A study on cervical cancer screening in asymptomatic women using Papanicolaou smear in a tertiary care hospital in an urban area of Mumbai, India

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Abstract

Introduction: Cervical cancer is the most common cause of death among women in developing countries. Among the Indian women, cervical cancer is the most common genital tract cancer. Papanicolaou (Pap) smear test plays a vital role in the detection of cervical cancer even in its premalignant condition. The aim of this study to evaluate the role of Pap smear in detecting premalignant and malignant lesions as well as nonneoplastic lesions of the cervix and to determine the prevalence of various lesions. **Materials and Methods:** We screened 1100 women in the age group of 21–65 years who attended our medical camp organized by the hospital in outdoor patient department. All women was willing to give consent for screening by Pap smear test were included. **Results:** Of 1100 cases, majority of the cases were benign comprising negative for intraepithelial neoplasia (NILM) of about 581 (52.8%) cases, 203 (18.4%) inflammatory, atypical squamous cells of undetermined significance 45 (4%), low-grade squamous intraepithelial lesion (LSIL) in 75 (6.8%), and high-grade squamous intraepithelial lesion (HSIL) in 74 (6%) women. Overall sensitivity and specificity for the detection of LSIL were 75.8% and 94.6% and those for the detection of HSIL were 68.9% and 98.6%. **Conclusions:** Pap smear test is a very easy, noninvasive, useful, simple, safe, and very economical tool to detect preinvasive cervical epithelial lesions. It is evident and proven that every woman above the age of 30–35 years must be subjected to cervical screening and this must be continued even in the postmenopausal period.

Keywords: Cervix cancer, high-grade squamous intraepithelial lesion, low-grade squamous intraepithelial lesion, Papanicolaou smear, screening

Introduction

In women, cervical cancer is very common and preventable cancer in developing countries. In our country the burden of cervical cancer is much more than we think; it is more than 10 lacs.[1] According to the report published by the World Health Organization (WHO), 80% of deaths from cervical cancer were from developing countries because of poor screening facility in the society as well as poor awareness among women. By organizing screening programs in developing country by government/authority, the incidence of cervix cancer can be reduced. More so, it can be detected much earlier and treated as well. Among the Indian women, cervical cancer is the most common genital tract cancer. Many studies shown that in India, 126,000 new cases of cervical cancer occur every year.[2,3] Unlike most other malignancies, cervix cancer is easily detected and readily preventable disease.[4] Cervical cancers in their early stage of development is completely and easily treatable as the cancer cells are localized and confined to the surface of the cervix and have not spread into the adjacent tissues. Once cancer metastasizes to other parts of the body, the disease becomes more difficult to treat and increases morbidity and mortality. Screening programs are the effective ways to reduce the

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incidence and mortality significantly, for which awareness and sensitization of women are required through community-based approach.

The Papanicolaou (Pap) smear was introduced in 1941, became the standard screening test for cervical cancer and premalignant lesions, and is being used globally.[5,6] Many studies in the literature showed that there is a reduction in the incidence and mortality due to invasive cervical cancer worldwide because of early detection and screening; this is possible because the Pap test detects early cervical epithelial cell abnormalities and mild-to-severe dysplasia to invasive cancer and facilitates early diagnosis.[7-9] This test not only plays a crucial role in the detection of cervical cancer and its precursor lesions but also aids in the diagnosis of other conditions as well such as infective and inflammatory conditions. Greater awareness among medical fraternity regarding this screening is required to carry out screening for cancer of the cervix among women in both rural and urban areas in India. Being simple, effective, and versatile, the Pap smear becomes an integral part of routine clinical examination and large population at risk can be screened. Pap smear screening has sensitivity of 50%–75% and specificity of 98%–99%.[10] A Pap test is performed using a brush or spatula to gently scrape the cellular material from the squamocolumnar junction of the cervix and this is smeared onto a glass slide of about 25 mm × 50 mm. The cells are fixed in methanol, stained, and visually examined under a microscope.

Materials and Methods

In our study, the results of Pap smears obtained from 1100 women were analyzed, which had been examined in the Department of Pathology, INHS Asvini, Colaba, Mumbai. The study was conducted in four medical health checkup camps between March 2013 and October 2017. The age of the women ranged from 21 to 65 years. Detailed history including medical, menstrual history, marital history obstetric history, vaginal discharge, sexual history, postcoital bleeding, intermenstrual bleeding, postmenopausal bleeding, and educational history was taken.

Inclusion criteria

Patients aged range 21–65 years were included.

Exclusion criteria

Women not willing to give consent for pap smear, known case of cancer cervix, treated cases of cancer cervix, women who were pregnant, woman who used local douche or antiseptic cream, and woman who had Pap smear testing earlier were excluded from the study.

