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PREVALENCE OF ABNORMAL PAP SMEAR AMONG PREGNANT WOMEN, POSTPARTUM FOLLOW UP AND ITS ASSOCIATION WITH SOCIODEMOGRAPHIC FACTORS AT TERTIARY CARE CENTRE: A PROSPECTIVE OBSERVATIONAL STUDY

Obstetrics & Gynaecology

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ABSTRACT

Background: Cervical cancer is the most common genital malignancy diagnosed during pregnancy. Pregnancy and postpartum follow up provides an opportunity for a woman of a reproductive age to implement cervical screening in patients of a young age. **Aim:** 1) To estimate the prevalence of abnormal cervical cytology in pregnancy and postpartum. 2) To study the effect of sociodemographic factors on pap smear in pregnancy. **Material & Methods:** The study was conducted in OPD of obstetrics & gynaecology in GSVM medical college, Kanpur. Antenatal women between 21-45 years age from 10 to 34 weeks period of gestation were included in study. Patients with abnormal cervical cytology in pregnancy were followed in postpartum. **Results:** 6.3%(n=32) of antenatal patients had abnormal cervical cytology where ASCUS is 2.0%(n=10), LSIL is 3.3%(n=17), HSIL is 1.0%(n= 5) and SCC is 0.0%(n=0). 93.7% (n= 478) of pap smear findings reported to be as negative for intraepithelial malignancy (NILM). 43.5% subjects had non precancerous lesions such as vaginitis(12.5%, n=64), cervicitis(3.9%, n=20), bacterial vaginosis(1.4%, n= 7), reactive cellular changes (1.6%, n= 8), pregnancy associated changes(23.9%, n=122) and vaginitis with leptothrix (0.2%, n=1). Around 47%(n=15) regression, 34%(n=11) persistence and 6.2%(n=2) progression of preinvasive cervical lesion was seen in postpartum period. **Conclusion:** Abnormal cervical cytology was mainly seen in pregnant women between 21-30 years and during second trimester in women with lower education and high parity. Pap smear is a reliable screening test and should be included in antenatal routine investigations due to high mortality rate in India. Most of the lesions regress in postpartum period.

KEYWORDS

cervical cancer, pap smear, antenatal, postpartum, screening, preinvasive, NILM

INTRODUCTION

Cervical cancer is the most common genital malignancy diagnosed during pregnancy. It is the 4th most commonly occurring cancer in women and the 7th most common cancer overall. [1] The incidence of cervical cancer among pregnant women varies from 0.8 to 1.5 cases per 10,000 births.[2-4] Approximately 5% of pregnant female will have abnormal cervical cytology.[5]

Cervical cancer is a preventable disease due to the long preinvasive stage.[6] Early detection and appropriate treatment are possible if robust screening is implemented. Early cervical epithelial changes can be identified by a Pap smear test, which is the primary screening test for detection of precancerous cervical intraepithelial neoplasia and the early stage of invasive cervical cancer.[7,8]

The majority of pregnancies occur between the ages of 18-35 years of age and when there is no organised screening programme in developing countries like India, antenatal visits can be utilised to screen women for cervical cancer. [9] The highest rate of cervical abnormality occurs in women of reproductive age and the goal of screening is to identify a pre- invasive lesion to prevent the abnormality from progressing to an invasive state. The cervical cytology is valid during pregnancy, and usually pregnancy induce an opening of the junction zone that helps to have a good evaluation of the cervix.[10]

There are several risk factors for carcinoma cervix such as young age at first intercourse (less than age 16), multiple sexual partners, cigarette smoking, high parity, low socioeconomic status, race.[11]

This study to estimate the prevalence of abnormal Pap smear results among pregnant women attending tertiary care centres in India. It assesses the adequacy of their postpartum follow-up and analyzes the association between abnormal cytology and sociodemographic factors. The findings could serve as a foundation for implementing context-specific strategies, including counselling, education, and streamlined referral pathways, to improve screening coverage and follow-up compliance. Despite national guidelines recommending cervical cancer screening for women aged 21-65 years, the overall uptake remains low. Tertiary care centres play a critical role in bridging this gap by offering comprehensive antenatal and postpartum care with integrated screening services. The findings could serve as a foundation for implementing context-specific strategies, such as counselling, education, and streamlined referral pathways, to fully utilize the window of opportunity presented during pregnancy for women's long-term reproductive health.

The aim of our study is to estimate the prevalence of abnormal pap smear in pregnancy, postpartum and also to determine the effect of sociodemographic factors on the cervical cytology.

