

A community-based cervical cancer screening program in Alappuzha district of Kerala using camp approach

Lakshmi Mohan¹, Karthika M²

¹Department of Obstetrics and Gynaecology, Urban Health Training Centre (UHTC) Ambalapuzha, Kerala, ²Department of Community Medicine, Government TD Medical College, Alappuzha, Kerala, India

ABSTRACT

Background: Cervical cancer is a major cause of preventable cancer related death in women, particularly in middle-income developing countries. Screening of cervical pre-cancer by cytology remains an effective strategy for prevention of mortality. However, there is paucity of community-based studies in Kerala. The aim of this study was to determine the prevalence of cervical precancerous lesions and to study the associated epidemiological factors through camp approach. **Materials and Methods:** A cross-sectional study was carried out among women in Alappuzha district, Kerala, by conducting community-based screening camps covering all the panchayaths from February 2017 to January 2019. **Statistical Analysis Used:** Descriptive statistics including mean for continuous variables and frequency along with their percentage for categorical variables were determined. Pearson's Chi-square test was used to determine the strength of the association between variables. Statistical significance was set at *P* value less than 0.05. **Results:** Out of 5241 women screened, majority (62.9%) were in the reproductive age group (31–50 years) with mean age of 47.1 ± 10.3 years. The prevalence of precancerous lesions of cervix was 6.37%, which consisted of low-grade squamous intraepithelial lesion (LSIL) in 2.2%, high-grade squamous intraepithelial lesion (HSIL) in 0.5% and Carcinoma-in-situ in 0.2%. Risk factors that had significant association with cervical precancerous lesions were lower education status, genital infections, early marriage age and high parity. **Conclusion:** Well planned community-based screening programs can help to identify the exact prevalence of cervical pre-cancer in a region and the associated epidemiological factors leading to formulation of effective elimination strategies.

Keywords: Camp approach, cervical pre-cancer, cytology, pap smear, screening

Introduction

Worldwide, around 2,66,000 women die of cervical cancer every year.^[1] It is estimated that almost nine out of every 10 of these deaths, occur in low and middle-income countries, compared to just one in high-income countries.^[2] The reason for this disparity is the relative lack of effective prevention, early detection and treatment programmes, and the lack of equal access to such programmes. Majority of these deaths can be prevented through universal access to comprehensive cervical cancer prevention and control programmes, especially screening and treatment for

pre-cancer. Primary care providers and family physicians have a great role in successful implementation of these programmes.

In India, cervical cancer is the second most common cancer among women.^[3] The age-adjusted incidence rate for cervical cancer has been reported to vary widely among various population-based cancer registries in India, ranging from 4.91 to 23.07 per 1,00,000 women.^[4] In the south Indian state of Kerala, age-standardised incidence rate for cervical cancer as of 2016 was 9.9 per 1,00,000 women.^[5] A long latent period of 10–20 years between cervical pre-cancer and cancer provides sufficient opportunity to screen, detect and treat pre-cancer and avoid its progression to cancer. For the early diagnosis of cervical cancer, cytological screening (Pap smear) is used widely.

Address for correspondence: Dr. Lakshmi Mohan, Urban Health Training Centre, Ambalapuzha, Kerala, India. E-mail: drlakshmimohan18@gmail.com

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Main advantage of cytological screening is that it permits to detect the disease in its pre-invasive phase, which can be easily treated. Various population-based and hospital-based studies have explored the prevalence of cervical pre-cancer and associated epidemiological factors. Most studies in rural population had shown higher incidence of squamous intraepithelial lesions compared to urban population.^[6,7]

This might be due to poor socio-economic condition, poor genital hygiene, associated persistent vaginal infections, malnutrition, early marriage, and less use of contraceptive methods.

There is paucity of data in the state of Kerala and hence the objective of the present study is to throw some light into the same. The present study was undertaken with the objectives of:

1. To determine the prevalence of cervical precancerous lesions reported to the various community-based screening camps conducted in Alappuzha district.
2. To study the epidemiological factors associated with cervical pre-cancer.

