Primary screening of cervical cancer by Pap smear in women of reproductive age group

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ABSTRACT

Introduction: Cancer cervix is a major health problem responsible for causing a higher mortality rate in women worldwide; the exponential increase in such cases can be reduced by early screening of women. The cytology-based cervical screening had a higher success rate in reducing the incidence of cervical cancer. The present study aimed to evaluate the use of Pap smear screening to find cytological abnormalities and precancerous lesions. Materials and Methods: Sexually active women over 21 years of age were enrolled for the study. A detailed history was taken on the preformed proforma, and all were subjected to vaginal examination. Samples for Pap smear were taken with the help of Ayre spatula and immediately spread over a marked grease-free glass slide and dipped into 95% ethyl alcohol fixative for cytological examination. Results: Most of the abnormality of the epithelial cells found was in the age range of 31–50 years, and most of them were multiparous. 47.92% of the women had a chief complaint of vaginal discharge, an irregular menstrual cycle in 11.07%, and abdominal pain in 7.83%, while 30.41% were asymptomatic. Women found negative for intraepithelial neoplasia were 82.94%, while 13.36% had an inflammatory smear. 0.92% atypical squamous cells of undetermined significance (ASCUS), 2.78% Low-grade squamous intraepithelial lesion (LSIL) were found, no woman had High-grade squamous intraepithelial lesion (HSIL). Conclusion: Pap smear is a simple, cost-effective, non-invasive, and easy to perform tool for early detection of precancerous lesions, and it is evident that every woman above the age of 25–30 years must be recommended for cervical screening.

Keywords: Atypical squamous cells of undetermined significance, high-grade squamous intraepithelial lesion, low-grade squamous intraepithelial lesion, Pap smear
programs had significantly reduced the mortality rate from cervical cancer. The sensitivity of the Pap test has significantly increased by HPV DNA co-testing. In India, where a majority of women are not educated, especially those residing in rural areas, are ignorant about their personal hygiene. They are more prone to hazards of suffering from this dreaded disease. Although regular screening has significantly reduced the number of cervical cancer, there is still a need to spread awareness, educate women regarding the signs and symptoms of cancer, and motivate them to visit nearby hospitals more frequently for routine check-ups. Regular follow-up and adequate treatment with proper counseling is needed for those who are found positive for Pap smear. Thus, we need to strengthen our health care sector by including screening at primary health centers. Early detection and robust screening may prevent this disease significantly. To achieve the target of successful elimination of cervical cancer, one can be the primary prevention by HPV vaccination program which aims to prevent cervical cancer by preventing HPV infection, and another could be the secondary prevention by early screening to detect prevalent cervical precancerous lesions. The importance of this study is to detect the precancerous lesions and high grade cervical intraepithelial neoplasia (CIN) so that effective treatment can be given in order to prevent them from undergoing invasive cervical cancer treatment. This can bring about a huge awareness regarding the screening for precancerous neoplastic changes in women and enable physicians to intervene and thereby help in treating carcinoma cervix at an early stage. Pap smear testing is easy to perform, economical, and can be done with limited resources in a simple setup for the detection of precancerous cervical intraepithelial lesions, and the present study is an effort to examine Pap smear testing.

Materials and Methods

This study was carried out at the Department of Microbiology in collaboration with the Department of Gynecology at Santosh Medical College and Hospital, Ghaziabad. Two hundred seventeen sexually active women over 21 years of age were included for the study from May 2019 to April 2021. Complete history was taken and recorded for future references on preformed proforma, including menstrual, marital, and sexual history, vaginal discharge, postcoital bleeding, intermenstrual bleeding, education, and occupational history. After that, per speculum vaginal examinations were done by an expert. Women not interested in participation, pregnant, or having a history of malignancy were excluded from the study. Patients were asked to lie down in dorsal lithotomy position; sterile bivalve speculum was inserted into the vagina to examine the posterior and anterior vaginal wall to allow the proper visualization of the cervix.

Samples were collected with the help of Ayre spatula, were smeared on a clean, grease-free glass slide by gentle spreading, and then instantly placed into Coplin jar containing 95% ethyl alcohol (fixative). The slides were then sent for cytopathological examination. Cervical cytology results were reported according to the Bethesda System 2014. Pap smear reports were broadly categorized into negative for intraepithelial neoplasia (NILM) and epithelial cells abnormality (ECA). Women found positive for Pap test results, including atypical squamous cells of undetermined significance (ASCUS), low grade squamous intraepithelial lesion (LSIL), and high-grade squamous intraepithelial lesion (HSIL) were advised for colposcopic examinations.

The collected data were tabulated and analyzed by using the SPSS software version 22.0 using mean ± standard deviation, percentage, and comparative study was done using the Chi-square test where applicable. Categorical data were presented in percentage (%).

The study was considered and approved by the Institutional Ethics Committee (IEC). All participants were informed about the objectives of the study prior to taking the samples, and written informed consent was obtained from subjects under study.

