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By Shraddha D. Pathak, Nina V. Kate, Sujatha P, Lalitha P & Prathusha.K.

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Results: Mean age of the patients was 25.98±3.56 years. 99% smears were reported as satisfactory. The smear was inflammatory in 55.6% cases. Candidial infection was detected in 2%, bacterial vaginosis in 4% and trichomoniliasis in 5.6% of the cases. Epithelial cell abnormality was reported in 2 (0.4%) cases namely, ASCUS and HSIL. Only 0.6% of the patients were aware of Pap smear.

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GJMR-E Classification: *NLMC Code: WQ 400*



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A Prospective Analytical Study of Cervical Cytology in Pregnant Women Attending a Tertiary Hospital in Pondicherry

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Conclusions: The study demonstrates the feasibility of doing antenatal screening using Pap smear and provides an opportunity in educating and sensitizing women about cervical screening. Pap smear also has a role in detecting infections thereby preventing antenatal complications.

Keywords: cervical cytology, cervical cancer, Papanicolaou smear, cancer screening, epithelial cell abnormality.

I. Introduction

In women aged 21 to 35 years, pregnancy provides a window of opportunity to screen the cervix for neoplastic as well as infectious diseases and create awareness in women about the need for regular screening. Carcinoma of the cervix is the most common malignancy among Indian women between 15-44 years of age.[1] The crude incidence rate for cervical cancer is 23.5 per 1,00,000 population. About 30% of cervical cancers are diagnosed during the reproductive years and 3% of cervical cancers are diagnosed during pregnancy.[2] The incidence of abnormal Pap smear is reported to be 5-8% and 1.2% of these patients end up having cervical cancer during pregnancy.[3]

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The Pap smear is most successful screening test for carcinoma cervix. It is also used to detect inflammation and infections in asymptomatic women. Early diagnosis and treatment of such infections results in prevention of premature rupture of membranes, premature birth, chorioamnionitis etc.

This study was conducted to analyse cervical smear abnormalities in pregnant women attending the antenatal clinic of our hospital.

II. Methodology

A prospective analytical study was conducted in 500 pregnant women attending the antenatal OPD at a District Hospital in the Department of Obstetrics and Gynecology in Puducherry for a period of one year fulfilling the inclusion criteria, after obtaining written, informed and valid consent.

a) Inclusion Criteria

1. Pregnant women presenting for the first antenatal visit.
2. Aged between 21-35 years.

The study was done after obtaining the clearance from the institutional ethical committee.

b) Exclusion Criteria

Pregnant women presenting with

1. Threatened abortion.
2. Vaginal bleeding due to any other cause.
3. Not consenting to be a part of the study.

Pap smear with cotton tipped swab was taken, conventional smears were made and fixed in 95% alcohol, dried, stained and interpreted according to Bethesda-III system (2001).

In patients where the Pap smear was satisfactory with normal findings, a routine screening was advised postnatally.

Patients with unsatisfactory Pap smear, a repeat Pap was taken after 8weeks.

Patients whose Pap smear showed infections, were treated with appropriate antibiotics and again it was repeated after 6weeks.

Pap smear which showed abnormal cytology or premalignant lesions, were followed up with repeat cytology, colposcopy or biopsy.

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c) *Statistical Analysis*

The data obtained from the study was analysed using SPSS 15.0 software. Results on continuous measurements were presented on Mean SD(Min-Max) and results on categorical measurements were presented in Number(%). Chi-square/Fisher Exact test was used to find the significance of study parameters on categorical scale between two or more groups. A P value <0.05 was considered to be significant.

III. Results

500 antenatal patients participated in the study and the mean age was 25.98±3.56 years with 51% of the patients in 21-25years age group.(Table 1).

Table 1: Distribution of age of patients (N=500).

Age in years	No. of patients (%)
21-25	255 (51)
26-30	191 (38.2)
31-35	49 (9.8)
36-40	5 (1)
Total	500 (100)

**Range of age: 22- 39 years*
**Mean age: 25.98 ± 3.56 years (mean ± SD)*

62.8% of the study population belonged to socioeconomic class IV.(Figure 1).

