

# Comparison of Ayer's Spatula Versus Cytobrush in Adequacy of Sample Obtained for Pap Smear

GULWISH SALAHUDDIN<sup>1</sup>, TAHIRA JABEEN<sup>2</sup>, AYESHA NAZ<sup>3</sup>, RUKHSANA SHAHEEN AFZAL<sup>4</sup>, KHAIRUN NISA<sup>5</sup>, IRAM MUSHTAQ<sup>6</sup>

<sup>1,3</sup>Senior Registrar, Department of Obstetrics & Gynaecology, Wah Medical College, Izzat Ali Shah Hospital, Wah Cantt

<sup>2</sup>Senior Registrar, <sup>4</sup>Assistant Professor, Department of Obstetrics & Gynaecology, HITEC-IMS, HIT Hospital, Taxilla Cantt

<sup>5</sup>Assistant Professor, <sup>6</sup>Senior Registrar, Department of Obstetrics & Gynaecology, Wah Medical College, POF Hospital, Wah Cantt

Correspondence to Dr. Gulwish Salahuddin, E-mail: [gulwishhameed@gmail.com](mailto:gulwishhameed@gmail.com) Cell: 0332-8519189

## ABSTRACT

**Aim:** To compare the adequacy of Pap-smear in the same patient obtained by Ayer's spatula and cytobrush.

**Study design:** Comparative cross-sectional study

**Methodology:** One hundred and fifty patients were enrolled. Each patient was subjected to both the tools i.e. cytobrush and Ayer's spatula.

**Results:** The mean age was 41.6±10.4 years. 83.3% of patients using Ayer's spatula while 94.7% was using cytobrush and statistically the significant (P=0.002) results were found.

**Conclusion:** Sampling with cytobrush resulted in better percentage of adequate samples as compared to Ayer's spatula.

**Keywords:** Cervical cancer, Cervical cancer screening, cervical cancer screening techniques

## INTRODUCTION

Cervical Cancer is defined as slow-growing cancer forming in the cervix tissues. It is second most common gynaecological malignancy worldwide after breast carcinoma<sup>1</sup> and most preventable and treatable form of cancer occurring in females.<sup>2</sup>

The incidence of cervical cancer in developing countries reaches upto 80%<sup>3</sup> due to lack of established screening program. Screening for cervical cancer is not well established.<sup>4</sup> Improvement in screening facilities available to patients has decreased incidence and mortality rate. In western world, frequency of cervical cancer was reduced to half due to cervical screening program established in 1988.<sup>5</sup> The benefits and harms of cervical cancer screening vary with age, medical history and non-adherence to screening.<sup>6,7</sup>

Screening for cervical cancer is carried through Papanicolaou (Pap) test and high-risk human papilloma virus (HPV). In Pap smear cells samples taken from cervix and vagina. Atypical cells are most commonly found in transformation zone i.e. junction of ectocervix and endocervix. The sensitivity and specificity of tests varies significantly. This test is more sensitive for detecting squamous malignancy.<sup>8</sup> For cervical cancer screening conventional or liquid-based tests are carried out<sup>9</sup>.

HPV tests are approved by US Food and Drug Administration (FDA) for use in co-testing with pap test. HPV testing is more sensitive in detecting cervical histopathology.<sup>10-12</sup> Strategies that include HPV testing increases the number of positive results as suggested by various studies.<sup>13-15</sup> Combination of Pap and HPV test together improve cervical cancer detection than when used alone.<sup>16</sup> With pap testing, screening is suggested every three years while required after every five years with HPV and Pap co-testing<sup>17</sup>.

Researchers have shown that the incidence of cervical cancer have been decreased since the development of screening methods. Overall, adequate researches have been done on the screening strategies (i.e. cytology, HPV testing, co-testing) and the sampling devices but studies on comparison of devices in terms of safety and efficacy are rare. Comparison of efficacy of Ayer's spatula versus cytobrush in terms of adequacy of sample obtained for Pap-testing is important so that patient suffering can be reduced false negative results can be prevented and hence decreases in morbidity and mortality rates.

The objective of the study was to compare the adequacy of Pap-smear in the same patient obtained by Ayer's spatula and cytobrush.

