Smear and Liquid Based Cytology for Cervical Cancer screening. A Comparative Study. Journal of Cytology, 24 (4): 167 - 172.

[17] Robert ME, Fu YS. Squamous cell carcinoma of the uterine cervix – a review with emphasis on prognostic factors. Semin Diagn Pathol 1990; 7: 173 - 189.

[18] Vallikad E, "Cervical Cancer: The Indian Prospective, " International Journal of Gynecology Obstetrics, 95 (1) November 2006: S215 - S233.

[19] Kurkure AP, and Yeole BB, "Social inequalities in cancer with special reference to South Asian Countries, " Asian Pacific Journal of Cancer Prevention.7 (1) (Jan – March 2006): 36 - 40.

[20] Ashish Kumar Bhattacharyya, Jyan Dip Nath, and Harajyoti Deka. Comparative study between pap smear and visual inspection with acetic acid (via) in screening of CIN and early cervical cancer. J Midlife Health.2015 Apr - Jun; 6 (2): 53–58.

[21] Christopherson WM and Parker JE. Poor socioeconomic condition and its association with carcinoma cervix. Cancer 1960; 13: 711 - 715.