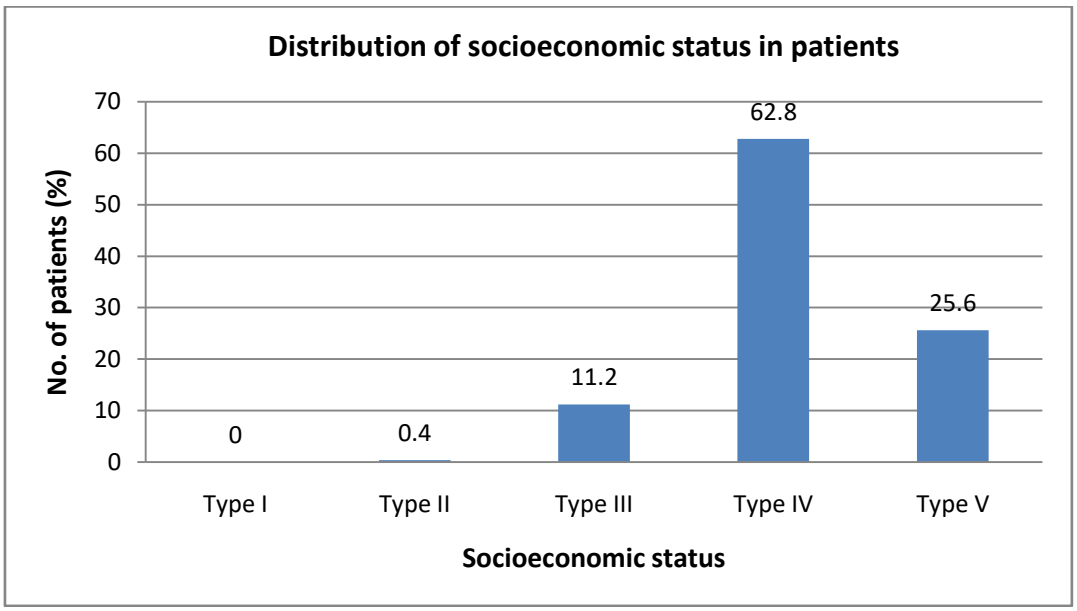


Figure 1: Distribution of socioeconomic status in patients

The mean age at marriage was 22.66±3.24 y, 27.6%(138) were married and 9.2%(46) had their first child at or before 20 years of age. (Table 2, 3)

Table 2: Distribution of patients in relation to age at marriage (N=500).

Age at marriage in years	No. of patients (%)
≤20	138 (27.6)
21-25	277 (55.4)
26-30	77 (15.4)
31-35	6 (1.2)
36-40	2 (0.4)
Total	500 (100)

**Range: 17 - 37 years*
**Mean age at marriage: 22.66 ± 3.24 years (mean ± SD)*

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Table 3: Distribution of patients in relation to age at 1st child birth (N=500**).**

Age at 1st child birth in years	No. of patients (%)
≤20	46 (9.2)
21-25	301 (60.2)
26-30	137 (27.4)
31-35	14 (2.8)
36-40	2 (0.4)
Total	500 (100)

**Range: 19 – 38 years*
**Mean age at 1st child birth: 24.31± 3.39 years (mean ± SD)*

Out of the 240 primigravida patients, only one patient had used any method of contraception i.e condom whereas out of 169 second gravidas, 25.4%(43) used Cu T and 0.6%(1) used condom and OC Pills each respectively. (Table 4)

Table 4: Distribution of Contraceptive methods in relation to gravidity of the patients (N=500).

Gravida	Contraceptive methods (%) Condom	Cu-T	OC Pills	*ST Failed	Total no. None	of patients
Primi gravida	1 (0.4)	00 (00)	00 (00)	00 (00)	239 (99.6)	240 (48)
Second gravida	1 (0.6)	43 (25.4)	1 (0.6)	00 (00)	124 (73.4)	169 (33.8)
Third gravida	1 (1.4)	11 (15.3)	00 (00)	2 (2.8)	58 (80.5)	72 (14.4)
Fourth gravida	00 (00)	00 (00)	00 (00)	1 (6.7)	14 (93.3)	15 (3)
Fifth gravida	00 (00)	00 (00)	00 (00)	00 (00)	3 (100)	3 (0.6)
Six gravida	00 (00)	00 (00)	00 (00)	00 (00)	1 (100)	1 (0.2)
Total	3 (0.6)	54 (10.8)	1 (0.2)	3 (0.6)	439 (87.8)	500 (100)