METHODS

It was a prospective observational study conducted in department of obs & gynae of G.S.V.M medical college, Kanpur, U.P. after obtaining institutional ethical approval. The study was done in time duration between July 2022 to July 2023 after taking informed and written consent from the participants. 518 antenatal women of age between 21-45 years attending the ANC OPD for regular check-up between 10 weeks to 34 weeks period of gestation were included in study while patients with vaginal leaking, bleeding per vaginum, threatened abortion, active labour, obvious growth on cervix, history of sexual intercourse and vaginal medications in past 48hrs or any other obstetrical emergencies were excluded from study.

The socio-demographic details have been taken using a pre-structured questionnaire which included the information regarding Patient's age, socioeconomic status, gravida, parity, age at marriage, addiction history for smoking, alcohol or tobacco, multiple partners, any significant family history of malignancy and clinical examination findings.

Procedure:

Antenatal examination and data collection was done. Patient's Pap smear was taken.

All smears were analysed according to Bethesda classification 2014 in

department of pathology and was stratified as negative for intraepithelial malignancy (NILM) and epithelial cell abnormality including ASCUS, low grade (LSIL) or high grade squamous intra epithelial lesions (HSIL) and invasive cervical cancer. NILM comprises of all the infective and inflammatory lesions of cervix such as reactive cellular changes, Pregnancy associated changes, bacterial vaginosis, viral and fungal associated changes etc.

Antenatal patients with pre-invasive cervical lesion were followed in postpartum and treated accordingly. A repeat pap smear was taken at 6 weeks postpartum to determine the persistence, regression or progression of the abnormal lesion so that none of the patients with abnormal cervical cytology be missed.

The data so obtained has been analysed for correlations and significance by suitable statistical techniques using SPSS software. Statistical tests applied were, Quantitative variables were compared using student t test/Mann-Whitney Test between the two groups. Qualitative variables were correlated using Chi-Square test/Fisher's exact test. A p value of <0.05 was considered statistically significant.

RESULTS

The study found that 6.3% of 510 antenatal women had abnormal pap smear during pregnancy, including epithelial cell abnormalities like ASCUS, LSIL, HSIL, and SCC, with 2.0%, 3.3%, 1.0%, and 0.0% respectively, among the 32 subjects excluded due to inadequate cytology. A study found that 93.7% of participants had NILM, which was further categorized into normal (50.2%), pregnancy-related changes (23.9%), reactive cellular changes (1.6%), vaginitis (12.5%), bacterial vaginosis (1.4%), viral-associated cervical changes—leptothrix (0.2%), and cervicitis (3.9%). The latest classification includes infectious and inflammatory pathologies. (Table 1)

The study found that 84% of participants were aged 21-30, with the average age of patients with abnormal pap smears being 30.97±5.07 years. The age group between 26 and 30 had the highest distribution of abnormal cervical cytology, accounting for 40.6% of abnormal smears, followed by the age group between 36 and 40 with 25% abnormal smears. (Table 2)

The study found that 61.9% of patients with NILM had a healthy cervix, while 40.6% of patients with premalignant cervical cytology had a hypertrophied cervix. Abnormal clinical findings, such as ectropion, circumoral erosion, and bleeding upon touch, were observed in 15.6%, 21.9%, and 21.7% of patients with premalignant lesions, respectively. Abnormal cervical smears were also linked to an unhealthy cervix.(Table 3)

Most patients with prenatal vaginitis, bacterial vaginosis, and reactive cellular abnormalities recovered to normal. However, one postpartum patient with leptothrix infection and vaginitis lost it. Postpartum, 47% of preinvasive cervical lesions regressed, with disease progression and persistence at 6.25% and 34.3% respectively. After delivery, 12.5% were lost.(Table 4)

DISCUSSION

The prevalence of abnormal pap smear during pregnancy in our study amongst 510 antenatal women (8 study subjects excluded due to inadequate cytology) came out to be 6.3% (n=32). Here the abnormal pap smear findings included the epithelial cell abnormality (according to Bethesda 2014) such as ASCUS, LSIL, HSIL and SCC which were 2.0%(n=10), 3.3%(n=17), 1.0% (n= 5) and 0.0%(n=0) respectively. It was in contrast to Shaheen R et al(2017) where the prevalence was 3%, 4 were cases of ASCUS(2%) and 2 of LSIL(1%).[12] Ankita et al (2021), reported that 0.33% screened women showed abnormal cytology reports where only 2 cases of LSIL were detected.[13] T. Radha Bai Prabhu et al. (2016)(46), and Himanbindu P et al. (2015), inferred the prevalence of abnormal pap smear in their study to be 0.3% and 0.5% which is very low as compared to our study.[14,15] It could be because of less sample size and regional variation.