Materials and Methods

A cross-sectional study was carried out among women in Alappuzha district, Kerala, by conducting community-based screening camps covering all the panchayaths from February 2017 to January 2019. The study was conducted after obtaining clearance from Institutional Ethics Committee.

Inclusion criteria

All married women who attended the camp, consenting for gynaecological examination and cervical screening.

Exclusion criteria

1. Unmarried women
2. Women with menstrual period or active vaginal bleeding
3. Pregnant women
4. Women who underwent hysterectomy
5. Women with diagnosed carcinoma cervix either on treatment or cured.

Screening camps were scheduled in different parts of the district, covering all the panchayats. Health education activities on cervical screening were conducted in the villages, prior to the camps by trained female health workers, through group meetings and discussions. Recruitment of eligible women was done by auxiliary nurse midwives (ANM) and Accredited Social Health Activists (ASHA) through community group talks and personal communication with the help of health education material. Mobile screening camps were organised in village schools or community health centres on mutually convenient dates. Women who attended the camps were again counselled and explained about the procedure of screening. Informed written consent was taken from each participant. A structured proforma with identification number,

sociodemographic data and clinical information was collected for each woman.

Detailed history of the patient with regard to gynaecological complaints such as any white/blood-tinged discharge per vaginum, postcoital/postmenopausal bleeding, previous Pap smears, obstetric history, menstrual history, and contraception history were obtained. Informed written consent was taken. Comprehensive clinical and socioeconomic data were obtained and noted on a structured proforma.

Per speculum examination of cervix and vagina was done using a Cusco's bivalved self-retaining speculum with patient in lithotomy position. The squamocolumnar junction was visualised; with the hooked end of Ayre's spatula, squamocolumnar junction was scraped gently throughout its circumference and material was transferred to glass slides. Smears were fixed with 95% alcohol immediately and stained by Papanicolaou stain.

Histopathological examination of these slides were done at District Cytopathology section and classified as: negative for intraepithelial malignancy (NILM), inflammatory smear, atypical squamous cells of undetermined significance (ASCUS), low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL), atypical squamous cells -cannot rule out high-grade lesion (ASC-H), atypical glandular cells of undetermined significance (AGUS), carcinoma *in situ* or inconclusive for lesions, according to Bethesda system.^[8]

Any screened women detected as positive was referred to district hospital for colposcopic examination and biopsy for confirmation of diagnosis. Report was distributed to women by ASHAs or ANMs of the area. The treatment of precancerous lesions was done as per WHO guidelines.^[9]

Statistical analysis

The data was field-edited daily and Statistical Package for Social Sciences (SPSS, version 21) was used for analysis. Descriptive statistics such as mean and standard deviation was used for continuous variables. For categorical data, frequencies were computed. Pearson's Chi-square test was used to determine the strength of the association between variables. The level of statistical significance was set at *P* value less than 0.05.

Results

Out of 5565 women who attended the camps, 5241 women satisfied the inclusion and exclusion criteria. Majority (62.9%) of the study population were in the reproductive age group (31–50 yrs) with mean age of 47.1 ± 10.3 years [Table 1]. Only 11.4% were older than 60 years of age. Most of them had got married between the age of 21–30 years (78.3%); the mean age of marriage being 22.45 ± 2.75 years. About 10.5% had a family history of malignancy. Most (81.5%) of the women attending the camp were in the below-poverty-line (BPL) category and had lesser than Higher Secondary school education (72.3%). Among

the women participants, 582 women (11.1%) had studied till graduation or above, whereas majority (72.3%) studied only till higher secondary level.

