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"UTILITY OF PORTABLE COLPOSCOPE IN WOMEN WITH UNHEALTHY CERVIX"

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Abstract

Background: Cervical cancer is the fourth most common cancer in women worldwide and the most common cancer affecting females in many developing countries. Conventional Pap smear is the most widely used method with sensitivity of 51% and specificity of 98%. Other screening methods are liquid based cytology, pap net, auto pap, auto screen, visual inspection with acetic acid and Lugols Iodine, HPV DNA testing Colposcopy, Cervicography, Speculoscopy, and polar probes. Portable colposcope is an instrument which overcomes the disadvantages of standard colposcope. The advantages of portable colposcope are low cost, portability and can be used in rural setting for mass screening because of its portability . The **aim of the present study** is to assess the efficacy of portable colposcope in assessing women with unhealthy cervix .**Methodology:** Prospective interventional study conducted for 1 year .250 patients who presented with unhealthy cervix and consented for the study are randomly selected. **Results:** Sensitivity and specificity of pap smear in the present study were 72% and 95% respectively. Sensitivity and specificity of colposcopy were 84.4% and 92.48% respectively. Diagnostic accuracy of pap smear was 88.4%. Diagnostic accuracy of colposcopy was 91.2% in the present study. **Conclusion:** The diagnostic accuracy of pap smear and colposcopy were good in the present study. The present study finds that colposcopy is safe and effective and reasonably accepted method of investigation for evaluating unhealthy cervices.

Keywords: Cervical Cancer, Colposcopy, Pap Smear, Sensitivity, Specificity

INTRODUCTION

Cervical cancer is the fourth most common cancer among females worldwide. GLOBOCAN 2020 estimated that, worldwide, there were approximately 6,04 ,000 new cases of cervical cancer, with 3,42 ,000 deaths annually.[1] The majority of new cases and deaths (approximately 85% and 90%, respectively) occur in low and middle-income countries (LMICs), where it is the third most common cancer among women.[2] India's cervical cancer age-standardized incidence rate (30.7 per 100,000) and age-standardized mortality rate (17.4 per 100,000) are the highest in South Central Asia.[3,4]

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Cervical cancer is one of the most preventable human cancers; its prevention is based on , screening ,early diagnosis and treatment of precancerous lesions. Knowledge of HPV epidemiology and its role in causation of cancer has resulted in the development of two major strategies for prevention and early detection, namely: HPV vaccination; and screening for precancerous lesions

The World Health Organization has called for a global initiative for elimination (≤4 per 100,000 women worldwide) of cervical cancer as a public health problem by implementing the following 90%–70%–90% triple pillar intervention strategy before the year 2030 : 1. 90% of girls fully vaccinated with two doses of HPV vaccine by the age of 15 years; 2. 70% of women screened using a high-performance screening test at the age of 35 and 45 years; and 3. 90% of women detected with cervical lesions to receive treatment and care.

Screening for premalignant lesions (secondary prevention) is an important strategy in the global elimination of cervical cancer. In LMIC, only 44% of women have been ever screened for cervical cancer ,whereas in high income countries it is as high as >60%. [5] According to various reports, in developed countries 68%-84% of women are being screening by Pap smear, but in India this proportion is 2.6%-5% only.

In developed countries since 1940s, implementation of carcinoma cervix screening programme has resulted in 4-10 fold reduction in carcinoma cervix rates even with a single appropriate timed smear around 40.Early screening for carcinoma cervix reduces the incidence and mortality from it.

Conventional pap smear is the most widely used method with sensitivity of 51% and specificity of 98%.But false negative pap smear in the presence of invasive cancer is 50%, so negative pap smear should never be relied on in symptomatic women . Other screening methods are liquid based cytology, papnet, autopap, autoscreen, visual inspection with acetic acid and lugols iodine, HPV DNA testing colposcopy, cervicography, speculoscopy, polar probes.

Portable colposcope is an instrument which overcomes the disadvantages of standard colposcope. The advantages of portable colposcope are low cost, portability, can be used in rural setting for mass screening because of its portability .The present study determines the efficacy of portable colposcope in detecting abnormal cervical lesions in our rural setting.