All the women included in the study were sensitized about the screening method to detect carcinoma of the cervix in preclinical stage. The women who volunteered to participate were reinformed about the Pap smear, biopsy if required, and the required follow-up in case of an abnormal Pap test results

with the help of an information sheet that was provided to them and all queries were answered by the investigators. Thereafter, informed consent was obtained. A detailed history was taken in all the women and that included personal information, history, and clinical examination. It was ensured that no local douche, antiseptic cream, and no local internal examination were done on the day of test. The patient was placed in lithotomy position, a Cusco's bivalve speculum was introduced through the vagina, and the cervix was visualized. The longer projection of the Ayre's spatula was placed in the cervix near squamocolumnar junction and rotated through 360°. For each subject, an average of two smears was collected. The smear material gently spread on a clean glass slide. The glass slide was then immediately put into the Coplin jar containing 100% methanol (fixative) which was then stained by Pap method (RAPID-PAP kit). The cytological interpretation of smears was made according to the New Bethesda System for Reporting Cervical Cytology 2014. Based on Bethesda system, lesions are broadly divided into negative for intraepithelial neoplasia and epithelial cell abnormalities including squamous and glandular cells.

Cytology laboratory reported the examination results according to the Bethesda III Classification System (2001) as follows:
a. Adequacy of sample
   • Satisfactory
   • Unsatisfactory
b. Squamous cell abnormalities
   • Atypical squamous cells (ASCs)
   • ASC of undetermined significance (ASC-US)
   • ASC that cannot rule out high-grade lesion (ASC-H)
   • Low-grade squamous intraepithelial lesion (LSIL)
   • High-grade squamous intraepithelial lesion (HSIL)
   • Squamous cell carcinoma (SCC)
c. Glandular cell abnormalities
   • Atypical glandular cells, specify site of origin, if possible
   • Atypical glandular cells, favor neoplasia
   • Adenocarcinoma in situ
   • Adenocarcinoma
d. Other cancers (such as lymphoma, metastasis, and sarcoma)
   • All the women with abnormal results detected in Pap smear were advised for follow-up and treatment as per the standard guidelines by the WHO
   • Those with LSIL and HSIL were counseled and were advised to undergo colposcopic examination and biopsy for histopathological examination.

Data analysis

Data collected were analyzed using SPSS version 19 SPSS version for Windows (IBM Corp., Armonk, NY, USA). Categorical data were presented as percentage (%). Normally distributed data were presented as means and standard deviation.

The objectives of the study was to detect early cervical neoplasia in asymptomatic women of educated society living in urban locality.

Results

In our study, only 44 women (4%) knew that there are tests available that can detect cancer of the cervix. However, none knew about the test that can detect the precancerous lesions. Sociodemographic characteristics of the included population are shown in Table 1. Majority of the women included in the study were in the age group of 21–65 years, with mean age of 38.6 years. Of 1100 women, 1074 (97.6%) were parous and 26 women (2.3%) were nulliparous. All women were married and were in monogamous relationship. Of 1100 women, 328 women (29.8%) had studied till postgraduation, 731 women (66.4%) had studied till graduation, and 29 women (2.6%) studied till higher secondary. Of 1100 women, 1053 women (95.7%) were using some kind of family planning methods. Most of the women were of middle socioeconomic strata, 27 (2%) had gave history of smoking, and 69 (6%) gave history of occasional drinking.

Table 1: Socioeconomical and demographic characteristics of the women	
Sociodemographic characteristics	*n* (%)
Age group	
19-30	201 (18.2)
31-40	489 (44.4)
41-50	328 (29.8)
51-65	82 (7.4)
Marital status	
Married	1100
Unmarried	Nil
Contraception usage	
Never used	47 (4.2)
Barrier methods	129 (11.7)
OCP	512 (46.5)
Vasectomy	29 (2.6)
Tubal ligation	124 (11.2)
IUCD	238 (21.6)
Coitus interuptus	11 (1)
Calander method	10 (0.09)
Parity distribution	
Nulliparous	26 (2.3)
Primiparous	893 (81.1)
Multiparous	181 (16.4)
Education level	
Metrics	12 (1)
Higher secondary	29 (2.6)
Graduation	731 (66.4)
Postgraduation	328 (29.8)
Complaints	
No complaints	282 (25.6)
Asymptomatic vaginal discharge	402 (36.5)
Postcoital bleed	34 (3)
Inter menstrual bleeding	79 (7)
Postmenopausal bleed	89 (5)
Fowl smelling vaginal discharge	57 (5)
Vulvar itching	58 (5.2)
Low backache	82 (7.4)
Dyspareunia	17 (1.5)
Total (*n*=1100)	1100

OCP: Oral contraceptive pills; IUCD: Intrauterine contraceptive device

The presenting complaints of the study population and clinical finding on examination are shown in Table 1. The most common presenting complaint of the study population was asymptomatic vaginal discharge which was 36.5% followed by fowl-smelling vaginal discharge in 5% and postmenopausal bleed in 8%. However, 25.6% women had no complaints. On speculum examination of the cervix, 17.1% of women had normal looking cervix, 56% has discharge mostly asymptomatic, 11% had unhealthy looking cervix, 15% had cervical erosion, and 2% had ectropion of the cervix.