## MATERIALS AND METHODS

After the approval from Hospital Ethical Committee, this comparative cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Federal Government Services Hospital Islamabad from July 1<sup>st</sup> 2018 to 30<sup>th</sup> June 2020. A total of 150 patients were enrolled in the study. All female patients from 25-65 years of age who require Pap-smear, postmenopausal bleeding, postcoital bleeding, intermenstrual bleeding and profuse foul-smelling vaginal discharge were included in the study. The exclusion criteria were females with diagnosed carcinoma cervix, pregnancy, post hysterectomy, virginity and patient refusal. The purpose and procedure of the study was elaborated to all the patients fulfilling the inclusion criteria and written consent was taken.

Selected female patients were subjected to both the tools i.e. Cytobrush and Ayer's spatula. The procedure was performed by the trainee researchers or equivalent fourth year postgraduate trainee. All data were collected on specified proforma. Data were entered and analyzed using SPSS-20. For the purpose of comparing the adequacy of sample with Cytobrush and Ayer's spatula, an independent t-test sample was applied. A P-value ≤ 0.05 was considered statistically significant. Effect modifiers like age was calculated by stratification. Post-stratification interpretation sample t-test was applied and p-value ≤ 0.05 was considered significant.

## RESULTS

The mean age of the patients in the study was 41.6±10.4 years with ranges from 20 to 62 years. Adequacy of samples with cytobrush and Ayer's spatula was also calculated in terms of frequency and percentages. Quantitative variables like age were measured as mean and standard deviation. Comparison of adequacy of Pap-smear in same patient obtained by Ayer's spatula and cytobrush was conducted in this study. In the study, samples were found to be adequate in 125(83.3%) of patients using Ayer's spatula, while adequate samples was 142(94.7%) with cytobrush. Independent t-test was used to compare adequacy of samples with both the tools and the p-value obtained was less than 0.05 showing that the results were significant statistically (Tables 1-2).

Table 1: Demographic characteristics of the data

| Category | Minimum | Maximum | Mean  | SD    |
|----------|---------|---------|-------|-------|
| Age      | 20.00   | 62.00   | 41.59 | 10.42 |

Table 2: Comparison of Adequacy of samples by Ayer's Spatula and Cytobrush

| Tools                  | Adequacy | Inadequacy | %age | P-value |
|------------------------|----------|------------|------|---------|
| Ayer's Spatula (n=150) | 125      | 25         | 83.3 | 0.002   |
| Cytobrush (n=150)      | 142      | 08         | 94.7 |         |

Received on 11-09-2021

Accepted on 19-02-2022

## DISCUSSION

Cervical cancer is common malignancy of old age women. Countries observing screening and HPV vaccination programs show less incidence and mortality rate for cervical cancer. Most common factor predisposing to progression of cervical cancer is presence and persistence of infections with high-risk strains of HPV. Most common risk factors of acquiring HPV infection e.g. early onset of sexual activity, multiple or high-risk sexual partners and immunosuppression<sup>18</sup>. The epidemiology and prevalence of HPV infection may also vary geographically.

Cervical cancer screening has decreased mortality from cervical cancer. Pap-test and HPV testing are the two methods devised for cervical cancer screening. The incidence and mortality of cervical cancer has been decreased in the countries that adopted Pap-test for screening. In addition to Pap test, test for HPV are important for pathogenesis of cervical cancer. Despite its advantages, traditional Pap-smear has certain drawbacks. False negative result rate is quite high due to the presence of insufficient number of cells in the smear, substandard preparation of slide and error in laboratory reports. Therefore, an appropriate tool was required to reduce false negative results.

Several studies have shown that sampling with cytobrush provided sufficient number of cells and reduced the possibility of false negative results. A study conducted by Kohlberger PD, et al suggested that percentage of slide surface covered with valuable endocervical cells was best with Cytobrush.<sup>19</sup> In our study, samples were found to be adequate in 125(83.3%) of patients using Ayer's spatula, while the percentage of adequate samples was 142(94.7%) with cytobrush suggesting that sampling with cytobrush resulted in better percentage of adequate samples as compared to Ayer's spatula. Thus, finding of our study is also similar to another study conducted by Luzzatto et al<sup>20</sup> that the cytobrush samples were more efficient in the detection of intraepithelial neoplastic lesions suggesting that most of them originate in the endocervical epithelium. Kavak et al<sup>21</sup> compared the effectiveness of e cervical smear sampling devices (cotton swab-Ayer's spatula, Cervix brush and cytobrush-Ayer's spatula). They concluded that there was an increased detection of endocervical cells in the cytobrush plus Ayer's spatula and Cervix brush method.