*P<0.001**, Significant, Fisher Exact test; *Sterilisation failed*

Knowledge regarding Pap smear was very poor as out of 500, only 0.6% (3) patients had undergone a Pap smear in the past, while just 5.2% patients had previously heard of a Pap smear test. (Figure 4)

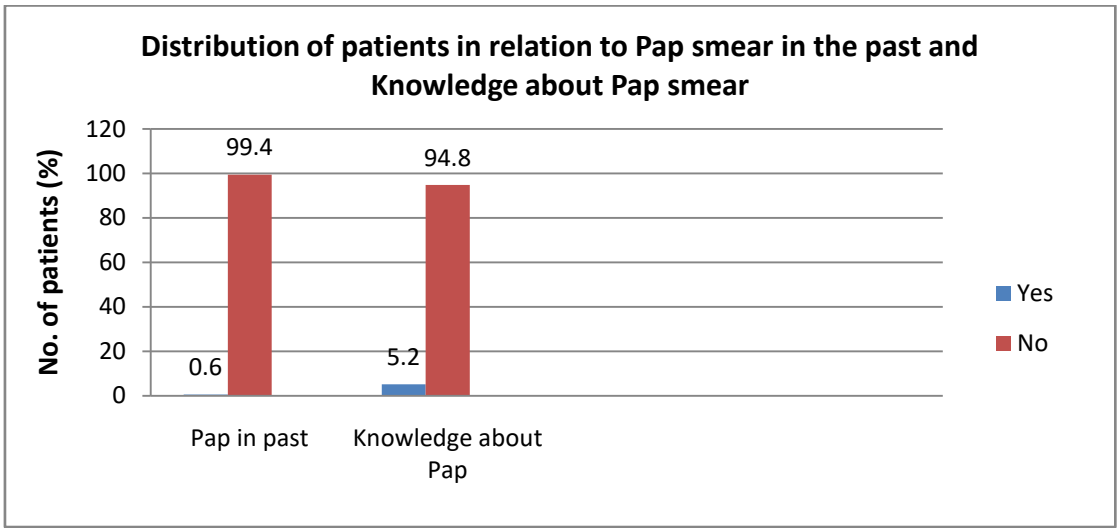


Figure 4: Distribution of patients in relation to Pap smear in the past and knowledge about Pap smear

On speculum examination, vagina was healthy in all 500 patients examined and 92.4% (462) had healthy cervix while 7.6% (38) had unhealthy cervix. (Table 5)

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Table 5: Distribution of findings of Per speculum examination in patients (N=500).

Per speculum Findings	Cervix (%)	Vagina (%)
Healthy	462 (92.4)	500 (100)
Hypertrophy	1 (0.2)	00 (00)
Erosion	33 (6.6)	00 (00)
Polyp	2 (0.4)	00 (00)
Growth	2 (0.4)	00 (00)
Total	500 (100)	500 (100)

Of the 462 patients who had healthy cervix, Pap smear revealed that, infection was noted in 11.6%(55) patients where as inflammation and epithelial cell abnormality in 54.1%(250) and 0.2%(1).

Out of the 38 patients with unhealthy cervix, Hypertrophy was seen in 0.2%(1), Polyp in 0.4%(2), growth in 0.4%(2), cervical ectropion in 6.6%(33) and their pap smear showed inflammation in 78.8%(26), infection in 6.1%(2). Among the growth, 1 Papsmear showed inflammation while other was reported as HSIL. (Table6)

Table 6: Comparison of per speculum findings with Pap smear report

Per speculum Findings	No. of patients (%)	Pap smear report (%)					
		US	Normal	*Inf	*Inflam	*Epi. Cell abnormality	
Healthy	462 (92.4)	5(1.1)	151(32.7)	55(11.9)	250(54.1)	1(0.2) (ASCUS)	
Hypertrophy	1 (0.2)	0(00)	0(00)	1(100)	0(00)	0(00)	
Erosion	33 (6.6)	0(00)	5(15.1)	2(6.1)	26(78.8)	0(00)	
Polyp	2 (0.4)	0(00)	1(50)	0(00)	1(50)	0(00)	
Growth	2 (0.4)	0(00)	0(00)	0(00)	1 (50)	1(50) (HSIL)	90
Total	500 (100)	5(1%)	157(31.4)	58(11.6)	278 (55.6)	2 (0.4)	