Negative for intraepithelial lesion or malignancy comprises a broad entity including inflammatory and infective pathology according to latest classification. The findings of NILM in our study was 93.7%(n=478) which was further classified as normal (50.2%, n=256), pregnancy associated changes (23.9%, n=122), reactive cellular changes(1.6%, n=08), vaginitis(12.5%, n=64), bacterial vaginosis (1.4%, n=07), viral associated cervical changes- leptothrix(0.2%, n=01), cervicitis(3.9%, n=20). No epithelial cell abnormality was noted in the study conducted by S Ethirajan et al. (2018) and Pahwa S et al. (2016), but around 50-55% nonspecific inflammatory changes with 3-8% candida and 13% bacterial vaginosis was seen in their study while in our study 43.5%(n=222) comprises the inflammatory and infective pathology including bacterial vaginosis (1.4%), vaginitis (12.5%) etc.[16,17]

Among the sociodemographic factors, 84% of the subjects were between 21-30 years age group. The mean age of patients with abnormal pap smear is 30.97±5.07 while in the other group it is 26.75±3.70 years. Manikkam B. (2016), inferred that majority of the patients involved in study were in the age group of 20-35years with only 3.5% below 19yrs and 2% above 35years with mean age of 26.9 years.[18] The maximum distribution of abnormal cervical cytology in our study was seen in age group between 26-30 years which accounted for 13 abnormal smears (40.6%)(p value<0.001) followed by 8 abnormal smears (25%) in age group between 36-40 years. Sueblinvong T et al. (2005)[19] stated the mean age of the women was 25.78 years old. Most of the women were 20 to 29 years old. It was similar to our study suggesting that abnormal pap smear is reported highest during 25-30 years so screening at this age is a valuable step in prevention of cervical carcinoma. Shaheen R et al. (2017), stated maximum number of patients with cervical dysplasia belonged to the age group 30-35 years (66.66%) dissimilar to our study.[12] This can be due to a greater number of pregnant women belonging to this age group reaching for antenatal care.

The mean age at marriage in the pregnant women with abnormal cervical cytology was seen to be 23.72±2.95 years while that in subjects with NILM as a finding was 22.88±2.73 years(p value=0.09). Since the study population were Indian women, they were hesitant to reveal information about their age of first intercourse so association of pap smear findings with age of first intercourse could not be studied thereby, age of marriage could be considered as age of first intercourse. This result is similar to the study done by Manikkam B. (2016)[18] where mean age of marriage was 23.4 years and also a study done at Turkey by AytenDinc in 2008-09,where average age of marriage for pregnant participants was 20.65±2.94 suggesting role of early sexual life in the pathogenesis of cervical neoplasia.[20]

The level of education and occupation in women under study was mostly secondary and were housewives respectively similar to Ankita et al (2021) and Khaengkhor P et al (2011) while Shaheen R et al (2017) found in their study that incidence of cervical hyperplasia was higher in illiterate or primarily educated in contrast to our study.[12,13,21]

The prevalence of abnormal cervical cytology was higher in multigravidas (81.2%, n=26, p value<0.01). 18.8% of the study subjects with abnormal cervical cytology were primigravida. Pahwa S et al. (2016) inferred that primigravida's had 40.5% abnormal smears and 59.5% abnormal smears were in multigravidas similar to our study.[16] The p value for the distribution of pap smear findings in relation to parity in our study came out to be <0.01 showing multiparity as a risk factor for preinvasive cervical lesion.

Amongst the risk factor for cervical abnormality, 4 patients with abnormal cytology and 3 patients with normal cytology gave history of tobacco chewing which was non-significant. None of the study subjects gave history of alcohol or smoking. Ankita et al (2021), reported none of the screened women as smokers or had any history of sexually transmitted disease or pelvic inflammatory disease, habit of smoking or family history of any cancer.[13] Pahwa S et al. (2016) inferred that smokers were more likely to have abnormal smears 28 of 29 in smokers.[16] There was a significant association between smoking and abnormal smears in their study which was in contrast to our study that can be due to subjects unwillingness to reveal alcohol or smoking history due to social taboo.