Of 5241 women, 5131 (97.9%) were parous and 110 women (2.09%) were nulliparous. It was observed that 44.4% of women had at least one but less than three children, whereas 53.39% had parity of more than or equal to 3 [Table 2]. The mean age of first delivery was noted to be 23.61 ± 2.73 years, with the majority of them delivering their first child between the age of 21–30 years (87%). The age of last delivery was also observed to be mostly between 21 and 30 years with the mean being 29.23 ± 4.31 years. About 95.7% of participant women had their menarche between the age of 11 and 15 years. Only 34 of them (0.7%) had early menarche below the age of 10 years. A total of 2861 women were menopausal; among them 84.8% had attained menopause between the age 41 and 50 years. Only 235 women (4.5%) had late menopause after 50 years of age. It was noted that 3221 women were using some form of contraception. A vast majority of women had undergone permanent sterilisation (82.36%) (postpartum or interval sterilisation) followed by usage of Intrauterine contraceptive device (IUCD) (7.2%), barrier contraception (6.1%), non-scalpel vasectomy (NSV) (3.3%) and Oral contraceptive pills (OCP) (0.83%).

Gynaecological symptoms

About 893 subjects (17%) complained of white discharge per vaginam. Eight-five women gave a history of post-coital bleeding. History of post-menopausal bleeding was obtained in 207 women (3.9%). On clinical examination cervix was unhealthy in 24.4% patients. Cervix showed atrophy in 7.9%, whereas hypertrophy was noted in 5.7%. Bleeding on touch was detected in 7.6% of subjects. Among other findings, cervical polyp (3.9%) and fibroid (2.3%) were the most frequent.

Of the collected smears, 64.8% were negative for intraepithelial malignancy and 17.2% showed benign inflammatory changes, whereas 3.4% samples were found to be unsatisfactory. Distribution of pap smear findings is illustrated in Figure 1. As many as 8.1% slides showed atrophic endometrium, whereas 0.2% showed carcinoma *in situ*. Squamous intraepithelial lesions were identified in 2.2% (LSIL) and 0.5% (HSIL) smears [Table 3].

Discussion

Community-based cervical cancer screening programme by camp approach is gaining significance in the recent years, especially in India. Cervical cancer, being a preventable malignancy, the exact data regarding the prevalence of cervical precancerous lesions and associated risk factors is invaluable to plan strategies for elimination.^[10] Analysis of the existing data reveals that there are very few cross-sectional studies conducted at the community level in South Indian state of Kerala.

The prevalence of abnormal cytology in our study was 6.37%, among which 1.08% were high-grade epithelial lesions. Similar

Table 1: Socioeconomical and demographic characteristics of the women

Sociodemographic characteristics	n	(%)
Age group		
<30	191	3.6%
31-40	1323	25.2%
41-50	1977	37.7%
51-60	1149	21.9%
>60	601	11.4%
Marriage age		
<20	1076	20.5%
21-30	4106	78.3%
31-40	57	1.1%
>40	2	0.1%
Economic status		
BPL	4273	81.5%
APL	968	18.5%
Education level		
No formal education	33	0.6%
Primary school	303	5.8%
Upper primary	760	14.5%
Secondary	2743	52.3%
Higher secondary	820	15.6%
Degree and above	582	11.1%

Table 2: Gynaecological profile of study population

Frequency	Percent	age
Menarchal age		
<10	34	0.7%
11-15 years	5016	95.7%
>15	191	3.6%
Parity distribution		
Nullipara	119	2.3%
Parity 1	333	6.4%
parity of 2	1991	38%
parity of >3	2798	53.4%
Menopausal age		
Not attained menopause	2861	54.5%
<40	126	2.4%
41-45 yrs	1028	19.6%
46-50 yrs	991	18.9%
>50	235	4.5%
Complaints		
White discharge per vaginam	1008	19.2%
Blood-tinged discharge	250	4.8%
Post-coital bleeding	85	1.6%
Post-menopausal bleeding	207	3.9%
Contraception usage		
None	2020	38.5%
tubal ligation	2653	50.6%
IUCD	234	4.5%
NSV	109	2.1%
OCP	27	0.5%
Barrier contraception	198	3.8%

findings were reported in a few other studies. In a study by Rana *et al.*^[11] among 610 women in a semi-urban population in New Delhi, epithelial cell abnormality was reported in