P=0.656, Not significant, Fisher Exact test

**US- Unsatisfactory*

**Inf- Infection*

**Inflam- Inflammation*

**Epi cell abnormality- Epithelial cell abnormality*

449 patients were asymptomatic and clinically no discharge was documented but 5.4%(24) of these had infection on Pap smear which were treated. 10.2%(51) patients were asymptomatic and clinical examination revealed Discharge. Infection in both the groups were treated and repeat Papsmear was negative.(Table7)

Table 7: Distribution of patients with discharge Per vaginum in comparison with infection (N=500).

	Total no. of patients (%)	Infection present (%)	Infection absent (%)
Discharge present	51 (10.2)	34 (66.7)	17 (33.3)
Discharge absent	449 (89.8)	24 (5.4)	425 (94.6)
Total	500 (100)	58 (11.6)	442 (88.4)

*P<0.001**, Significant, Fisher Exact test*

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Overall Pap smear revealed Inflammation in 55.6%, Infections such as Candidiasis in 2%, Bacterial vaginosis in 4% and Trichomoniasis in 5.6%. Epithelial cell abnormality was reported in 0.4%(2) cases i.e, Atypical squamous cells of undetermined significance(ASCUS) (Figure6) and High grade squamous intra epithelial lesion (HSIL) (Figure7). (Table8).

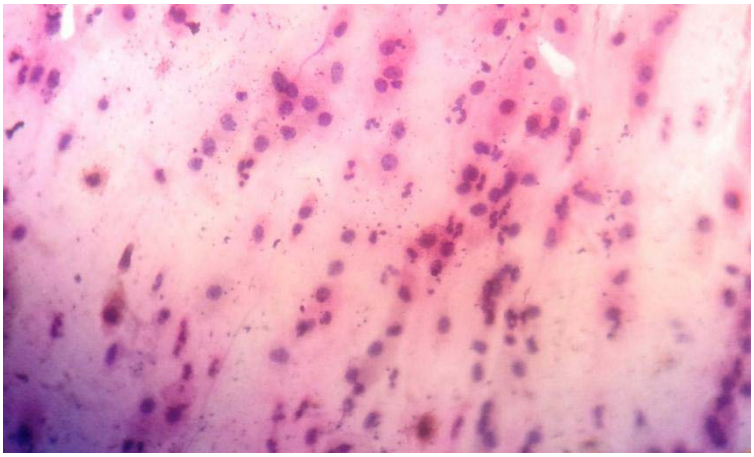


Figure 6: Pap smear showing ASCUS

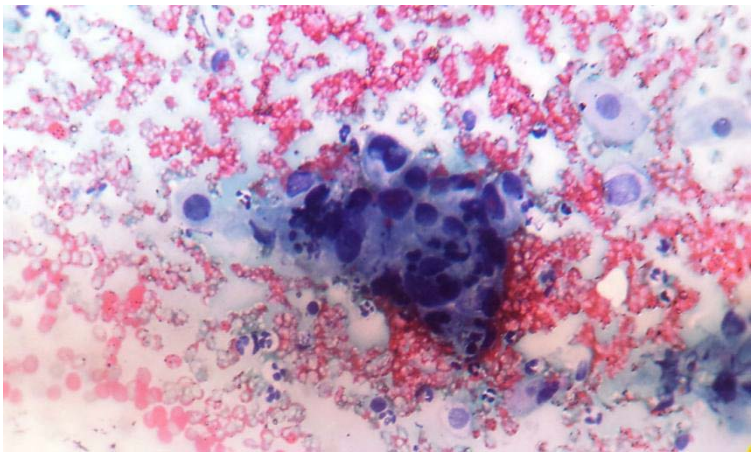


Figure 7: Pap smear showing HSIL

Table 8: Distribution of Pap smear report findings in patients (N=500).