A greater number of abnormal pap smear finding was seen in patients with multiple sexual partners (n=9, p value<0.001) and 23(71.8%) patients with abnormal pap smear gave history of single sexual partner similar to Pahwa S et al. (2016) who concluded that 92.3% abnormal smears were present in those with one sexual partner as compared to 7.73% abnormal smears in those with more than one partner.[16] Ngaojaruwong et al (2008) reported the Risk factor of cervical cancer as husbands with multiple sexual partners (18%), young age at first

intercourse (<16 years), multiple sexual partners and cigarette smoking present in 7.0%, 5.7% and 6.8% of cases, consecutively.[22] Only 3 and 5 pregnant women with abnormal cytology gave history of cervical cancer screening (p value=1) and family history of cervical cancer respectively (p value=0.2) while 9 and 7 pregnant women with normal pap smear findings gave history of cervical cancer screening in past and family history of cervical cancer respectively. This data was non-significant.

On clinical examination, hypertrophied cervix was found in 40.6%(n=13) patient with premalignant cervical cytology while 61.9% patients with NILM had healthy cervix. Other abnormal clinical findings such as bleeds on touch, circumoral erosion, ectropion was seen in 21.9%(n=7), 21.7%(n=7) and 15.6%(n=5) patients with premalignant lesions respectively. A statistically significant correlation was seen (p value<0.001). Pahwa S et al. (2016) showed the Per speculum finding of unhealthy cervix were present in 35 women and 31 (18.45%) of these had abnormal smears.[16] 96.97% with healthy cervix had normal smears. Only 4 (3.03%) with an unhealthy cervix had a normal smear. Unhealthy cervix on per speculum examination was associated with abnormal cervical smears. A statistically significant correlation (p value 0.0007) was reported between unhealthy cervix and abnormal Pap smear report which was similar to our results. Radha Bai Prabhu et al (2016) in their study 49%(n=147) of antenatal women among 300 had marked cervical ectropion.[14] Ankita et al (2021), found healthy cervix in 85.33%, ectopy in 7.83% and hypertrophy in 6.83% of the women.[13]

The postpartum cervical changes in antenatal patients with abnormal pap smear was studied at 6 weeks and it was inferred that amongst 10 patients with ascus in antenatal period, 2 had persistence of disease, 1 patient progressed to LSIL, 4 patients had regression of disease and the other 3 were loss to follow up. Amongst 17 patients with LSIL in pregnancy, 5 patients had persistence of disease, 1 patient had progression of disease to high grade squamous intraepithelial lesion. 10 patients with LSIL had regression of disease to NILM(2 patients regressed to cervicitis and vaginitis). One patient with LSIL was loss to follow up in postpartum. HSIL was seen in 5 antenatal women amongst which 4 had persistence of disease in postpartum period while 1 had regression of disease to normal. Marcus D et al(2019) reported high-grade cervical intraepithelial neoplasia (CIN) in 24 patients. Of these, CIN regressed in 6/24 (25%) cases and persisted in 18/24 cases (75%). No cervical cancer cases were diagnosed similar to our study.[23] The regression, persistence and progression rates of 32 cases with low-grade smear abnormalities during pregnancy were: 20/32 (63%), 6/32 (19%) and 6/32 (19%) respectively. This study shows high rates of regression of low-grade abnormalities following pregnancy. Post-partum follow-up remains essential for those with high-grade CIN due to significant levels of persistence

Majority of patients with bacterial vaginosis, vaginitis, reactive cellular changes in antenatal period regressed to normal. One patient with vaginitis with leptothrix infection was loss to follow in postpartum. Around 47%(n=15) Regression of preinvasive cervical lesion was seen in postpartum period. 34.3%(n=11) persistence and 6.25%(n=2) progression of the disease was seen. 12.5%(n=4) were loss to follow after delivery.

Dinc A et al(2012) report that 10%-70% of dysplasia cases diagnosed during pregnancy regress and sometimes even disappear postpartum, while persistence in the severity of cervical neoplasia is reported in 25%-47% of cases and progression in 3%-30% of cases.[20] Stuebs FA et al (2023) reported the rates of persistence, regression, and progression of CIN 3 were 76.1%,20% and 3.2%, respectively.[24] Grimm D et al (2020), showed 61.7% persistent lesions, 5% were diagnosed with CIN1 and 33.3% with complete remission.[25] Strinic T et al (2002), reported that PAP smear results returned to normal in 46% of cases during postpartum, PAP smear results regressed in 57% of cases during postpartum, and PAP smear results were preserved in 40% of cases during postpartum.[26] Self-regression after natural delivery has something to do with the increase in desquamation of the cervical epithelial, or the increase in local reparative immune response. The study on abnormal Pap smear results among pregnant women at a tertiary care center provides valuable insights into cervical health during and after pregnancy. It emphasizes the importance of routine screening, early detection, and management of abnormalities, which can improve maternal health outcomes. Understanding sociodemographic factors can help tailor targeted interventions for high-risk groups, enhance preventive strategies, and improve healthcare accessibility. However, limitations include a limited sample size, single-center design, potential selection bias, and observational nature. Future multicenter studies with larger cohorts are needed to validate and expand these findings.