Results

In our study, very less number of women were aware of the test. The majority of the women enrolled were in the age group of 31–40 years (45.62%). The mean age of the patients was 32.99 ± 8.92 years. All subjects enrolled for the study were married; amongst them, 212 (97.6%) were multiparous, three were primiparous (1.38%), and two women (0.92%) were nulliparous. There is no significant relation seen between parity and the abnormal cytology in the present study. Most of them belonged to low socio-economic strata.

During the questionnaire session, women were also asked for any addiction or drug abuse; seven (3.23%) had a history of smoking, 22 (10.14%) had tobacco (chewing), and 33 (15.2%) were addicted to alcohol [Table 1].

The most common clinical findings on examinations were vaginal discharge constituting 47.92%, followed by an irregular menstrual cycle in 11.07%, while the least number of complaints registered were of abdominal pain (17 (7.84%) followed by frequency in micturition 6 (2.76%). However, 30.41% of the women were asymptomatic as they did not experience any signs and symptoms. On speculum examination, 34.56% of the women had a normal-looking cervix, 13.36% had inflammation, 3.22% had cervical erosion, and 0.92% appeared with vaginal cyst [Graph 1].

All the women included in the study had undergone cytological examination, of which the majority of the cases (180 (82.94%)) were benign, comprising negative for intraepithelial lesions or malignancy (NILM); 29 (13.36%) smears were found as inflammatory, ASCUS (2 (0.92%)), six (2.78%) were LSIL. The most important feature of this study that has drawn attention is no HSIL has been found. 23 (10.58%) cases of bacterial vaginosis and six (2.78%) cases of Candida spp. were found in our study [Graph 2]. Of all the smears tested, two (0.92%) of the study population were unsatisfactory in nature. Those were repeated again for cytology to check any abnormality.
Of all the women included in the study, eight (3.69%) were found positive for squamous cell abnormalities. Most of the LSIL cases were found in patients with symptoms of white vaginal discharge and abdominal pain in the age group of 31–40 years. Of all the screened women, 30.41% women were found asymptomatic; amongst them, 9.09% had an inflammatory smear on microscopy, and 3.03% were ASCUS [Table 2].

Discussion

It has been found that in the last few decades, cervical cancer cases has been increased exponentially because of prevention programs that have been poorly implemented. The most effective screening method for cervical cancer is Pap smear, but due to lack of awareness in the general population, it is very low. According to recent guidelines, cervical screening is recommended at the age of 25 to 65 years (HPV testing in combination with cytology) every five years or cytology alone every three years; however, those women who did not have their first smear till the age of 45 might have more serious implications because the persisting infection has a higher chance to get converted into cervical intraepithelial lesions (CIN) if left undetected and untreated at an early stage.

Our study has shown an unsatisfactory cytology report in 0.92%, which might have been due to sampling or technical error which is comparable to the Vaghela et al.[10] as they reported 4.8%. However, such unsatisfactory cases had been repeated again and further included in the total number of cases.

47.92% of the women were found with chief complaints of vaginal discharge, almost similar to other studies[11,12] but considerably higher than the 14.5% reported by Patel et al.[13] In our study, 13.36% of the participants had inflammation, which is significantly lower than another study, where 42.66% inflammation was reported.[14] We have found 23 (10.58%) cases of bacterial vaginosis and six (2.78%) cases with Candida spp. infection, whereas Marconi et al.[14] found 23 (30.1%) bacterial vaginosis cases in their study, and Salih et al.[12] reported 67 (33.5%) women with Candida spp., which is considerably higher than this study. By studying these data, much geographical heterogeneity in cervical abnormalities has been observed; such large variations could have been the result of immunity level, self-hygiene dwelling inhabitants, and literacy rate, which has a profound effect on causing such infections.

In our study, ASCUS in 0.92%, LSIL in 2.7%, and no HSIL have been found, which is different in comparison to Verma...
et al.,[14] where ASCUS in 1%, LSIL in 5.5%, and HSIL in 2.5% have been observed; this was in sharp contrast to the study done by Kang et al.,[16] in which higher percentage of HSIL (46.7%) and LSIL (13.5%) have been reported. In our study, LSIL was found in a larger proportion (1.88%) in the age group of (31–40) years, while Sachan et al.[11] reported a large number of abnormal cytology (5.57%) in the age group of 40–60 years.

According to several studies conducted in India, the prevalence of cytological abnormality is high. The difference in the prevalence of epithelial cells abnormality and inflammatory changes could have been the result of diverse cultures, ages at marriage, cohabitation, sexual activity, the incidence of related infections, and improper execution of cervical screening programs.

In our study, women addicted to alcohol were found positive for abnormal cytology in six (16.21%), which is showing similarity to another study, where it had been reported 16.7%.[17] This might indicate that alcohol may be one of the important factors; however, more study is required to prove such associations of alcohol in cervical abnormality.

In the present study, higher number of LSIL has been observed in younger women in whom it may lead to cancer cervix if no proper treatment has been provided at an early stage. However, no HSIL was observed in any age group, and this might suggest an active host immune response that has prevented the conversion of low-grade to high-grade lesions. This highlights the need to follow up the screening program to understand the factors responsible for the transformation of abnormal cells to high-grade lesions and eventually lead to invasive carcinoma cervix. There is a need to provide a huge platform for a regular Pap smear screening program, which can be successfully implemented by creating awareness among women on cervix cancer and the importance of early detection by regular screening and for clinicians to ensure and provide prompt and adequate treatment.