42 cases (6.8%). In a Delhi-based study using camp approach by Sharma *et al.*,^[12] the prevalence of carcinoma *in situ* and high-grade cervical carcinoma was found out to be 10.7%. In a study by Gupta *et al.*,^[13] the prevalence of cervical dysplasia was found to be 3.2% among women in western Uttar Pradesh. However, in a study by Shaki *et al.*,^[14] among 1100 asymptomatic women in a tertiary care hospital in an urban area of Mumbai, epithelial cell abnormality was reported to be as high as 17.8%. This higher prevalence could be due to a hospital-based study population compared to a community setting in our study.

In our study, out of 5241 participating women, 3605 (68.78%) women had multiple symptoms of reproductive tract morbidity. Low backache (43.98%) and discharge per vaginum (19.23%) were the most common complaints. Among 893 patients who had increased vaginal discharge, 51 (5.71%) had abnormal pap smear, which was statistically significant (p value < 0.01). The excessive discharge could be from the fragile blood vessels due to neoangiogenesis seen in malignancy or inflammation of colpos due to lower genital tract infections. Other complaints reported by the study subjects were coital bleeding (1.62%) and postmenopausal bleeding (3.94%). Among patients with coital bleeding, 5 had AGUS, 18 had epithelial lesions and 35 patients had inflammatory smears. In the study by Sharma *et al.*,^[12] among the 435 women screened, gynaecological morbidity was observed to be 59.8%. Similar to our findings, discharge per vaginum (28.5%) and pain in lower abdomen (20.1%) were the most common complaints reported. Sachan *et al.*^[15] in a study also found vaginal discharge (36.9%) and abdominal pain (25.6%) to be the most common complaints. A study conducted by Shahina Begum in the low socio-economic community of urban slums in Mumbai revealed that about 64.8% of women who attended the camp had at least one complaint regarding reproductive morbidity.^[16]

On clinical examination, erosion was noted in 560 patients. Among these, 34 (6.07%) patients had abnormal cytology. A total of 299 patients had hypertrophy of cervix, among which nine patients had high-grade epithelial lesions. Discharge per vaginum was the most common finding in per speculum examination. Blood-tinged discharge was complained by only 250 (4.77%) women, among whom seven had glandular lesions and nine patients had high-grade epithelial lesions. Bleeding on touching the cervix is an important clinical sign of fragility of blood vessels of the cervix, which could be due to abnormal angiogenesis as in case of cervical malignancy or because of severe infection causing inflammation of cervix.^[17] About 114 patients with bleeding on touch had inflammatory smear, 33 patients had abnormal epithelial lesions, among which 10 had high-grade lesions and 10 had glandular lesions.

Parity of three or more was observed in 2369 (45.20%) patients who attended the camps. Among them 193 (8.14%) patients had abnormal smears, which was statistically significant [Table 4]. Thirty-two patients had high-grade epithelial lesions and 28 of