CONCLUSION

Antenatal visits are crucial for cervical cancer screening, as they are the first contact with a gynaecologist. Early detection of pre-invasive lesions can prevent their progression to invasive carcinoma. Pap smear is a reliable screening test. Abnormal cervical cytology is common in pregnant women aged 21-30 and during the second trimester in women with lower education and high parity. Risk factors include early marriage age, multiple sexual partners, family history of cervical cancer, and low socioeconomic status. Postpartum cervical smears often show regression of preinvasive lesions due to pregnancy-induced cervical changes. None of high-grade lesions progressed to invasive carcinoma, so a conservative approach can be considered for pregnancy management. Education and counseling in antenatal care clinics and postpartum wards can increase cervical cancer screening coverage among reproductive age women in India.

Tables

Table 1 : Findings of pap smear in study subjects (n=510)

Result of pap smear	No.	%
NILM	478	93.7
a) Normal	256	50.2
b) Pregnancy associated changes	122	23.9
c) Reactive cellular changes	08	1.6
d) Vaginitis	64	12.5
e) Bacterial Vaginosis	07	1.4
f) Viral associated cervical changes leptothrix	01	0.2
g) cervicitis	20	3.9
Epithelial cell abnormality	**32**	**6.3**
ASCUS	10	2.0
LSIL	17	3.3
HSIL	5	1.0
SCC	0	0.0
Inadequate(n=8) excluded Total= 518		

Table 2 : Distribution of pap smear finding in relation to sociodemographic factors (n=510)

		Normal (n=478) (NILM)	Abnormal (n=32)	P value
Age group	21-25 years	200	4	<0.001
	26-30 years	213	13	
	31-35 years	57	7	
	36-40 years	8	8	
	Mean age in years	26.75±3.70	30.97±5.07	<0.001
	Mean age at marriage (years)	22.88±2.73	23.72±2.95	0.09
	Mean POG at delivery	38.30±1.74	37.47±1.43	<0.01
Education	Illiterate	67	9	0.15
	Primary	98	6	
	Secondary	184	13	
	Graduate	112	3	
	Postgraduate	17	1	
Occupation	Employed	29	2	1.0
	Housewife	449	30	
Parity	Primigravida	220	6	<0.01
	Multigravida	258	26	
Risk factors	Tobacco	7	0	1.0
	Smoking	0	0	-
	Alcohol	0	0	-
	Multiple sexual partner	4	9	<0.001
	History of cervical cancer screening	11	1	0.54
	Family history of cervical cancer	9	3	0.03

Table 3: Clinical Examination finding in study subjects (n=510)

	Normal (n=478) (NILM)	Abnormal (n=32)	p value

Bleeds on touch	8(1.7%)	7(21.9%)	<0.001
Circumoral erosion	76(15.9%)	7(21.9%)	
Ectropion	15(3.1%)	5(15.6%)	
Healthy	296(61.9%)	0(0.0%)	
Hypertrophied cervix	72(15.1%)	13(40.6%)	
Nabothian cyst	11(2.3%)	0(0.0%)	

Table 4: Comparison Of Pap Smear Finding During Pregnancy And At 6 Weeks Postpartum In Study Subjects (n=132)

Pap smear finding during pregnancy		Pap smear finding at 6 weeks postpartum				
	Total	ASCUS	LSIL	HSIL	NILM	LTF
ASCUS	10	2	1	0	4	3
LSIL	17	0	5	1	10	1
HSIL	5	0	0	4	1	0
NILM*	100	0	0	0	82	18
Total	132	2	6	5	97	22

*NILM includes infective and inflammatory findings which do have impact on pregnancy outcome. (bacterial vaginosis, vaginitis, cervicitis, reactive cellular changes, viral associated cervical changes)

Table 4: Comparison Of Abnormal Pap Smear Finding During Pregnancy And At 6 Weeks Postpartum In Study Subjects (n=32)

	Pap smear finding at 6 weeks postpartum				
Pap smear finding during pregnancy	TOTAL	Persistence	Progression	Regression	LTF
ASCUS	10	2 (20%)	1 (10%)	4 (40%)	3 (30%)
LSIL	17	5 (29.4%)	1 (5.9%)	10 (58.8%)	1 (5.9%)
HSIL	5	4 (80%)	0	1 (20%)	0
SCC	0	0	0	0	0
Total (in %)	32(100%)	11(34.3%)	2(6.25%)	15(46.9%)	4(12.5%)

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