AIM: To assess the efficacy of portable colposcope in assessing the women with unhealthy cervix .

OBJECTIVES:

To determine the efficacy of portable colposcope in assessing women with unhealthy cervix. To compare portable colposcopy with histopathology which is taken as gold standard. To study the value of portable colposcopy as an adjuvant to conventional cytology in evaluation of women with unhealthy cervix.

MATERIAL AND METHODS: Prospective interventional study done for 1 year in the rural areas in and around Tirupathi. Both symptomatic and asymptomatic women with unhealthy cervices are subjected to cytology, colposcopic visualization and directed

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biopsies. 250 patients who presented with unhealthy cervix and consented for the study are randomly selected.

Inclusion criteria: Women in the age group of 20-60 years ,were selected who include women in reproductive, perimenopausal and postmenopausal age groups who present with abnormal cervical lesions without symptoms, abnormal cervical lesions with symptomatology like menstrual irregularities, Post menopausal bleeding, Post coital bleeding, white discharge per vaginum, Lower abdominal pain. **Exclusion criteria:** Antenatal and postnatal women, Menstruating women, those who already underwent screening tests, Already diagnosed case of preinvasive, invasive cervical cancer and growth on cervix, Already on treatment for carcinoma cervix, Post radiotherapy follow up cases.

Unhealthy cervices are identified by cervical hypertrophy, congestion, erosions, ulcers, irregular cervix etc. After obtaining detailed history regarding age, socioeconomic status, age at marriage, marital life, menstrual history, sexual history, presenting complaints and noting them in the proforma, patient is explained about the importance of the screening, necessity of their participation and about the procedure, informed written consent is taken for the procedure.

After obtaining approval of the ethical committee, all the subjects were informed about the study and written consent taken. All the patients with abnormal cervical lesions and symptomatology are subjected to portable colposcopic guided examination under Magnification. Pap smear is taken and fixed with 95% ethyl alcohol and colposcopy is done using normal saline, 3% acetic acid. Colposcopic guided biopsy is done using cervical punch biopsy forceps. The pap smear and biopsy specimen are sent for histopathological examination. The results of the present study are compared with studies done with standard colposcope.

Statistics: The data is tabulated as shown below and the results are analysed using various statistical methods like mean, median, mode, chi-square tests whichever is appropriate.

RESULTS

The present study is an interventional study conducted among 250 symptomatic and asymptomatic women with unhealthy cervix in women from areas in and around Tirupathi.

Majority of the women in the present study are in the age group between 31-50 (67.6%) years. Among them, maximum of 100 patients (40%) are in the age group of 31-40 years. This may be due to high risk of infection in reproductive age group. Among 250 women, Majority of the women 119 (47.6%) had primary school education, 79 women (31.6%) were illiterate, 44 (17.6%) women had secondary school education, 6 (2.4%) women were educated up to intermediate, 2 (0.8%) were graduates and none of them were educated up to professional degree.

Out of 250 women, 131 (52.4%) were married in the age between 16-20 years of age, 77 women (30.8%) were married at less than 15 years of age, 37(14.8%) women got married in the age between 21-25 years and only 5 (2%) women got married after 25 years of age.

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Out of 250 women, maximum women 125 (50%) had duration of married life of more than 20 years. Forty seven (18.8%) women had married life of 16-20 years. Only 2% had marital life of duration less than or equal to 5 years. Among 250 women, 142 women (56.8%) had 1 or 2 children and 97 women (38.8%) had parity of 3-4 and only 11 (4.4%) women had parity more than 4. Lower socioeconomic status constituted maximum number 191(76.4%) and 59 women (23.6%) were middle class. None of them belonged to upper class. 92.8% were Hindus, 6.4% were Muslims and 0.8% was Christians. This disparity may be due to location of hospital. 81.2% of women were from rural areas and only 18.8% are urban in the present study.