On pervaginum examination, 957 women (87%) had normal findings; 109 women (9.9%) had mass in the uterus or adnexa, while 34 women (3%) had cervix which bled on touch.

Cytological examination was done in all the 1100 women who included in the study, 581 (52.8%) smears were reported as negative for intraepithelial lesions or malignancy (NILM), 262 (23.8%) were reported as inflammatory smear, 75 (6.8%) were reported as LSIL, and 74 (6%) were reported as HSIL. In cases of 12 women (1% of study population) the smears were repeated due to unsatisfactory sampling in nature. Even after repeat sampling the cytology of 11 women showed non specific findings as depicted in Table 2.

Out of 1100 women who underwent cervical cancer screening extermination 232 women were found to have squamous cell abnormalities like ASUS,ASCH,HSIL,SCC and LSIL lesions on microscopy. Amongst them, 75 (32.3%) were found to have LSIL, 38 (16.3%) HSIL, 27(11.6%) squamous (immature) metaplasia, 88 (37.9%) cervicitis, and 4 women (1.7%) were found to have leukoplakia.

The sensitivity, specificity, positive predictive value, and negative predictive value of Pap smear in the diagnosis of low-grade lesions and high-grade lesion are shown in Table 3. However the overall sensitivity and specificity for the detection of LSIL were 75.8% and 94.6% and for the detection of HSIL were 68.9% and 98.6%.

Discussion

Despite widespread screening and acceptance of the Pap smear, morbidities, and mortalities from cervical cancer has not been eliminated. In a study, 1,867 elderly women in the United States died from cervical cancer in 1986.[11] Cervical cancer is the most widely screened cancer in both developed and developing countries. Nayir *et al*.[12] in their study showed that the population-based cervical cytology screening programs using Pap smear testing every 3–4 years have reduced cervical cancer incidence and mortality by up to 80% in developed countries in the last five decades. In developing country like India, cervical cancer is on the declining trend in a population-based study by Sreedevi *et al*.[3] In our study, most of the women had Pap smear test for the first time in their life, and none of the women knew that cervical cancer can be detected in this method called Pap

smear test done in outdoor patient department basis. All women in our study were married with mean duration of 6.8 years. The mean age of the participants was 38.6 years. Cervical cancer usually occurs between 40 and 50 years and its precursor lesion usually occurs 5–10 years earlier as shown in the study by Shanmugham *et al.*[13] It is recommended that the women should have at least one smear test before the age of 45 years;[14] however, those women who did not had their first smear after age of

45 years might miss the chance of cervix cancer prevention and this may be frustrating.

Screening for cancer cervix with Pap smear is an important part of preventive health care of women. It was reported as NILM in 581 women (52.8%). Inflammatory smear was found in 262 (23.8%) in our study. Lawley *et al.*,[15] observed a lower rate of 14.3% inflammatory smears; on the other hand, Kulkarni *et al.*,[7] observed a high rate of 73.7%. These authors observed that persistent inflammation is associated with cervical intraepithelial neoplasia (CIN) in 14.3%–16.7% of women. The women who had abnormal pap smear (CIN) should be evaluated further.[7,14-16] Comparison of epithelial cell abnormality in our study with other studies in the literature is shown in Table 4. According to many studies conducted in India, the overall prevalence of cytological abnormality is high. The difference in the prevalence of inflammatory changes and cervical dysplasia could have been the result of social and cultural differences, age, sexual activity level, incidence of related infections, and presence or absence of cervical screening programs in different locality and societies.

In our study, epithelial cell abnormality was observed in more younger age groups of women as compared to many studies.[17-26] This fact highlights the need for cytological screening in these groups as well as in older age group. There is a need to create awareness about cervical cancer among women and motivate them to attend such screening time to time as medical health checkup. Pap smear screening program can be improved by following ways.

1. Women need to be educated and made aware about cervix cancer and importance of early detection by regular screening programs as prevention is better than cure
2. Health-care provider should obtain an adequate sample and ensure regular follow-up with adequate treatment of the patient
3. Health-care systems should provide better infrastructure and financial support to conduct screening programs regularly in their area of responsibility, preferably with the help of local authority/government.