Pap smear report	No. of patients (%)
Normal Pap smear	162 (32.4)
Benign cellular changes	
Infections	58 (11.6)
• Trichomonas vaginalis	28 (5.6)
• Candidiasis	10 (2)
• Bacterial vaginosis	20 (4)
Reactive cellular changes	278 (55.6)
Epithelial cell abnormalities	
ASCUS	1 (0.2)
HSIL	1 (0.2)
Total	500 (100)

IV. Discussion

Carcinoma cervix is the most common malignancy among Indian women aged 15- 45 years and though Pap smear is an easy and useful tool to screen, the awareness of this test is very poor. Women always visit health care providers during pregnancy so this contact should be optimally utilised to screen and

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create awareness regarding Carcinoma cervix and the need for regular Pap smears so that carcinoma cervix can be down staged and infections if any can be treated early preventing its associated maternal and foetal complications.

In the present study, the mean age of the patient was 25.98 years with a standard deviation of 3.56 years. The youngest patient was 22 years while oldest was 39 years of age. In a study conducted by Ayten Dinc, average age was 27.1±4.70 yrs.[4] Mean age of the patient included in study by Singh P et al was 23.44±3.96 yrs.[5] while it was 26 and 27 years for studies conducted by Kaplan et al and Cronje et al respectively.[6,7] (Table 9)

Table 9: Mean age group in various studies

Study	Observations regarding age
Singh P et al[5]	23.44±3.96, years
Ayten Dinc[4]	27.1±4.70 years
Kaplan et al[6]	26 years
Cronje et al[7]	27 years
Present study	25.98±3.56 years

The incidence of abnormal cervical cytology was more in low socioeconomic classes(62.8%) based on B G Prasad's classification comparable to a study by C.Kurian et al[8].

Though in the study population it was seen that there was a trend of early marriage(27.6% <20 years vs 55.4% <25 years) there was a low incidence of cervical cancer, In a number of case control studies the risk of cervical cancer was found to be inversely related to age at 1st sexual intercourse, with approximately 2 fold differentials between those with consummation before 16 years of age and those having it after 20 years of age.[9] The mean age at marriage was 22.66±3.24 yrs in the present study. Thus the low incidence of cervical cancer in present population could be due to no promiscuity and delay in consummation of sexual activity.

In the present study, only (9.2%)46 patients had their first child below the age of 20 years indicating low incidence of early sexual activities, one of the main predisposing factor for abnormal cervical cytology. Sexual behavioural characteristics were considered independent risk factors for precancer and invasive cancer in Indian women in the study by Cuziks et al and Juneja et al.[10,11]

It is observed that there is significant increase in frequency and grade of cytological change with increasing parity due to cervical trauma, hormonal and nutritional changes during pregnancy and labour.[12] In the present study, 55% patients were nulliparous while 35.2% were second gravidas, having one full term delivery which may be the reason for lower rate of abnormal smears, similar to the study by Singh P et al.[5]

It was seen that, 37% belonged to first trimester, 58.2% belonged to second trimester and 4.8% belonged to third trimester at the time of examination out of which the 2 atypical cytological reports obtained were in second trimester similar to the study by Jones et al[13] This emphasizes on the need of education and awareness in patients regarding cervical cytological screening in early pregnancy similar to the study by Jones et al.[13]

Poor use and awareness of contraceptive practices was observed in our study as 87.8% of study population did not use any kind of contraception and was significantly associated with abnormal cervical cytology ($P < 0.001$) in accordance to the study conducted by C.Kurian et al where 84% patients did not use any method of contraception while 11% used condoms, 4% used Cu-T and 1% used oral contraceptive pills.[8]

Our study in accordance with other studies conducted in India Hande CM et al and C Kurien et al also showed very poor awareness and knowledge about of Pap smear, female health negligence as well as inadequate use of health resources in our country.5.2% of study population had heard of Pap smear test and only 0.6% had previously undergone a Pap smear test[15,8] (Table 10) while a study conducted in Vietnam by Nguyen et al[14] identified that 74% had heard of the test, and 76% had undergone a smear test.[14] Ayten Dinc concluded that 60.7% of cases had heard of Pap smear test and 30.1% had previously undergone a smear test.[4]

Table 10: Knowledge and awareness about Pap smear in various studies

Study	knowledge about Pap smear	Previous Pap smear
Nguyen et al[13]	74%	76%
Ayten Dinc[4]	60.7%	30.1%
Hande CM et al[14]	90.7%	-
C.Kurian et al[8]	-	0.39%
Present study	5.2%	0.6%

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During pregnancy, as transformation zone is better exposed due to physiological eversion of cervix, cervical sampling becomes easier which is evident in the present study in which 99% patients had satisfactory Pap smear in accordance to the study carried out by C.Kurian et al.[8]