The most common presenting symptom was white discharge in 104 (41.6%) women followed by white discharge and lower abdominal pain in 43(17.2%) women. Overall women with white discharge constitute 58.8% in the present study. Thirty (12%) women had postcoital bleeding and 31(12.4%) had postmenopausal bleeding. Menstrual irregularities were seen in only 6(2.4%) women in the present study. Cervical erosion was the most common clinical finding in 117(46.85%) women followed by hypertrophy in 59(23.6%) women. Both hypertrophy and erosion were found in 27(10.8%) patients, 19(7.6%) women had Nabothian follicles, 8(3.2%) had induration and 20(8%) had suspicious looking cervix.

Out of 250 women, pap smear was normal in 3(1.2%) cases, inflammatory smear in 183(73.2%) women, CIN-1 IN 24 women(9.6%), CIN-2 in 15(6%) and CIN-3 in 14(5.6%). Pap smear showed invasive features in 11(4.4%) women. A majority of patients showed inflammatory smear because of infection. Pap smear is positive in 25.6% of women and negative in 74.4% women in the present study.

Colposcopy showed normal in 57(22.8%) women, erosion in 142 (56.8%) women, ectopy in 3(1.2%), Nabothian follicle in 18(7.2%) women and colposcopy showed atypical transformational zone in 30 women (10%). Most common colposcopic finding was erosion in the present study. In the present study, colposcopy with acetic acid is normal without uptake in 18% of women, faint acetowhite areas were seen in 69.2% women and dense dull acetowhite areas were seen in 12.8% of women. 59.6% women were has uptake of lugols iodine and 40.4% had no uptake. Colposcopic grading of CIN showed normal impression in 45(18%) women, Grade1 inflammation in 127(50.8%) women, Grade 1 CIN1 in 27 (10.8%) women, Grade 2 in 17(6.8%), Grade 3 in 17(6.8%) and colposcopic impression was found to be invasive cancer in 17 women (6.8%). Most common colposcopic impression was found to be Grade 1 inflammation in the present study.

Out of 250 biopsies, biopsy was normal in 2(0.8%) cases, chronic cervicitis is the most common histological finding seen in 170(68%), CIN-1 in 23(9.2%) cases, CIN-1 in 12(4.8%) cases and CIN-3 in 18(7.2%) of cases. Biopsy was confirmed to be invasive cancer in 25(10%) women out of which 24 were squamous cell carcinoma and 1 was adenocarcinoma.

In the age group between 21- 30, only 1(3.3%) woman showed ATZ, (4.6%) had dysplasia on cytology and 8 women (15.3%) had dysplasia on biopsy. Majority of

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women with dysplasia on pap smear and biopsy were found to be between 31-50 years of age which is about 76.9%. Maximum of 17 (68%) cases of carcinoma on biopsy were found to be in age group of 41-60 years.

Maximum number of women had ATZ (63%) and dysplasia on cytology (51.5%) and malignancy on biopsy (60%) when parity was 3-4. Biopsy showed dysplasia maximum in the group with parity of 1-2(48%).

Maximum number of women showing ATZ (93.2%) on colposcopy, dysplasia on cytology(90.5%), dysplasia on biopsy (86.4%) and invasive cancer(100%) on biopsy had their age at marriage between less than 20 years of age. In women married at less than 15 years of age, 14(46.6%) of them showed atypical transformational zone, 27 (42.1%) showed dysplasia on cytology, 21 (40.3%) showed dysplasia on biopsy and 12(48%) were confirmed to have carcinoma on biopsy. This indicates that early marriage and early coitarche increases the risk of cancer cervix.

Lower class had majority of cases of ATZ (86.6%) on colposcopy, dysplasia on cytology (87.5%), biopsy (45%) and maximum cases of invasive cancer (88%) on biopsy. This may be due to poor nutrition, poor hygiene, early marriages and risky behavior among lower socioeconomic group. In women who presented with white discharge, 2 had ATZ on colposcopy, 18 had dysplasia on cytology, 15 had dysplasia on biopsy and 3 were confirmed to be carcinoma on biopsy. In women who presented with lower abdominal pain, 1 had ATZ, 2 had dysplastic cytology, 3 had dysplasia on biopsy, no patients were proven to have carcinoma on biopsy. In women with PCB, 8 patients showed ATZ , 15 showed dysplasia on cytology, 11 were dysplastic on biopsy and 8 patients had carcinoma on biopsy .Women with PMB had majority of ATZ(31), 20 had dysplastic cytology and biopsy showed invasive cancer maximum in 13 patients.