Different studies have shown that sampling with cytobrush provides even distribution of cells resulting in higher diagnostic efficiency. The cytobrush is effective mainly for endocervical sampling and assures adequate sampling of the transitional zone.

## CONCLUSION

Sampling with cytobrush resulted in better percentage of adequate samples as compared to Ayer's spatula. Further controlled studies are needed to establish its efficacy over Ayer's spatula.

## REFERENCES

1. Armstrong EP, Prophylaxis of cervical cancer and related cervical disease: a review of the cost-effectiveness of vaccination against oncogenic HPV types. *J Managed Care Pharmacy* 2010; 16(3): 217-30.
2. Oran NT, et al. Health promotion lifestyle and cancer screening behavior: a survey among academicians women. *Asian Pac J Cancer Prev* 2008; 9(3): 515-8.
3. Kent A. HPV vaccination and testing. *Rev Obstet Gynecol* 2010; 3(1): 33.
4. Ponka D, Dickinson J. Screening with the Pap test. *CMAJ* 2014; 186(18): 1394-9.
5. Vaccarella S, et al. 50 years of screening in the Nordic countries: quantifying the effects on cervical cancer incidence. *Br J Cancer* 2014; 111(5): 965-9.
6. Kamau G. Cervical cancer: test and prevention. 2011.
7. Jemal A, et al. Global cancer statistics. *Cancer J Clin* 2011; 61(2): 69-90.
8. Akimunnessa K, et al. Effectiveness of cervical cancer screening over cervical cancer mortality among Japanese women. *Japanese J Clin Oncol* 2006; 36(8): 511-8.
9. ACOG practice Bulletin number 131: screening for cervical cancer. *Obstet Gynecol* 2012; 120(5): 1222-38.
10. Leinonen MK, et al. Detection rates of precancerous and cancerous cervical lesions within one screening round of primary human papillomavirus DNA testing: prospective randomised trial in Finland. *BMJ* 2012; 345: e7789.
11. Ogilvie G, et al. Primary cervical cancer screening with HPV testing compared with liquid-based cytology: results of round 1 of a randomised controlled trial—the HPV FOCAL Study. *Br J Cancer* 2012; 107(12): 1917-24.
12. Koliopoulos G, et al. Diagnostic accuracy of human papillomavirus testing in primary cervical screening: a systematic review and meta-analysis of non-randomized studies. *Gynecol Oncol* 2007; 104(1): 232-46.
13. Castle PE, Katki HA. Benefits and risks of HPV testing in cervical cancer screening. *Lancet Oncol* 2010; 11(3): 214.
14. Feldman S. Human papillomavirus testing for primary cervical cancer screening: is it time to abandon Papanicolaou testing? *JAMA Internal Med* 2014; 174(10): 1539-40.
15. Ronco G, et al. Efficacy of human papillomavirus testing for the detection of invasive cervical cancers and cervical intraepithelial neoplasia: a randomised controlled trial. *Lancet Oncol* 2010; 11(3): 249-57.
16. Rijkaart DC, et al. Human papillomavirus testing for the detection of high-grade cervical intraepithelial neoplasia and cancer: final results of the POBASCAM randomised controlled trial. *Lancet Oncol* 2012; 13(1): 78-88.
17. Moyer VA. Screening for cervical cancer: US Preventive Services Task Force recommendation statement. *Ann Internal Med* 2012; 156(12): 880-91.
18. Klumb EM, et al. Is higher prevalence of cervical intraepithelial neoplasia in women with lupus due to immunosuppression? *JCR* 2010; 16(4): 153-7.
19. Kohlberger PD, et al. Comparative evaluation of seven cell collection devices for cervical smears. *Acta Cytologica* 1999; 43(6): 1023-6.
20. Luzzatto R, Boon ME. Contribution of the endocervical Cytobrush sample to the diagnosis of cervical lesions. *Acta Cytologica* 1996; 40(6): 1143-7.
21. Kavak ZN, et al. A randomized comparison of the 3 Papanicolaou smear collection methods. *Austr NZ J Obstet Gynaecol* 1995; 35(4): 446-9.