Table 2: Clinical (per scapulum) and cytological examination findings

Clinical finding	n (%)
Healthy looking cervix	189 (17.1)
Discharge	616 (56)
Chronic cervicitis	121 (11)
Cervical erosion	117 (15.5)
Ectropion of cervix	23 (2)
Bled on touch	34 (3)
Pap smear	
Unsatisfactory	12 (1)
NILM	581 (52.8)
Inflammatory	262 (23.8)
ASC-US	45 (4)*
ASC-H	12 (1)*
HSIL	74 (6)*
SCC	26 (2.3)*
LSIL	75 (6.8)*
Other nonspecific findings	11 (1)
Others	02 (0.01)

NILM: Negative for intraepithelial lesions or malignancy; ASC-US: Atypical squamous cells of undetermined significance; ASC: Atypical squamous cells; ASC-H: ASCs that cannot rule out high-grade lesion; HSIL: High grade squamous intraepithelial lesion; SCC: Squamous cell carcinoma; LSIL: Low-grade squamous intraepithelial lesion; *Indicate Biopsy was taken in these cases

Table 3: Pap smear sensitivity, specificity and positive and negative predictive values in our study

	Low-grade lesion including HPV	High-grade lesion
Sensitivity	75.8	68.9
Specificity	94.6	98.6
Positive predictive value	91.5	81.3
Negative predictive value	91.2	94.6

HPV: Humanpapillomavirus

Table 4: Comparison of epithelial cell abnormalities with other studies and present study

	Total number of subjects	LSIL (%)	HSIL (%)	ASCUS (%)	SCC (%)
George and Rao[18]	1000	2.0	0.9	0.3	0.3
Sarma *et al.*[19]	242	3.53	3.53	1.32	3.53
Gupta *et al.*[20]	4703	1.36	0.91	0.52	0.28
Nayani and Hendre[21]	104	0.5	0.1	1.7	-
Sengul *et al.*[22]	1032	0.39	1 (0.1)	1.18	0.02
Kothari *et al.*[23]	36740	0.83	0.31	0.11	0.05
Nair *et al.*[24]	2028	1.58	0.49	0.15	0.2
Bal *et al.*[25]	300	2.7	0.7	0.3	1.3
Padmini *et al.*[26]	100	5.0	3.0	8.0	1
Nayir *et al.*[12]	1032	5 (0.5)	1 (0.1)	18 (1.7)	-
Present study	1100	75 (6.8)	74 (6)	45 (4)	26 (2.3)

HSIL: High-grade squamous intraepithelial lesion; SCC: Squamous cell carcinoma; LSIL: Low-grade squamous intraepithelial lesion; ASC-US: Atypical squamous cells of undetermined significance

Strengths of the study

The study was conducted in direct supervision of medical officer in a hospital setup area, dedicated to set up the medical camp along with other ancillary staff.

Limitations of the study

In this study, we included 1100 women who voluntary came to hospital for checkup; they are educated and slightly aware of the pap smear test as living in urban area. The study did not include uneducated women of rural area where awareness and health hygiene are all-time low as compared to urban area and educated population which may have different effect on Pap smear finding.

Future directions of the study

The more and regular health checkup camps are required in the rural and urban area and to be organized by the local government and medical fraternity to benefit women who hesitate to come hospital and to educate them regarding Pap smear test and its effectiveness in cervical cancer detection.

Conclusions

Cervix carcinoma is a preventable disease, but there is no perfect screening test that has 100% sensitivity and specificity. Pap smear testing is a very useful, simple, economical, and safe tool to detect preinvasive cervical epithelial lesion. Therefore, in the present study, an attempt has been made to analyze Pap smear testing.

It is evident and proven that every woman above the age of 21 or after the onset of sexual activity, must be subjected to cervical screening and this must be continued even in the postmenopausal period. Pap test has been regarded as the gold standard for cervical screening programs. Pap smear test combined with human papillomavirus-DNA testing can help increase the sensitivity of detection of cervical pathology.

In developing country like India, the regular health checkup camps should be organized by local government and medical fraternity to benefit women who hesitate to come hospital because of their busy household commitment and to educate them regarding Pap smear test and its effectiveness in cervical cancer detection. As many Indians do not have medical insurance and if cervical cancer is detected the medical expend is exorbitant, it is now high time to educate each woman over 40 years for regular checkup and avoid financial burden.

All medical professional such as doctors, nurses, anganwadi workers, midwives, and other health-care workers should be trained to reach out to these women so as to improve their knowledge and awareness regarding Pap smear examination. Each woman who comes for screening/hospital for any reason should be educated regarding the benefits and implications of Pap smear examination at the reception or waiting area of the hospital, which will not only improve knowledge among these women but will also improve compliance regarding follow-up.

For information, communication, and education, various methods such as posters and short films can be shown in outpatient departments, waiting area, and canteen of the major hospitals. The mass media may also be involved to further promote this cause.

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Conflicts of interest

There are no conflicts of interest.

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