Among 250 women who presented with unhealthy cervix, pap smear was normal in 3 cases of which 2 had cervicitis on biopsy and 1 case had CIN 3 on biopsy. Histopathology was normal in 2 cases, showed cervicitis in 161 women who had inflammatory pap smear. 15 cases of CIN-1, 3 cases of CIN-2 and 2 cases of CIN-3 on biopsy were underreported as inflammatory on pap smear. 24 patients had CIN-1 on pap smear out of which, 8 had chronic cervicitis, 4 had CIN-1 had CIN-2 and 4 had CIN -3 on biopsy and none had invasive cancer. 2 cases had CIN-1, 10 cases had CIN-2, 3 had invasive cancer on biopsy, all of which showed CIN-2 on cytology. Fourteen cases showed CIN-3 on cytology of which only 1 had CIN-3 biopsy. Remaining 13 cases had invasive cancer which was under-reported as CIN-3 on cytology. Out of 11 cases of carcinoma on cytology, 1 had CIN-1,1 had CIN-2 and 9 cases proved to have invasive cancer on biopsy.

Out of 250 cases, pap smear was positive in 64 women of which only 56 (72.7%) were confirmed to have invasive cancer on biopsy, 8 (4.6%) had no evidence of cancer. Of 186 women with negative pap smear, biopsy was negative in 165(95.35%) women. P value between pap smear and biopsy was found to be 0.01 in the present study which is statistically significant.

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Pap smear had sensitivity of 72%, specificity 95%, positive predictive value of 87.5% and negative predictive value of 88.7% in the present study. Colposcopy was normal in 45 women of which biopsy was normal in 2 cases and 43 had cervicitis. Out of 127 women with inflammatory impression on colposcopy, 115 had cervicitis, 8 had CIN-1, 2 had CIN-2, 1 had CIN-3 and 1 patient had invasive cancer on biopsy. 27 patients showed grade 1 impression on colposcopy of which, 10 had cervicitis, 14 had CIN-1, 3 had CIN-2 on biopsy. Seventeen cases had grade 2 colposcopic impression, of which 3 had cervicitis, 7 had CIN-2 and 7 had CIN-3.

Out of 250 patients, colposcopy was positive in 78 women of which 65(84.4%) patients were confirmed to be positive on biopsy. Out of 172 patients with negative colposcopy 160(92.4%) patients were biopsy negative. 12(15.5%) cases were biopsy positive which were underreported as negative on colposcopy. In the present study, p value between colposcopy and histopathology was found to be 0.001 which is statistically significant.

Colposcopy had sensitivity of 84.4%, specificity of 92.4%, positive predictive value of 83.3% and negative predictive value of 93.02 % in the present study. Eighteen cases of grade 1, 5 cases of grade 2 and 1 case of grade 3 colposcopy had inflammatory pap smear. Out of 24 cases with CIN-1 on pap smear, 6 cases showed grade 1, 6 showed grade 2 and 3 cases showed grade 3 on colposcopy. Among 14 cases with CIN-3 on cytology, 5 had grade 3 and 7 showed invasive impression on colposcopy.

Out of 64 patients with positive pap smear, only 53(67.9%) were detected to be positive on cytology. Out of 186 cases with negative Pap smear, 25(2.05%) had positive impression on colposcopy. In the present study pap smear has 67.9% sensitivity, 93.6% specificity, 83% PPV and 92.47% NPV when compared to colposcopy and diagnostic accuracy of 85.6% in the present study.

