INJ INTERNATIONAL NEUROUROLOGY JOURNAL

Prevalence of precancerous cervical lesions and its associated factors among women screened for cervical cancer in rural area at Chengelpet district

Johny Christopher[1], Prema Krishnan[2], Rajkumar[3], Deva Bala Nirmala[4], Umamageshwari[5]
Author Affiliation
[1]PhD Scholar, MAHER University & Chairman, Annai Veilankanni's Hospital, Perungalathur, Chennai, Tamilnadu
[2]Principal, Annai Veilankanni's College of Nursing, Perungalathur, Chennai, Tamilnadu
[3]Ph.D Guide, Professor, Department of Community Medicine, Meenakshi Medical College and Research Institute' Enathur, Kanchipuram, Tamilnadu
[4]Joint Director, Annai Veilankanni's Hospital, Perungalathur, Chennai, Tamilnadu
[5]Vice Principal, Annai Veilankanni's College of Nursing, Perungalathur, Chennai, Tamilnadu.

Abstract

Cervical cancer becomes the major health challenges and leading cause of death among women in developing countries, though it is a preventable condition. Routine cervical cancer screening helps to prevent the premalignant cervical lesion and thereby reduce morbidity and decrease the death rate. The objective of our study is to identify the risk factor associated with precancerous cervical lesion among women screened for cervical cancer.

Methods: A cross sectional study carried out in the community area attached to Annai Veilankanni's College of Nursing and Annai Veilankanni's Hospital. The cervical cancer screeningand awareness campaign were organised. The Camp was visited by the team of Physician, Surgeon, Gynaecologist and Nurses from Annai Veilankanni's Hospital, Chennai. Data was collected through structured questionnaires and cervical cancer screening(VIA, PAP smear and HPV DNA test). A total of 283 females attended this camp. Of this 250 women's were included in the study. Women who had atleast one complaint regarding reproductive tract were screened for cervical cancer by HPV DNA Test, PAP smear followed by VIA after obtained informed consent. The cytological diagnosis was confirmed by a pathologist for HPV DNA test and pap smears, Whereas VIA Positive was confirmed if any changes in SCJ (ie., transformation Zone)

Results: Out of the total 250 screened women, 8.5% were found to be positive for precancerous cervical lesion.Irregular menstrual cycle, History of unusual bleeding, presence of leucorrhoea was found to be significantly associated with precancerous cervical cancer at p-value less than 0.01.

Key words: Prevalence, Precancerous cervcal lesion, Cervical Cancer, Associated factors.

ABBREVATIONS: VIA, visual inspection with acetate, PAP, papanicolaou test, HPV, human papilloma virus, DNA, deoxyribo nucleic acid, SCJ, squamocolumnar junction.

Introduction

The most common human viral infection that can affect the skin and mucous membranes is Human PapillomaVirus (HPV) [1, 2]. Skin-to-skin contact and sexual activity both allow HPV to spread [2-4]. According to their propensity for oncogenesis, more than 130 HPV strains have been well-known and divided into low- and high-risk groups [2, 5]. One of the most frequent causes of precursor lesions and cervical cancer is HPV [6]. The two most cancer-causing HPV strains, HPV16 and HPV18, account for 70% of cervical carcinomas recorded globally

Cervical cancer is the most prevalent cancer in worldwide. In India it accounts 18.7% per 100000 women[1]in spite of being preventable, cervical cancer is the second most frequent cancer among women in India.According to Globocan 2020, there were 604,100 new instances of cervical cancer found worldwide in 2020, and this cancer was blamed for 341,831 fatalities. Cervical cancer made up 18.3% (123,907) of new cases and 9.4% of all cancer cases in India in 2020[2]. It continues to be one of the more prevalent malignancies in India and is the main reason why women die from cancer in low- and middle-income nations. Cervical cancer is the second

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

biggest cause of cancer deaths for females in 12 Indian states, despite a significant reduction in age-standardized incidence rate of 39.7% (95% UI 265-57.3) between 1990 and 2016[3].

With an estimated 570,000 new cases worldwide in 2018, cervical cancer accounted for 6.6% of all female cancer cases, making it the fourth most frequent cancer in women [8]. Between 2018 and 2030, the number of new cases of cervical cancer is predicted to climb from 570,000 to 700,000, while the number of fatalities is projected to rise from 311,000 to 400,000 [1]. A woman is affected by cervical cancer every minute of every day [9]. 90% of cervical cancer deaths, according to the World Health Organization (WHO), take place in areas with few resources [8].