### Future Directions of the Study

Health care camps for regular screening should be organized by local area authorities with better infrastructure and funding; to increase the coverage in the primary health centers for active participation to maximize the reach in the community. Pap smear, along with HPV DNA testing, may improve the detection of cervical cancer.

### Conclusion

In a country like India, where a large proportion of women generally visits gyne clinic during their pregnancy or some serious health issues, they barely go for routine check-up. Thus, clinicians need to motivate those women for regular screening. In the last few decades, this screening tool has shown significant results in developed countries so that the mortality rate has been reduced considerably, and thus, it should be included as a routine procedure. Pap smear, along with HPV DNA co-testing, increases the sensitivity of detection. Hence, there is a need to educate women for regular screening even if they are not experiencing any symptoms, as this will pave the way to reduce the incidence of cervix carcinoma. This study highlights the fact that regular screening is important for women to prevent them from undergoing carcinoma cervix as prevention is better than cure.

### Limitations of the Study

Women of reproductive age group attending outpatient department were enrolled for the study. For a more robust screening, women of post-menopausal age should be considered, which may have a different effect on cervical cytology findings.

### Ethical approval

The study was considered and approved by the Institutional Ethics Committee (IEC).

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### Conflicts of interest

There are no conflicts of interest.

## References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2021;71:209-49.
2. Ferlay J, Ervik M, Lam Q, Colombet M, Mery L, Piñeros M,
et al. Global Cancer Observatory: Cancer Today. Lyon, France: International Agency for Research on Cancer; 2020. Available from: https://gco.iarc.fr/today. [Last accessed on 2021 Nov 16].

3. Bal MS, Goyal R, Suri AK, Mohi MK. Detection of abnormal cervical cytology in papanicolaou smears. J Cytol 2012;29:45-7.

4. Patel MM, Pandya AN, Modi J. Cervical pap smear study and its utility in cancer screening, to specify the strategy for cervical cancer control. Natl J Community Med 2011;2:49-51.

5. Bhatla N, Aoki D, Sharma DN, Sankaranarayanan R. Cancer of the cervix uteri: 2021 update. Int J Gynecol Obstet 2021;155(Suppl 1):1-44.

6. Fontham ETH, Wolf AMD, Church Ruth Etzioni TR, Herzig A, Flowers CR, Herzig A, et al. Cervical cancer screening for individuals at average risk: 2020 guideline update from the American cancer society. CA Cancer J Clin 2020;70:321-46.

7. Umarani MK, Gayathri MN, Kumar RM. Study of cervical cytology in papanicolaou (pap) smears in a tertiary care hospital. Indian J Pathol Oncol 2016;3:679-83.

8. Bhutia K, Puri M, Gami N, Aggarwal K, Trivedi SS. Persistent inflammation on pap smear: Does it warrant evaluation? Indian J Cancer 2011;48:220-2.

9. Barouti E, Farzaneh F, Sene A. The pathogenic microorganism in papanicolaou vaginal smears and correlation with inflammation. J Family Reproduct Health 2013;7:23-7.

10. Vaghela BK, Vaghela VK, Santwani PM. Analysis of abnormal cervical cytology in papanicolaou smears at tertiary care center – A retrospective study. Int J Biomed Adv Res 2014;5:47-9.

11. Sachan PL, Singh M, Patel ML, Sachan R. A study on cervical cancer screening using pap smear test and clinical correlation. Asia Pac J Oncol Nurs 2018;5:337-41.

12. Salih MM, El Sir Al Hag FT, Khalifa MA, El Nabi AH. Cervical cytopathological changes among women with vaginal discharge attending teaching hospital. J Cytol 2017;34:90-4.

13. Patel V, Pednekar S, Weiss H, Rodrigues M, Barros P, Nayak, et al. Why do women complain of vaginal discharge? A population survey of infectious and psychosocial risk factors in a South Asian community. Int J Epidemiol 2005;34:853-62.

14. Marconi C, Marli T, Daniela D, Silva C, Márcia G. Silva. Prevalence of and risk factors for bacterial vaginosis among women of reproductive age attending cervical screening in Southeastern Brazil. Int J Gynaecol Obstet 2015;38:85-93.

15. Verma A, Verma S, Vashisth S, Attrhi S, Singhal A. A study on cervical cancer screening in symptomatic women using pap smear in a tertiary care hospital in rural area of Himachal Pradesh, India. Middle East Fertil Soc J 2017;22:39-42.

16. Kang M, Ha SY, Cho HY, Chung DH, Kim NR, An J, et al. Comparison of papanicolaou smear and human papillomavirus (HPV) test as cervical screening tools: Can we rely on HPV test alone as a screening method? An 11-year retrospective experience at a single institution. J Pathol Transl Med 2020;54:112-8.

17. Soccio J, Brown M, Comino E, Friesen E. Pap smear screening, pap smear abnormalities and psychosocial risk factors among women in a residential alcohol and drug rehabilitation facility. J Adv Nurs 2015;71:2858-66.