DISCUSSION

About 80% of cervical cancers occur in developing countries. This disproportionate burden of cervical cancer in such countries is mainly due to the lack of well organised screening programs. Organised and frequently repeated cytological screening has resulted in a substantial reduction of cervical cancer burden in developed countries. Several cervical cancer screening strategies have been proposed which are more cost effective than cytological screening.[6]

Among various modalities for control of cancer cervix, prophylactic vaccine against infection with HPV 6,11,16,18 (Gardasil/HPV4) and HPV 16 and18 (Cervarix/HPV 2) have become available since last decade. Gardasil is virtually 100% effective in preventing CIN2 or 3 associated with HPV 16 & 18. HPV 2 is highly effective in preventing more than 90% of HPV 16& 18 infections associated with CIN 2 or 3.[7]

The ultimate goal of screening for carcinoma cervix is to diagnose preinvasive and preclinical carcinoma cervix. But in low resource countries where organized cytological based cervical cancer screening programs cannot be implemented due to financial, technical, and logistic barriers, low cost technologies like Pap smear based approaches have been successfully tested and

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proposed to address the need to effectively improve and extend screening services in the country.[8]

Apart from cost, poor patient compliance for further diagnostic or treatment visits and inadequate patient tracking system creates further barriers in the successful implementation of screening programs. Hence a single visit screen and treat strategy that uses Pap smear, Colposcopy and colposcopic guided biopsy that eliminates the need for repeated visits due to delay in diagnosis, will be highly attractive in terms of cost effectiveness and compliance to treatment, which is crucial to bring down the incidence and mortality due to cervical cancer.

The cytology, Colposcopy and Histopathology have their own advantages in cervical cancer screening. In the present study, both asymptomatic and symptomatic women with clinically unhealthy cervices were subjected to Cytology, Colposcopy and Colposcopic guided biopsy among 250 women from areas in and around Tirupathi. The results of cytology and colposcopy were compared with histopathology which is a gold standard diagnosis.

Majority of the patients (40%) in the present study are in 31 – 40 years age group which is comparable to studies by Isha Tapasvi (40%), Savitha T.S (86%), C.P.Padmini (52%) where majority of patients are in 31-40 years of age. Maximum number of women in that age was seen in study conducted by Savitha T.S where it is 86%.

The mean age in the study by Dasari et al[9] was 37 years which was higher than that of higher than that of Seckin and colleagues where the mean age was 30.2 years. The mean age in the studies conducted by Savitha.T[10] (36.5%), Ashmitha.D11 (39.5%) and Geethalakshmi.U12 (36.7%) were higher. A.Herbert et al[13] found that cancers were most frequent in women aged 30-49 years. According to Daves DL, the mean age for squamous atypia is 3rd decade. In a study by Barabara A, endocervical atypia affected slightly elderly age group with the mean age of approximately 44 years. Mean age in studies by Arya SB[14], Saha. R[15] and Mostafa et al were 36.3 years, 40.3 years and 41.6 years respectively. The mean age in the present study is comparable to studies by Ashmitha et al and Saha .R.

In the present study, 31.6% of patients were illiterate and 68.4% were literate and had some form of education. In a study by Ashmitha .D[11], 94.2% of the women were literate which was higher when compared to present study. Bangal VB[16] found low level of literacy in his study. Many authors observed an inverse relationship between distribution of cervical cancer and the educational status of women.

In the present study, 76.4% of women were from lower socioeconomic status and 23.6% were from middle class. None of them were from upper class in the present study. In a study by Ashmitha.D[11], 48.1% belonged to low socioeconomic status which was lower than the present study. Saha .R[15] found 100% of women from middle class. In study by Bangal, Patil NA, and other study by Vijay. A et al[16], majority of women were from lower socio economic status which is comparable to present study. Many Indian studies have reported that women from lower socioeconomic status had higher incidence of cervical cancer.

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81.2% women were from rural areas in the present study. Illiteracy, low socioeconomic status and residing in rural area reflect the nature of patients attending the OPD. All of them are risk factors for carcinoma cervix. 92.8% were Hindus, 6.4% Muslims and 0.8% were Christians in the present study. This may be due to location of the hospital.