Cervical cancer is the leading and second-leading cause of cancer-related fatalities in low- and lower-middle-income countries, respectively [1]. Cervical cancer is one of the most preventable and treatable cancer types with early identification and efficient treatment. However, the majority of cervical cancer patients in low-income nations receive treatment and diagnosis at a late stage of the illness and lack access to life-saving preventative measures and treatments.

The cervical cells in a region known as the transformation zone alter in precancerous lesions. The World Health Organisation (WHO) states that there are three stages at which this transformation might occur: cervical stage 1 (CIN1), stage 2 (CIN2), or stage 3 (CIN3) of intraepithelialneoplasia. They are not yet cancerous conditions. But if they don't receive treatment, CIN2 or Cervical intraepithelial neoplasia stage 2, often known as CIN3, additional (CIN2+) can develop into cervical cancer.

The top cause of death in the world is cancer being responsible for around 10 million deaths in 2020, or almost one in every six deaths (WHO, 2022). The most common cancer in the world is cervical cancer. Within India despite being preventable, it accounts for 18.7% of 100000 women in one year.According to Globocan 2020, there were 604,100 new instances of cervical cancer found worldwide in 2020, and this cancer was blamed for 341,831 fatalities. Cervical cancer made up 18.3% (123,907) of new cases and 9.4% of all cancer cases in India in 2020[2]. It continues to be one of the more prevalent malignancies in India and is the main reason why women die from cancer in low- and middle-income nations. Screening women in early helps to reduce the cervical cancer

The purpose of the cervical cancer screening is to identify women who are at risk and to ensure that those who have a positive or abnormal test result receive the proper follow-up. The World Health Organisation advises using the "screen-and-treat" technique to detect and cure precancerous lesions in order to avoid cervical cancer. After a positive screening test, or ideally right away, treatment is given. Human papillomavirus (HPV) testing, visual inspection with acetic acid (VIA), and cytology (Pap test) are examples of screening tests.

Understanding the prevalence and causes of precancerous cervix lesions in women can be utilised to develop vaccination campaigns, increase screening rates, and implement close management and follow-up procedures that could reduce cervical cancer-related morbidity and mortality.

In Literature, risk factors that have been connected to cervical cancer and its precursors have been described as multiple sexual partners, STIs, and a young age at which the first encounter occurred are all linked to an increased risk of developing cervical cancer. The risk factors for precancerous cervical lesions have received little attention in Research in India. To the best of our knowledge, this is the first study to pinpoint factors associated with precancerous cervical lesions in Tamilnadu women undergoing cervical cancer screening.

The results of this study provide a valuable contribution to healthcare providers and policy makers in preventing precancerous lesions that lead to cervical cancer and also helps the health care providers involved in cancer prevention and treatment by identifying the most vulnerable group of precancerous cervical lesions that can progress to cervical cancer. It helps decision makers to develop early prevention and treatment strategies by identifying valuable for the disease. In addition, knowledge of precancerous risk factors helps women seek early treatment for cervical cancer and avoid risk factors that may predispose them to the disease. Therefore, we aim to conduct a study to investigate the risk factors associated with cervical precancerous lesions among women screened for cervical cancer in rural area of Chengelpet district.

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

Methods

Study Setting and participants

The study was conducted in the Kattankulathur block, a revenue block in the Chengalpattu district situated on the northern east coast of Tamil Nadu, India. The population of the Kattankulathur block comprises 39 villages (Population and Housing Census enumerated population 2011). The researcher has selected 1 village in each Zone (north, south, east and west).Women in the age group of 30-65 years, who are willing to participate, Women with or without having family history of cancer and Women available at the time of data collection were included. Women with history of cervical cancer,has received any treatment for cervical precancer after screening positive for precancer, Pregnant women, Active vaginal bleeding, Post hysterectomy patient, Recent VIA, PAP, HPV DNA Test done were excluded from the study.

Ethical Considerations: The permission obtained from the President of Katankulathur Block, and the study was approved by the Institutional Ethical committee- Institution Review Board, Meenakshi Academy of Higher Education and Research, Deemed to be an University, Enathur, Chennai. The study was conducted in 4 selected villages in Nedungundrum, Kolapakkam, Alapakkam and Mamabakkam of Chengelpet district. Before screening, door to door survey was done with the help of community health nurses. Then the Audio announcement was given to attend thescreening camp for the women with obstetrical gynecological problem in Annai Veilankanni's Hospital and the camp was conducted for Eligible population and willing to participate in the study.The aim of the study was explained to the participants and obtained consent. After that samples were requested to fill the structured questionnaire and risk assessment questionnaire on Menstrual, Marital, sexual, obstetrical, contraceptive and gynaecological factors

Procedures:

Then the women were screened byHPV DNA test, PAP Smear, followed by VIA. The positive cases in either one of the screening testwas referred for digital colposcopy and this was evaluated by using swede's score. Digital colposcopic impression was scored by swede's score 0-4 as Normal, 5-7 scored as LGL(Low grade Lesion) and HGL(high Grade Lesion) scored as 8-10. Punch biopsies were taken from the abnormal regions using colposcopy. A biopsy of the cervix within the transformation zone was collected from patients whose colposcopy results were normal. Patients who had negative /unsatisfactory colposcopy result were not included in the study. The histological analysis of biopsy samples was sent to the laboratory for the result. Anonymity and confidentiality were maintained.