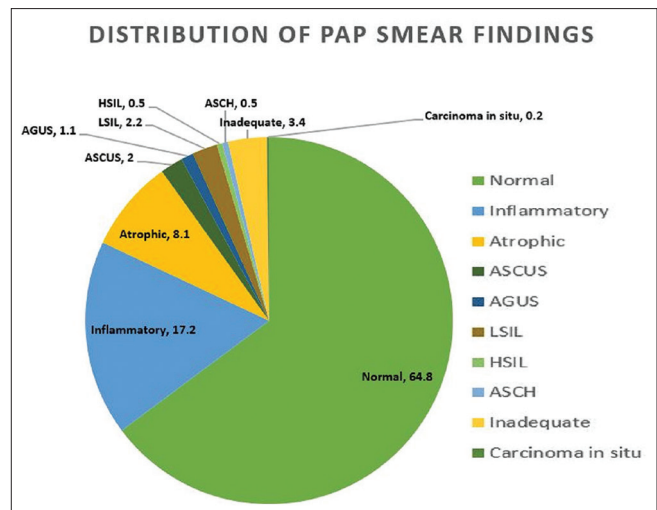


Figure 1: Distribution of Pap smear findings

Table 3: Distribution of study subjects according to Pap smear findings

Pap smear	Frequency	Percentage
Normal	3400	64.8
Inflammatory	902	17.2
Atrophic	426	8.1
ASCUS	106	2.0
AGUS	57	1.1
LSIL	114	2.2
HSIL	24	0.5
ASCH	24	0.5
Inadequate	179	3.4
Carcinoma <i>in situ</i>	9	0.2
Total	5241	100.0

Table 4: Relationship between associated factors and Pap smear findings

	Normal	Abnormal	P
Education status			
Below Secondary	738	89	0.00
Secondary and above	3560	245	
Marriage age			
Below 21	830	92	0.002
21 years and above	3470	242	
Parity			
<3	2121	141	0.00
3 or more	2176	193	
Family history of malignancy			
Yes	447	46	0.06
No	3852	288	

them had glandular lesions. In a multicentric study by Munoz *et al.*,^[18] high parity was found to increase the risk of squamous-cell carcinoma of the cervix, especially among HPV-positive women. Post-menopausal bleeding was noted in 207 patients, of which 14 had high-grade epithelial lesions and 13 had glandular lesions. Family history of cancer was noted in 10.5% patients; 29 patients had abnormal pap smears.

In our study, high-grade epithelial lesions were noted mostly in 51–60 years and more than 60 years age groups, whereas glandular lesions were noted in comparatively younger age group of 31–40 years (14 patients) and 41–50 years (27 patients). Inflammation of the cervix was noted more in sexually active age group of 31–50 years. High-grade epithelial lesions were noted mostly in women who had marriage between 21 and 30 years (39 patients) and less than 20 years of age (16 patients). AGUS was also noted more in women who had marriage between 21 and 30 years. Among the post-menopausal women, high-grade epithelial lesions were noted mostly in women who attained menopause after 46 years of age (27 patients). Similarly, AGUS was also observed to be the highest in women who attained menopause at a younger age of 41–45 years.

Lower education status and presence of genital infections had statistically significant association with abnormal smears in our study. Further, majority of patients who had severe infection and inflammation of the cervix had secondary education and below.

Similar results were obtained in the study by Sharma *et al.*,^[12] where illiteracy and poor genital hygiene were noted as prominent risk factors. In our study, high-grade epithelial lesions and glandular lesions were noted in mostly lower socioeconomic (BPL) category patients. In a meta-analysis by Parikh *et al.*,^[19] pooled data from 57 previously reported case-control studies of cervical cancer or dysplasia, found an increased risk of approximately 100% between high and low social class categories for the development of invasive cervical cancer, and an increased risk of approximately 60% for dysplasia, including carcinoma *in situ*. This underscores the importance of equitable access to adequate cervical cancer screening programs. The change has to occur at a grass root level and active involvement of primary care providers and family physicians can have a great impact in achieving this goal.

Limitations of the study

This being a cross-sectional study, a longitudinal follow-up of subjects could not be obtained. Larger studies with long-term follow-up of subjects are needed to determine the efficacy of cervical cancer preventive programmes and plan elimination strategies.

Conclusions

The prevalence of precancerous lesions of cervix in our study was 6.37%, which is at par with most of community-based studies conducted in India. Risk factors that had significant association with cervical precancerous lesions were lower education status, cervical and vaginal infections, early marriage age and high parity. Screening of cervical pre-cancer, especially through community-based camp approach with coordination of primary care providers, can ensure the much-needed equitable access to cervical cancer prevention programmes for the vulnerable groups.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Key Messages

Community-based camp approach in cervical pre-cancer screening is an effective strategy to identify the exact prevalence and epidemiological factors aiding in cervical cancer prevention and elimination.

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Conflicts of interest

There are no conflicts of interest.

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