Majority of women (52.4%) in the present study were married between 16-20 years of age and 30.8% were married at less than 15 years of age. Mean age at marriage in study by Savitha. TS[10] was 19.9 years**.** Saha.R[15] found mean age of marriage to be 21 years. In study by Ashmitha.D,[11] it was 16.8 years. In studies by Arya SB, Goel JK[14] and Geethalakshmi.U,[12] mean age of marriage was 21 years and 18.1 years respectively. The mean age in the present study is comparable to studies by Savitha et al, Ashmitha et al. Mean age of marriage was low because of high rate of illiteracy and low socio economic status.

Mean parity in study by Papa Dasari[9] was 2.6 which were higher when compared to study by Seckil and colleagues which was 1.7. Saha.R[15] found mean parity to be 2.3 and in study by Ashmitha.D[11] it was 2.5. Maximum mean age of parity was found to be 5 in the study by Shahida Akhtar et al.[17] Mean parity of women in the present study was 2.4 which is comparable to Saha .R and Ashmitha et al studies.

In the study by Papa Dasari[9] most common presenting symptom was white discharge followed by pelvic pain and in 45% of the patients the clinical diagnosis was pelvic inflammatory disease. Abnormal uterine bleeding and erosion of the cervix also contributed to inflammatory smear in approximately 20% of the patients.

In the study by Savitha.T.S[10] white discharge (86%) was the most common symptom followed by post coital bleeding(5%), post menopausal bleeding (5%), intermenstrual bleeding (5%).White discharge was the most common presenting symptom in studies by Ashmitha.D[11] (26.9%), Geethalakshmi. U[12] (80%) and Arya SB, Goel JK (62.8%). In the present study white discharge was the most common complaint seen in 58.8% of patients which is comparable with Arab Goel study.

Bangal VB, Patil NA et al[16] found white discharge to be the most common symptom in 69% of women followed by pain abdomen in 21% of cases. Cervical erosion (46.8%) was the most common clinical finding in the present study followed by cervical hypertrophy in 23.6% of the patients. Both hypertrophy and erosion were seen in 10.8%, cervical induration in 3.2% and irregular cervix is seen in 8% of the patients.

In study by Savitha.T.S[10], most common finding was cervical erosion seen in 74% women of which 44% had only erosion and 30% had hypertrophied cervix with erosion. 21% had hypertrophied which bleeds on touch. In Ashmitha.D et al[11] study 13.5% had normal finding on per speculum examination, 84.6% had cervical polyp /ectopy, 1.9% had suspicious looking cervix. In study by Padmini.C et al[18], 50 % had erosion, 46% had hypertrophied cervix and 4% had suspicious looking cervix. Vijay.A, Nath JD[19] found hypertrophied cervix or erosion (62%) to be the most common finding.

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In the present study, Pap smear was negative in 74.4%of women and positive in 25.6% of women. In study by Geethalakshmi[12], 80% of women had negative pap smear and 20% were positive for cytology of which 33.3% had LSIL, 33.3% were positive for HSIL , 33.3% were positive for invasive cancer on cytology which is comparable to present study. In study by Savitha.TS, out of 100 women 4% had normal pap smear, 78% had inflammatory smear, 13% had LSIL, 5% had HSIL on cytology. There was no case of malignancy in the study. Padmini.C.P, Indira N et al studied 100 women out of which 83% are negative for intra epithelial lesion or malignancy, 8% had ASCUS, 5% had LSIL, 3% had HSIL and 1% had carcinoma on cytology. The disparity in the cytological findings in different studies may be due to inadequate sampling, inadequate fixation, technical variability in the quality of smears and interobserver variability.

In the present study, colposcopy was normal among 18% women, had inflammatory impression in 50.8% which are comparable study by Parvin S et al where 19.2% had normal and 42.3% had inflammatory impression. Women with inflammatory impression are maximum (60%) in study by **Savitha et al.** In the present study low grade lesions constitute 10% which is comparable to study by Savitha et al where it is 15%, and **Parvin et al** found 25% low grade lesions on colposcopy. High grade lesions in the present study constitute 13.6% which correlates with study by Savitha et al. Invasive cancer on colposcopy was more in the present study when compared to study by Savitha et al. This may be due to more sample size in the present study.