Sample Size

The Centers for Disease Control and Prevention in the United States used Open Epi version 3 statistical software to determine the sample size [33]. Our final sample size was 300 (100 cases and 200 controls), based on the following assumptions: the proportion of controls (women without precancerous cervical lesions) with lifetime number of sexual partners two and above (30.57%), odds ratio 2.17 [26], power 80%, 95% confidence interval, non-response rate 10%, and the ratio of cases to controls 1:2.

Data Collection tool and technique

The research instrument used for data collection was structured questionnaire which was developed after reviewing the literature. These questionnaire consists of

- Part I: Socio demographic Data,
- Part II: Risk Assessment Dataencompasses:
  - ✓ Menstrual risk assessment
  - ✓ Marital risk Factors
  - ✓ Sexual Risk Factors
  - ✓ Obstetrical Risk Factors
  - ✓ Contraceptive Risk Factors
- Part V: Client Workup form
  - ✓ VIA, Pap test, HPV DNA test
  - ✓ Colposcopic Examination & biopsy result form
- Part VI: Treatment Form
- Part VII: Follow up Form

Data Quality Assurance

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

A pilot study was done to check the consistency and reliability of the tools. Data were collected from two villages of Chengelpet district. Training for nurses were given for a day in relation to door to door survey, about screening camp, Ethical consideration (Human rights and informed consent, Beneficence, Dignity, Confidentiality). All the data were checked for clarity completeness and consistency by the principal investigator.

Results

Socio demographic characteristics of the participants:

Out of 250 woman screened for cervical cancer, majority 81(32.40%) of the participants were in the age group of 51-60 years and 57(22.80%) of participants in the age group of 31-40 years. Most of them, 99(39.60%) had completed high school education and 151(60.40) were unemployed. (Table 1)

Table: 1 Socio Demographic Variables of the Woman Screened For Cervical Cancer in Cervical Cancer Screening Camp

DEMOGRAPHIC VARIABLES		**n** N=250	**%**
Age in years	≤ 30 years	40	16.00
	31 -40 years	57	22.80
	41 -50 years	46	18.40
	51 -60 years	81	32.40
	>60 years	26	10.40
Educational status	Graduate	42	16.80
	Diploma	12	4.80
	High school	99	39.60
	Middle School	17	6.80
	Primary	37	14.80
	Non literate	43	17.20
	Others	0	0.00
Occupational Status	Unskilled	15	6.00
	Semi-skilled	18	7.20
	Skilled	30	12.00
	Professional	36	12.40
	Unemployed	151	60.40
Occupation of the husband	Professional	73	29.20
	Clerical/Business/Farmer	26	10.40
	Skilled	29	11.60
	Unskilled	122	48.80
	Unemployed	0	0.00

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

INJ INTERNATIONAL NEUROUROLOGY JOURNAL

Fig 1 Percentage distribution of religion among the woman screened for cervical cancer in cervical cancer screening camp

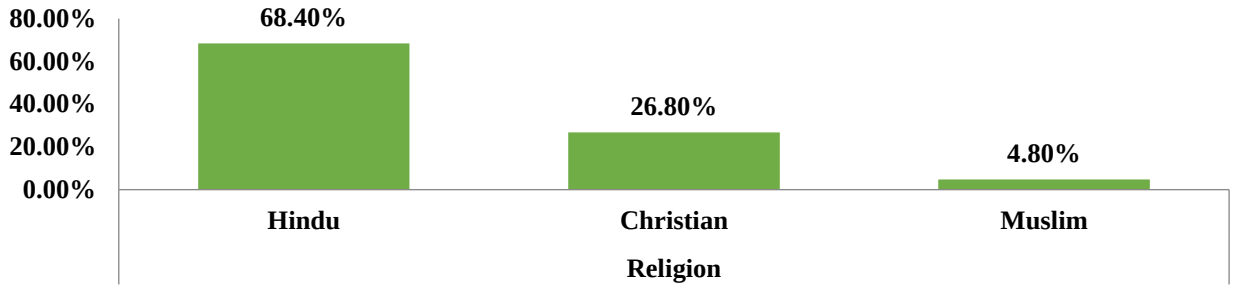


Fig 2 Percentage distribution of Family Income among the woman screened for cervical cancer in cervical cancer screening camp