In asymptomatic pregnant women, a simple speculum examination of the cervix provides an opportunity to down stage cervical cancer and detect the disease at an earlier, treatable and curable stage16. In the present study, 2 patients had growth on the cervix out of which one had HSIL. Though 94%(462) patients had healthy cervix, 11.9%(55) showed infection like Trichomonas vaginalis 5.6%, Candidiasis 2%, Bacterial Vaginosis 4% while 0.2%(1) patient had epithelial cell abnormality (ASCUS) similar to studies by C.Kurien et al and Singh et al.[8,5]

At times, patient may have asymptomatic vaginal discharge. In the present study, asymptomatic vaginal discharge was seen in 10.2%(51) of the patients, out of which 66.7%(34) patients had Pap smear suggestive of infections like Trichomonas vaginalis (5.6%), candidiasis (2%) and Bacterial vaginosis (4%). In remaining 89.8%(449) patients without discharge, 5.4%(24) patients had infections. This showed additional advantage of Pap smear examination in asymptomatic women as they being asymptomatic, they are unlikely to be diagnosed or treated for such conditions which otherwise leads to premature rupture of membranes, premature birth or chorioamnionitis. There was significant correlation between discharge per vaginum and abnormal cervical cytology ($P<0.001$).

Present study had a lower incidence of abnormal cytological smears (0.4%). This may be because of limited number of patients studied.(Table 11)

Table 11: Abnormal Pap smears in different studies

	No. of study population	Incidence of abnormal smear	Abnormal smear details
Present study	500	0.4%	1 ASCUS 1 HSIL
Kaplan et al[6]	6248	2.5%	129 LSIL 28 HSIL
C.Kurian et al[8]	1002	0.19%	1 ASCUS 1LSIL
Singh P et al[5]	590	0%	-

In the present study, patients whose smears showed infections were treated with appropriate antibiotics. After 6 weeks these smears were repeated and were found to be normal. Pap smear of one of the cervical growth on speculum examination was suggestive of dense inflammation and after a course of antibiotics repeat smear taken 6 weeks later was normal. Among the abnormal cytology, the patient with ASCUS was 30 year old primigravida and other patient with HSIL was 24 years second gravida with one full term normal delivery. The patient with ASCUS was followed up till delivery and a repeat Pap smear was taken 6 weeks postnatally which was normal. Patient was advised for regular follow up. Only one patient on per speculum examination had growth with Pap smear suggestive of HSIL, biopsy was taken which showed Squamous cell carcinoma. (Figure 8) Patient had spontaneous abortion at 24 weeks of pregnancy. Patient was then referred to Regional Cancer Centre (RCC), where she was staged as IIb cervical cancer and started with radiotherapy. (Figure 9)