In the present study, 68.4% women showed chronic cervicitis on biopsy, 8.8% showed LSIL, 12% showed HSIL, 10% showed Invasive cancer on histopathology. Chronic cervicitis cases are more in study by Savitha et al and Geethalakshmi et al[12] when compared to present study. Percentage of women with LSIL were similar among all the above studies. In the present study 12% of women had HSIL on biopsy which is more when compared to the other studies. 10% of women showed invasive cancer in the present study which is comparable to study by Geethalakshmi et al. Majority of women showed chronic cervicitis on biopsy which may be due to chronic infection.

In the present study, the sensitivity of pap smears 72%, specificity is 95%, positive predictive value is 87.5% and negative predictive value of 88.7%. Low sensitivity of pap smear may be due to infections, inadequate sampling, technical error in fixation of smear, interobserver variations. P value between pap smear and biopsy in the present study was 0.01 which is statisctically significant. Sensitivity of pap smear is more in the present study when compared to the other studies which is 72%. Specificity of pap smear is 90% in study by Savitha et al which is slightly lower than the present study.

In the present study colposcopy had a sensitivity of 84.4% and specificity of 92.4%, PPV of 83.3% and NPV of 93.2%. The specificity of colposcope is high in the present study. P value between colposcopy and biopsy in the present study was 0.001 which was statistically significant. Sensitivity of colposocopy in the present study is 84.4% which is comparable to study by Savitha et al which is 85%.

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Specificity in the present study is 92.48% which is more when compared to the other studies. Diagnostic value of colposcopy is estimated by calculating sensitivity, specificity, positive predictive value and negative predictive value. Taking histopathology as gold standard, the above parameters were calculated.

Out of 64 patients with positive pap smear, only 53 were detected to be positive on cytology. Out of 186 cases with negative pap smear, 25 had positive impression on colposcopy.

In the present study pap smear has 67.9% sensitivity, 93.6% specificity, 83% PPV and 92.47% NPV when compared to colposcopy. In the present study, the sensitivity of pap smear when compared to colposcopy is 67.94% and specificity is 93.6%. In the study by Ashmitha et al, sensitivity of pap smear is less (22.5%) and Specificity is 100% when compared to colposcopy.

In the present study, sensitivity of colposcopy is 84.4% which is more than sensitivity of Pap smear. When compared to pap smear, colposcopy had low specificity of 92.4%. Hence sensitivity is more for colposcopy and specificity is high for pap smear. Sensitivity of pap smear in the present study is not correlating with the other studies. Specificity of pap smear in the present study is comparable to studies by Arya SB et al and C.P.Padmini et al study. Sensitivity of colposcopy in the present study is 84.4% which is comparable to study by Arya SB et al study where it is 86.5%. Specificity of colposcopy is high in the present study.

In the present study, diagnostic accuracy of pap smear and colposcopy are 88.4% and 91.2% respectively which are higher than the studies by Arya SB et al and Ashmitha et al. In a study by SA Pimple[20], the sensitivity of colposocopy at low threshold was high at 74.5% but specificity was lower at 57.5% but at higher threshold the sensitivity of colposcopy for detection of CIN 2 plus histological lesions drops down to 58% with a consequent rise in specificity at 92.9%. In a metaanalysis by Mitchell and colleagues, the sensitivity of diagnostic colposcopy was high (87-99%) whereas specificity is low 23.87%. Massad et al also reported that the sensitivity of colposcopy with a threshold of any lesion detected was 89% but fell to 56% when threshold was raised to high grade result. Colposcopy performs well in diagnostic setting and poorly in screening. Colposcopy was slow to be used in cancer detection in most of the developed world. Gage et al found that substantial improvement in coposcopic guided biopsy sensitivity occurred when clinician took multiple biopsies from colposcopically abnormal areas.

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