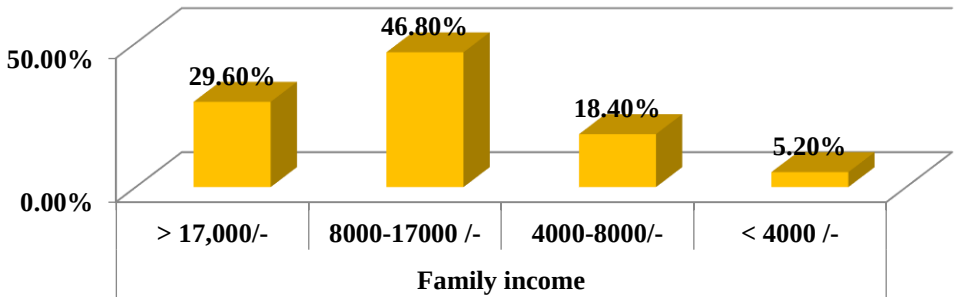
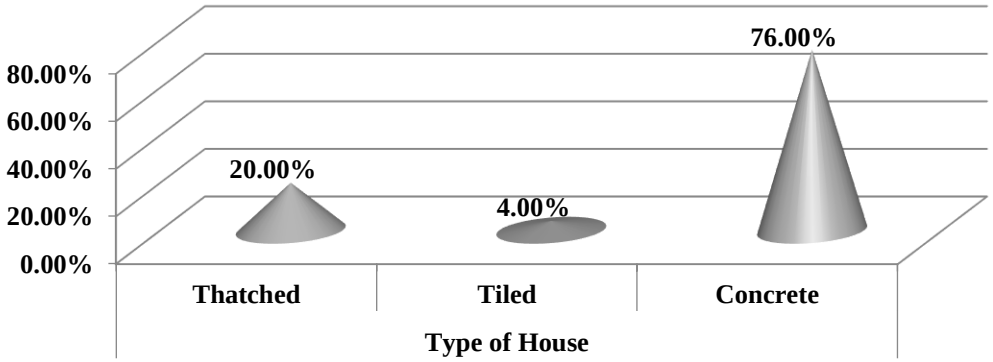


Fig 3 Percentage distribution of type of house among the woman who screened for cervical cancer in cervical screening camp



Menstrual History of the Respondents

The participants average starting age at menarche was between 10- 13 years (80.4%).The majority of participants 170(68%) had regular periods among them 138 (52.2%) had 3-5 days of duration of menstruation. The most of participants have practice of using napkins during menstruation 158 (63.2%) and two fifth of the participants using clean cotton cloth and one fifth of the participants have practice of using wastes cloth and among the participants 68(27%) have practice of drying the napkins(clothes) under sunlight and one fifth of participants have practice to dry inside the house and most of the participants using other methods. (Table.2)

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

Variables		No. of women (n=250)	%
Age at menarche	10-13 years	201	80.40
	14-16 years	49	19.60
Regularity of menstrual cycle	Regular	170	68.00
	Irregular	80	32.00
Duration of menstruation	3-5 days	138	52.20
	6-8 days	98	39.20
	9-11 days	10	4.00
	>11 days	4	1.60
Type of napkins used during menstruation	Sanitary napkins	158	63.20
	Clean cotton cloth	70	28.00
	Wastes cloth	22	8.80
Place of drying the napkins(clothes)	Under the sunlight	68	27.20
	Inside the house	24	9.60
	Others	158	63.20

Marital history of Respondents:
Among 250 participants 247 (98.8%)women married and 3 (1%) widow. The mojarity of participants got married at age between 21-25 years 134(53.60%) and two fifth of participants 97(38%)got married at 26-30 years. Those most of married women have marital life more than 20 years 120 members (48%). (Table.3)

Variables		No. of women (n=250)	%
Marital status	**Married**	**247**	**98.80**
	Widow	**3**	**1.20**
Age at marriage	**< 21 years**	**19**	**7.60**
	21- 25 years	**134**	**53.60**
	26-30 years	**97**	**38.80**
	31-35 years	**0**	**0.00**
Duration of marital life	**<5 years**	**21**	**8.40**
	6-10 years	**49**	**19.60**
	11-15 years	**31**	**12.40**
	16-20 years	**29**	**11.60**
	>20 years	**120**	**48.00**