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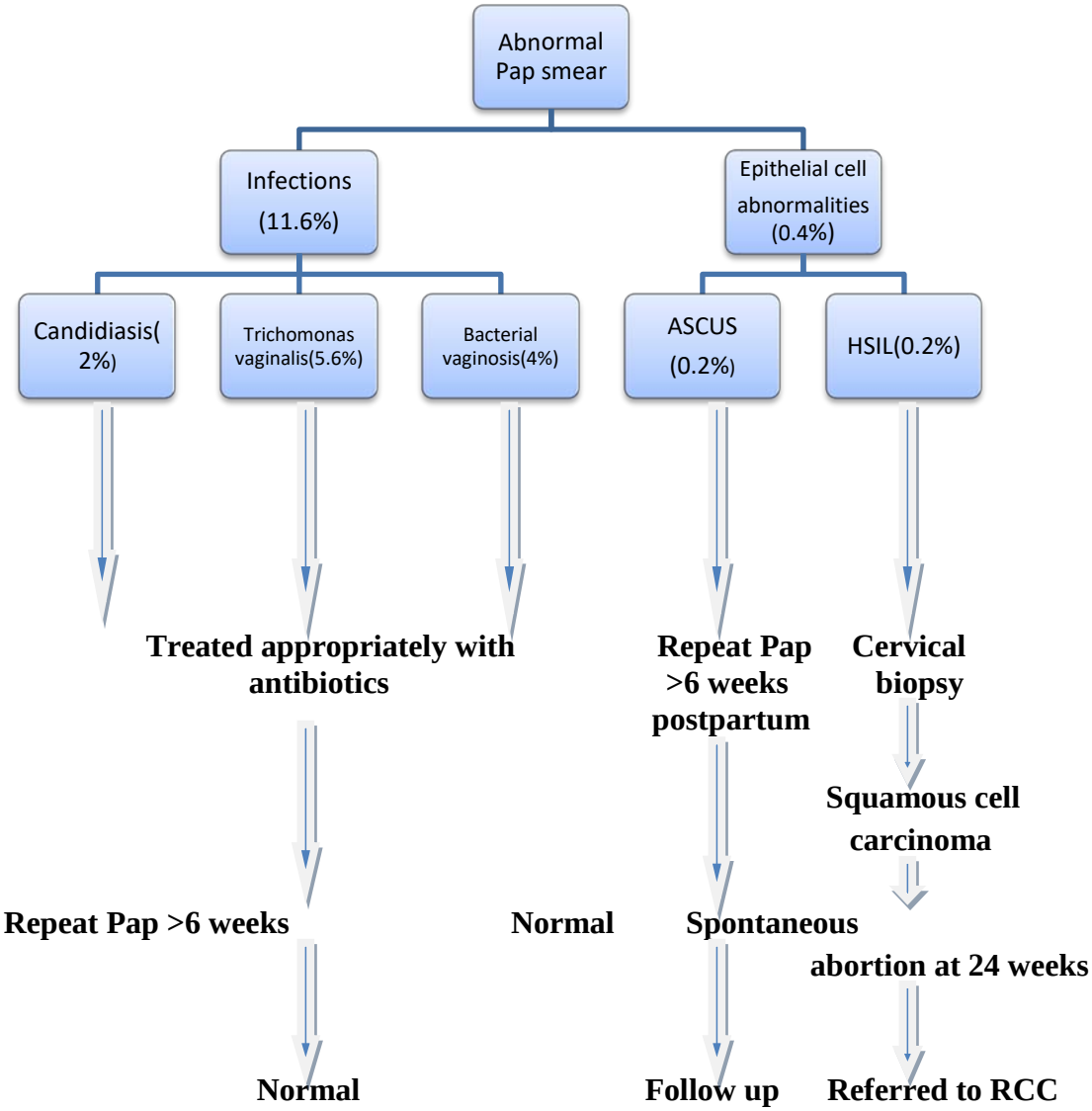


Figure 9: Abnormal Pap smear and their follow up

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Declarations

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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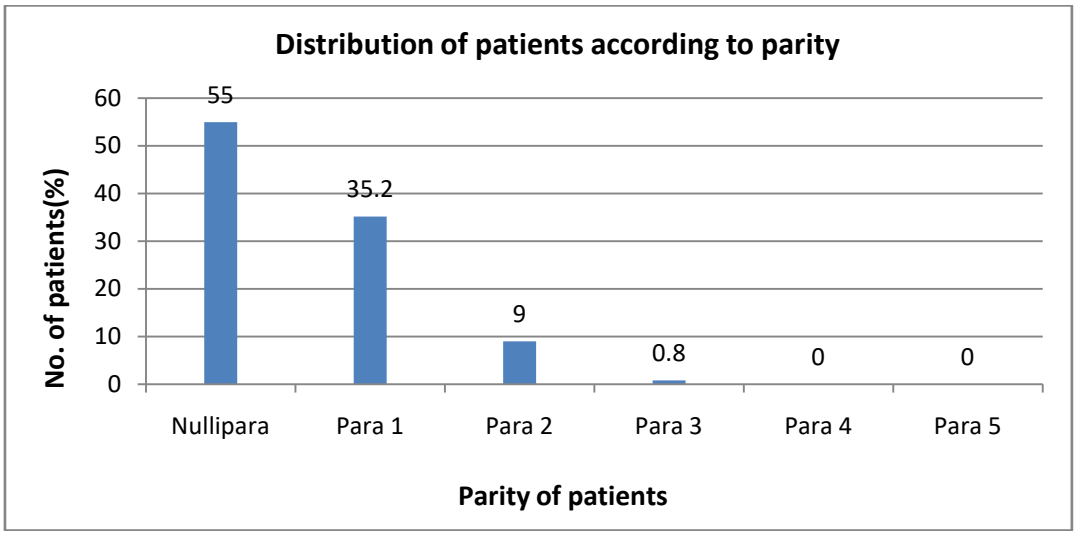