Sexual history of respondents:
The participants average age of sexual activity was between 21-25 years(53.60%). The majority of participants 102(40.8%) had a frequency of coitus 3-4 times per week and spouse had no history of circumcision and STI. (Table.4)

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

Variables		No. of women (n=250)	%
Age at first sexual intercourse	15-20 years	19	7.60
	21-25 years	134	53.60
	26-30 years	97	38.80
	31-35 years	0	0.00
Frequency of coitus per week	1-2 times	74	29.60
	3-4 times	102	40.80
	5-6 times	71	28.40
	> 6times	0	0.00
	Nil	3	1.20
Husband history of STI, Circumcision	Yes -circumcision	12	4.80
	No - STI	238	95.20

Obstetrical History of respondent:
Among 250 participants majority 88 (35.2%) had more than two child, of them got first child at the age 26-36 years 97 (38.8%).Nearly 88 (35.25%) of the participants had child birth interval more than 4 years. (Table.5)

Variables		No. of women (n=250)	%
Number of child birth	None	10	4.00
	One	61	24.40
	Two	91	36.40
	More than Two	88	35.20
Age at first child birth	15 -20 years	19	7.60
	21-25 years	124	49.60
	26-30 years	97	38.80
	31-34 years	0	0.00
	NIL	10	4.00
Interval between child birth	1-2 years	90	36.00
	3-4 years	62	24.80
	> 4 years	88	35.20
	No Child	10	4.00

Gynecological history of respondents:
Out of 250 women's 72(28.8%) had family history of cancer and 10 (4%) had history of cervical cancer. Among the participants 116 (46.4%) attained menopause and most of them in the age above 45 years. A symptom of leucorrhoea was present in nearly 132 (52.8%) and the participants 41(31.6%) are in leucorrhoea treatment. (Table.6)

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

Variables		No. of women (n=250)	%
Family history of cancer	Yes	72	28.80
	No	178	71.20
Family history of cervical cancer	Yes	10	4.00
	No	240	96.00
History of previous pelvic surgery	Yes	5	2.00
	No	245	98.00
Menopause attained	Yes	116	46.40
	No	134	53.60
no , if yes age at menopause	< 45 years	46	39.66
	45 -50 years	44	37.93
	> 50 years	26	22.41
History of postmenopausal bleeding	Yes	0	0.00
	No	116	100.00
Presence of leucorrhoea	Yes	132	52.80
	No	118	47.20
Treatment of leucorrhoea	Yes	41	31.06
	No	91	68.95

Contraceptive history of respondents

Among 250 women's 160 (64%) adapted contraception method. In that 90 (100 %) was used two years duration of contraceptives of which 76 (30.40%) had complaints of unusual bleeding and 59(77.63%) undergone treatment more than one year. (Table.7)

VARIABLES		No. of women (n=250)	%
Method of contraception adapted	condom	0	0.00
	copper T	160	64.00
	oral pills	0	0.00
	Others	82	32.80
if yes duration	6months	8	8.89
	1 year	22	24.44
	2 years	60	66.67
	> 2 years	0	0.00
Duration of contraceptive usage	< 12 months	0	0.00
	1- 2 years	90	100.00

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

	3-4 years	**0**	**0.00**
	> 4 years	**0**	**0.00**
History of blood stained vaginal discharge	**Yes**	**110**	**44.00**
	No	**140**	**56.00**
History of unusual bleeding	**Yes**	**76**	**30.40**
	No	**174**	**69.60**
if yes duration and treatment	**< 12 months**	**17**	**22.37**
	1- 2 years	**59**	**77.63**
Sources of health information obtained regarding cervical cancer	**Newspaper / health magazines**	**23**	**9.20**
	Health care professional or relatives	**39**	**15.60**
	None	**188**	**75.20**

Risk factors of Precancerous lesion

Table 3 shows out of 250 women's 132(52.82%) had the symptom of presence of Leucorrhoea, 110(44%) had the history of blood stained vaginal discharge, 108(43.2%) had more than 5 days menstrual cycle and 201(80.40) had early age of Menarche. (Table.8)

Risks	**Number of women screened(n=250)**	**%**
Irregular cycle	80	32.00
Early Age at menarche (10-11 years)	201	80.40
Duration of menstruation(>5 days)	108	43.2
Early marriage (15-20 years)	19	7.60
Number of children (More than Two)	88	35.20
Abortion status	48	19.20
Presence of leucorrhoea	132	52.80
Treatment of leucorrhoea	41	16.40
contraception adapted	90	36.00
History of blood stained vaginal discharge	110	44.00
History of unusual bleeding	76	38.58

Precancerous lesions prevalence:

Out of 250 women's attended the Medical Campaign 56(20.8%) was of positive to Visual Inspection of Acetic Acid (Table 9), 23(9.2%) cases were Positive for Pap smear. Among Positive Pap smear cases 4(17.39%) had AUC US, 13(56.52%) had LSIL and 6 (26.08%) HSIL(Table 10), whereas in HPV DNA test 9 cases were positive (Table 11)

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

Table 9: Distribution study population according of Pap smear finding

Test	No. of cases	Percentage (%)
Adequate sample	219	87.60
Unsatisfactory sample	31	12.40
Negative for malignancy	248	99.20
Inflammation	79	35.20
Squamous Cell Carcinoma	2	8.00
ASCUS	4	00.00
LSIL	13	4.80
HSIL	6	8.00

Table `10: Distribution of study population according to VIA result

Test	No. of cases	Percentage (%)
VIA Positive	52	20.8
VIA Negative	198	79.2

Table 11: Distribution study population according of HPV DNA Test

Test	No. of cases		Percentage (%)
	HPV	no.	
HPV Positive	61	2	3.60
	13	4	
	18	1	
	45	1	
	16	1	
HPV Negative	241		96.4

Table:12: Distribution of cases according to colposcopic impression

Swede score	Colposcopic impression	No. (n = 56)	%
0–4	Normal	48	57.3
5–7	LGL	4	24.3

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

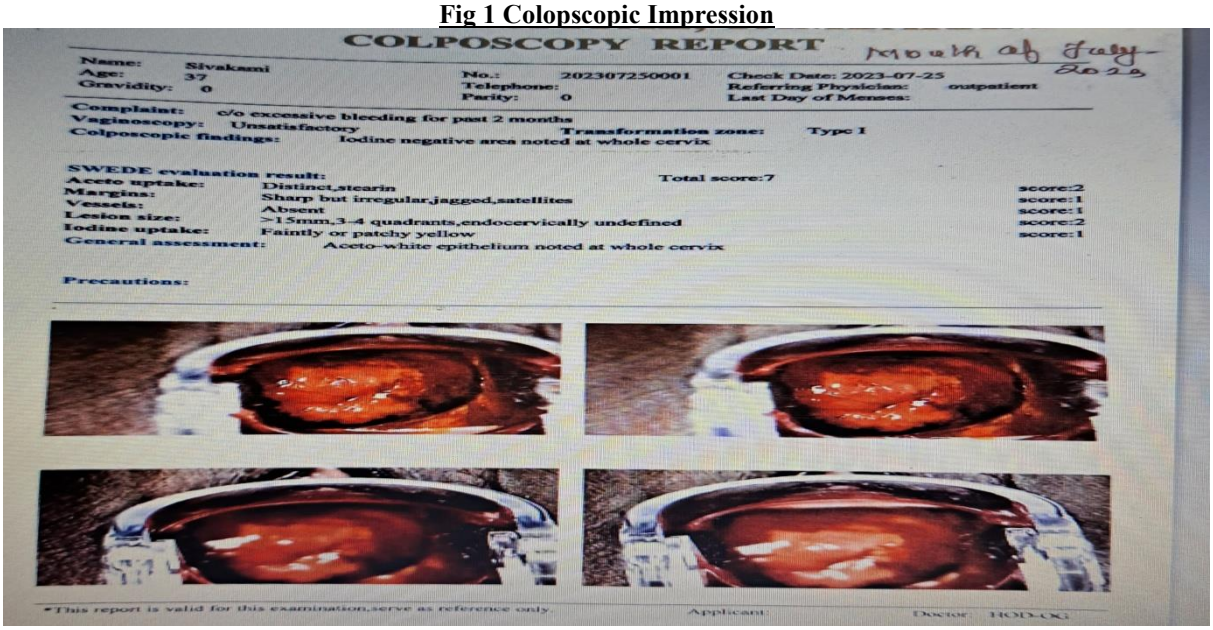
8–10	HGL	4	18.4

Women who had abnormal screening test result (VIA or PAP smear, or HPV DNA Test) were sent for Digital colposcopy examination (Fig.1), Colposcopy guided biopsy (Punch biopsy) done for the women who had abnormal findings ie., Swedes score 5 and above(swede score 0-4 Normal, 5-7 LGL and 8-10 HGL) (Table:12). Cryosurgery done for precancerous condition, whereas as Cervical cancer cases referred to tertiary care center(Table 13)