Figure 2: Distribution of patients according to parity

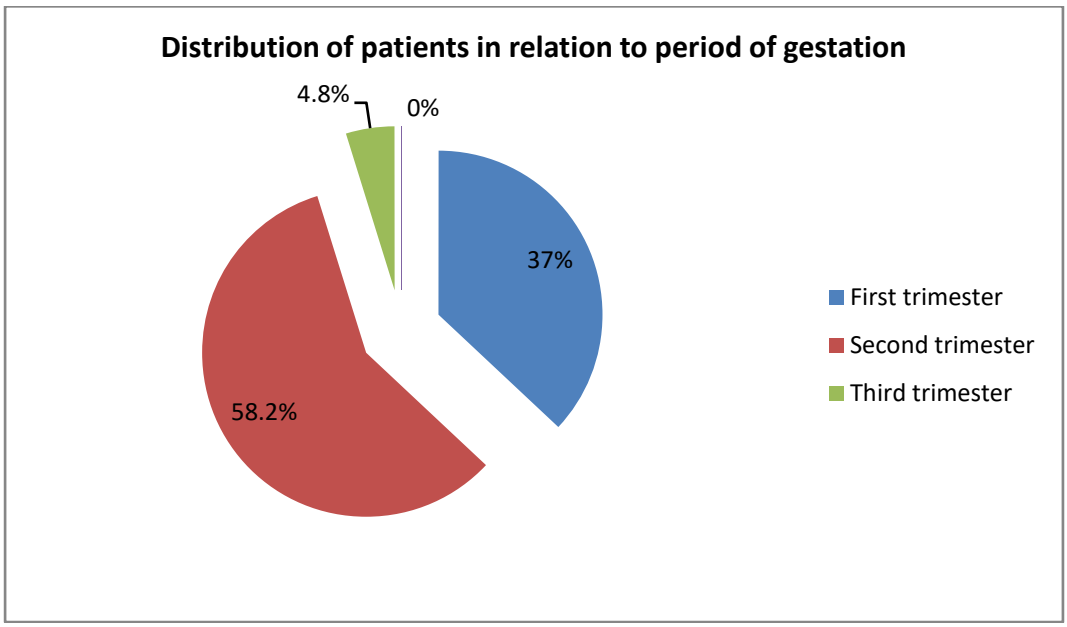


Figure 3: Distribution of patients in relation to period of gestation

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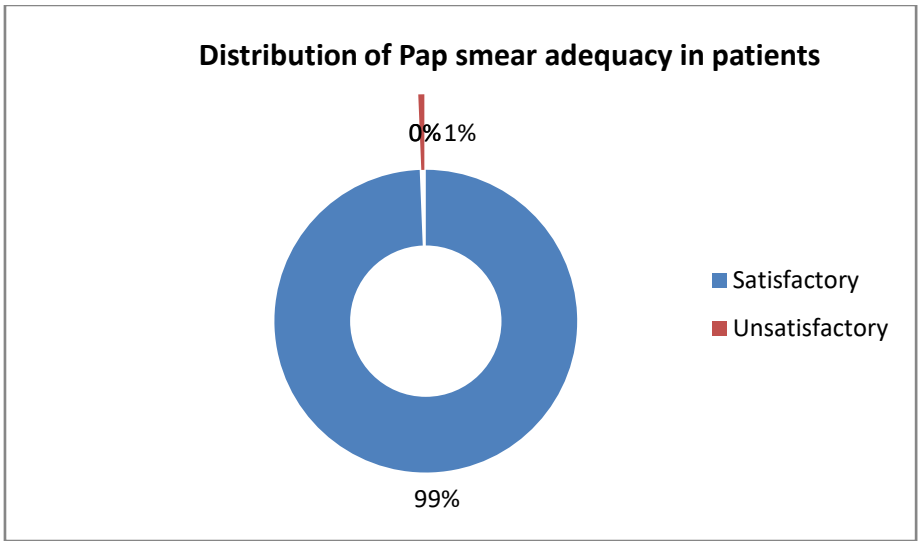


Figure 5: Distribution of Pap smear adequacy in patients

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