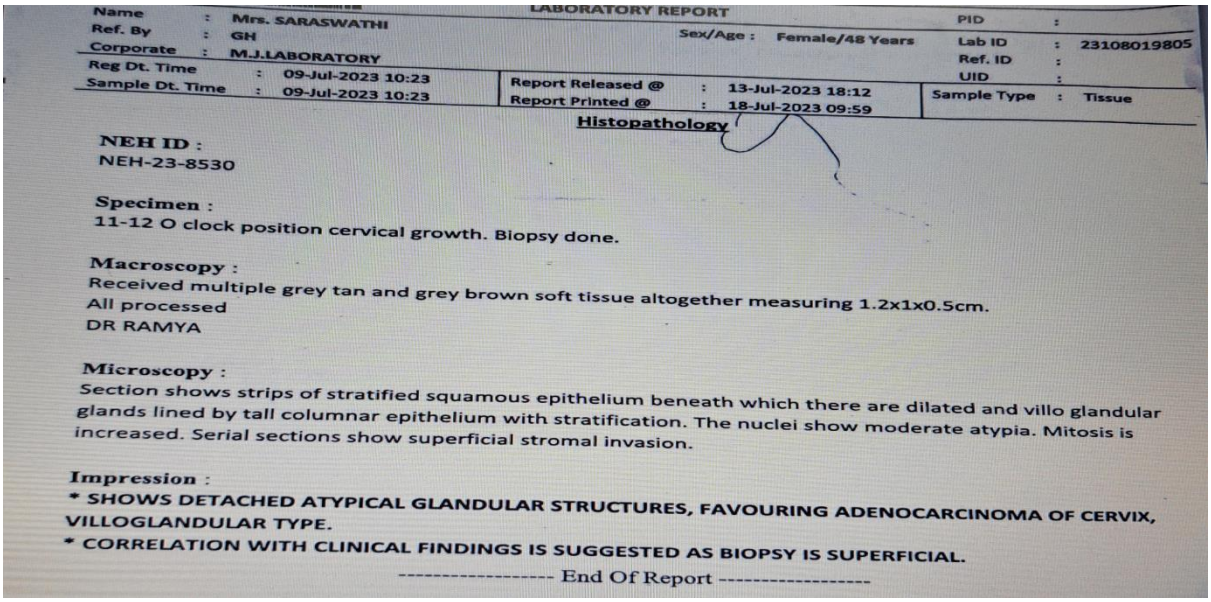
Table 13: Distribution of cases according to Histopathological reports of Cervical Biopsy

Histopathological report	**No. (n = 56)**	**%**
CIN 1	**36**	**64.28**
CIN 2	**8**	**14.28**
CIN 3	**2**	**3.57**
Chronic cervicitis/benign	**10**	**17.85**
Total	**56**	

Fig 1 Colopscopic Impression



Biopsy Report



LABORATORY REPORT

Name	: Mrs. SARASWATHI			PID	:
Ref. By	: GH	Sex/Age :	Female/48 Years	Lab ID	: 23108019805
Corporate	: MJ.LABORATORY			Ref. ID	:
Reg Dt. Time	: 09-Jul-2023 10:23	Report Released @	: 13-Jul-2023 18:12	UID	:
Sample Dt. Time	: 09-Jul-2023 10:23	Report Printed @	: 18-Jul-2023 09:59	Sample Type	: Tissue

Histopathology

NEH ID :
NEH-23-8530

Specimen :
11-12 O clock position cervical growth. Biopsy done.

Macroscopy :
Received multiple grey tan and grey brown soft tissue altogether measuring 1.2x1x0.5cm.
All processed
DR RAMYA

Microscopy :
Section shows strips of stratified squamous epithelium beneath which there are dilated and villo glandular glands lined by tall columnar epithelium with stratification. The nuclei show moderate atypia. Mitosis is increased. Serial sections show superficial stromal invasion.

Impression :
* SHOWS DETACHED ATYPICAL GLANDULAR STRUCTURES, FAVOURING ADENOCARCINOMA OF CERVIX, VILLOGLANDULAR TYPE.
* CORRELATION WITH CLINICAL FINDINGS IS SUGGESTED AS BIOPSY IS SUPERFICIAL.

---------- End Of Report ----------

Conclusion And Recommendation

In conclusion, this study found that the prevalence of precancerous cervical lesion is higher. To lower the prevalence of abnormal cervical lesions in the study area, its importance to concentrate on primary prevention strategy (HPV vaccine) at an earlier stage and periodical cervical cancer screening to the target group.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of the article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Institutional ethical committee of Meenakshi Academy of Higher Education and Research University. Written informed consent for participants was obtained.

AUTHOR CONTRIBUTION

Johny Christopher conceived and designed the study, Prema Krishnan and Rajkumar analyzed the data. Deva Bala Nirmala and Umamageshwari prepared the manuscript. All the authors contributed to the article and approved the submitted version.

Acknowledgements

We would like to express our gratitude to the study participants.

Conflict Of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

1. Kulasingam SL, Havrilesky L, Ghebre R, Myers ER. Screening for Cervical Cancer: A Decision Analysis for the US Preventive Services Task Force. AHRQ Publication No 11-05157-EF-1. Rockville, MD: Agency for Healthcare Research and Quality; 2011.
2. 2.American Cancer Society. Cervical Cancer. Atlanta, GA: American Cancer Society; 2006. [19 April 2011.
3. 3.Saraiya M, Ahmed F, Krishnan S, et al. Cervical cancer incidence in a prevaccine era in the United States, 1998–2002. Obstet Gynecol. 2007;109:360–370.
4. 4.Abeloff MD, Armitage JO, Niederhuber JE, Kastan MB, McKenna WG, editors. Clinical Oncology. 3. Philadelphia, PA: Elsevier Churchill Livingstone; 2004.

DOI: 10.5123/inj.2023.4.inj10
ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)

5. 5.Richart RM. Cervical intraepithelial neoplasia. Pathol Annu. 1973;8:301–328.
6. 6.McCredie M, Sharples K, Paul C, et al. Natural history of cervical neoplasia and risk of invasive cancer in women with cervical intraepithelial neoplasia 3: a retrospective cohort study. Lancet. 2008;9:425–434.
7. 7.Chang AR. Carcinoma in situ of the cervix and its malignant potential: a lesson from New Zealand. Cytopathology. 1990;1:321–328.
8. 8.Kinlen LJ, Spriggs AI. Women with positive cervical smears but without surgical intervention: a follow-up study. Lancet. 1978;2:463–465.
9. 9.Smith HO, Tiffany MF, Qualls CR, et al. The rising incidence of adenocarcinoma relative to squamous cell carcinoma of the uterine cervix in the United States—a 24-year population-based study. Gynecol Oncol. 2000;78:97–105.
10. 10.Solomon D, Davey D, Kurman R, et al. The 2001 Bethesda System: terminology for reporting results of cervical cytology. JAMA. 2002;287:2114–2119.
11. 11.Acta Cytol; The Bethesda System for reporting cervical/vaginal cytologic diagnoses: revised after the second National Cancer Institute Workshop; April 29–30, 1991; 1993. pp. 115–124.
12. 12.National Office of Vital Statistics, US Department of Health, Education, and Welfare. Vital Statistics of the United States, 1950 Volume III: Mortality Data. Washington, DC: U.S. Government Printing Office; 1953. [19 April 2011].
13. 13.Xu J, Kochanek KD, Murphy SL, Tejada-Vera B. Deaths: final data for 2007. Natl Vital Stat Report. 2007;58:1–135.
14. 14.International Agency for Research on Cancer. IARC Handbooks of Cancer Prevention: Cervix Cancer Screening. Vol. 10. Lyon, France: IARC Press; 2005.
15. 15.National Cancer Institute, Surveillance Epidemiology and End Results (SEER) Program. SEER Stat Fact Sheets: Cervix Uteri. Bethesda, MD: National Cancer Institute; 2011. [21 April 2011
16. 16.Howlader N, Noone AM, Krapcho M, et al., editors. SEER Cancer Statistics Review, 1975–2008. Bethesda, MD: National Cancer Institute; 2011. [21 April 2011].
17. 17.Howlader N, Noone AM, Krapcho M, et al., editors. SEER incidence and U.S. death rates by race/ethnicity: cancer of the cervix uteri, SEER Cancer Statistics Review, 1975–2008. Bethesda, MD: National Cancer Institute; 2011.
18. 18.Janerich DT, Hadjimichael O, Schwartz PE, et al. The screening histories of women with invasive cervical cancer, Connecticut. Am J Public Health. 1995;85:791–794.
19. 19.Kinney W, Sung HY, Kearney KA, et al. Missed opportunities for cervical cancer screening of HMO members developing invasive cervical cancer (ICC). Gynecol Oncol. 1998;71:428–430
20. 20.Sung HY, Kearney KA, Miller M, et al. Papanicolaou smear history and diagnosis of invasive cervical carcinoma among members of a large prepaid health plan. Cancer. 2000;88:2283–2289.

DOI: 10.5123/inj.2023.4.inj10

ISSN:2093-4777 | E-ISSN:2093-6931
Vol. 27 Iss. 4 (2023)