

# Compliance for Community-Based Cervical Cancer Screening Program among Women of Age 30–65 Years Residing in Low Socioeconomic Settings of Mumbai, India

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## Abstract

**Background:** Low participation in screening and poor follow-up are major challenges in implementing population based screening in developing countries. Determinants of participation in a community-based organized cervical cancer screening program are discussed here. **Objectives:** The objectives were to study factors determining compliance of women for cervical cancer screening in an urban low socioeconomic setting. **Methodology:** Community-based service program was conducted for screening uterine cervix cancers with a visual inspection of the cervix on the application of 5% acetic acid by trained primary health workers. The process involved the selection of clusters, household surveys, health education, and screening of eligible women for uterine cervix cancer. Logistic regression analysis was conducted to identify determinants of participation in cervical cancer screening. **Results:** A total of 138,383 population were surveyed, of which 21,422 eligible women were contacted and 16,424 (82.50%) complied for screening. According to the results of univariate and multivariate analysis, women belonging to the age group of 30–39 (80.69%), literate women with school level or education up to Senior College (78.97% and 80.86%) (odds ratio [OR], 1.323;  $P \leq 0.001$ ) and (OR, 1.402;  $P \leq 0.001$ ), belonging to Hindu religion (77.20%), speaking Marathi (77.07%), and with a family history of cancer (81.93%) had higher participation for screening, while women belonging to the Muslim community (73.95%) (OR, 0.743;  $P \leq 0.001$ ), speaking other than Marathi and Hindi language (73%) (OR, 0.872;  $P = 0.017$ ), illiterate women (70.71%), and graduate women (70.78%) had lower participation. **Conclusion:** High compliance can be achieved by providing good-quality health education and setting up of screening clinics in vicinity of participating women.

**Keywords:** Cervical cancer, compliance, early detection, screening

## INTRODUCTION

Cervical cancer is the fourth most diagnosed cancer worldwide, with an estimated 570,000 new cases and 31,100 deaths in 2018. In low economic settings, it is the second most common cancer next to breast cancer. It is the most commonly diagnosed cancer and leading cause of death in many countries.<sup>[1]</sup> Almost nine of ten (87%) cervical cancer deaths occur in the less developed regions.<sup>[2]</sup> Although cervical cancer is on a declining trend in India, deaths due to cervical cancer are more among Indian women than in any other country. It is estimated that there are 96,922 (age-standardized rate [ASR] 14.7) new cases of cervical cancer and 60,078 (ASR 9.2) deaths due to cervical cancer every year in India.<sup>[1]</sup> Large geographic variations in cervical cancer incidence and mortality rates are attributable to poor health-care infrastructure, lack of effective screening,

early detection program, and cancer treatment facilities in low- and middle-income countries.<sup>[3]</sup> Developed countries have implemented cervical cancer detection programs based on Papanicolaou (Pap) testing. This has led to a reduction in cervical cancer incidence and mortality over the last 50 years.<sup>[4]</sup> However, cervical cancer screening program based on Pap smear is difficult to implement in Indian settings

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due to logistic challenges. Hence, alternative methods like visual inspection of cervix by application of 5% acetic acid (VIA) have been assessed for prevention of cervical cancer.<sup>[5]</sup> Evidence from a large randomized controlled trial from Mumbai, India, suggests that VIA screening by primary health workers (PHWs) significantly reduces cervical cancer mortality.<sup>[6]</sup> The screening program for cervical cancers is effective because there is a long latent period that is easily recognizable before the development of cervix cancer. Furthermore, the uterine cervix is an easily accessible site for diagnostic evaluation like biopsy.

PHWs form the backbone of service providers in public health systems of many developing countries. Hence, training and utilization of PHWs for early detection of common cancers (breast, cervix, and oral) has been proposed.<sup>[7,8]</sup> VIA screening can be provided by a variety of personnel such as trained nurses, midwives, and PHWs.<sup>[6]</sup> Currently, an organized population-based cervical cancer screening program has not been implemented all over India. Operational guidelines have been formulated and there are directives to all states to roll out cancer awareness and screening programs.<sup>[9]</sup> The major challenges of implementing screening in most developing countries are low participation and poor follow-up. This is also consequent to a lack of awareness among population.<sup>[10,11]</sup> Although challenging in community settings, VIA-based cervical cancer screening can be a viable and feasible alternative in countries like India. For a screening program to be successful, good compliance to screening is very important. The present paper discusses the participation rates, the predictors of women's participation in cervical cancer screening, and measures for improving participation in a community-based organized service program.

## METHODOLOGY

This project is a community-based organized service program for screening of common cancers (breast, cervix, and oral cavity) among women residing in low socioeconomic areas of Mumbai, India. The methodology associated with current objectives is described here. The total population of 138,383 was covered over a period of 5 years. Eleven slum clusters were selected in such a way that they were previously unexposed to cervical cancer health education or any kind of cervical cancer screening activity. The project activity was initiated by meeting the local leaders and local health authorities to confirm their support throughout the service program. Mapping of the selected clusters was done to facilitate easy location of the participants. Women aged 30–65 years and staying for more than 1 year in the selected area were included. Women with a history of breast, cervix, or oral cancer and women <30 and more than 65 years were not included in the program.

### Approaching the field and invitation of women for screening

Door-to-door survey was conducted to generate list of eligible women and the sociodemographic details were recorded by

trained medical social workers (MSWs). MSWs were trained intensively for a period of 4 weeks for delivering standard health education, conducting household surveys, introducing the consent forms, counseling, and re-inviting noncompliers to the camp places. All eligible women were invited to a common accessible place such as temple, political party offices, and community halls where temporary clinics were set up for screening of women. The women were presented with a participant information sheet and those willing to participate were voluntarily asked to sign an informed consent form in vernacular language. They were provided an identity card containing the respective participants' photograph and distinctive participant numbers. Health education was delivered by MSWs using posters and flip charts. The contents of Health Education Program (HEP) included introduction to the anatomy and physiology of the reproductive organs, information about the risk factors, methods for primary prevention, early signs and symptoms, methods for early detection, and secondary prevention of uterine cervix cancer. After explaining the entire program, women were then invited by MSWs to participate in screening. The trained PHWs performed screening of uterine cervix cancer by VIA. The PHWs were tenth grade passed and were trained rigorously in conducting visual inspection of cervix by application of 5% acetic acid (VIA). The VIA training for PHWs was based on the IARC manual and chart.<sup>[12]</sup> The training was provided at Department of Preventive Oncology (PO) Tata Memorial Hospital for 3 months. As per their examination findings and predefined referral criteria, they were instructed to refer all screen-positive participants to PO Screening Outpatient Department for further diagnostic evaluation and treatment. A trained medical officer (MO) randomly re-examined 5% of the women examined by PHWs for quality check at the same camp site. There was good agreement between the PHWs and MO in identifying lesions by VIA ( $\kappa = 0.77$ , confidence interval [CI] = 0.809–0.731  $P < 0.001$ ). The entire investigation and treatment cost at the hospital was covered by project funds. The entire program design, methodology, and interim results have been published in our earlier paper.<sup>[13]</sup> Figure 1 describes the methodology of the project. This was a service program and not a research trial; hence, ethical approval was not sought.

### Sample size, data collection, and analysis

This was a community-based organized service program; hence, there was no sample size calculation. The data from the field were collected on a pretested structured questionnaire and recorded in My Structured Query Language version 2.11.6 (Stata Corp LP a company, US). The determinants of compliance were analyzed by univariate and multivariate logistic regression analyzes. Odds ratio (OR) for compliance with their 95% CI were reported.  $P < 0.05$  was found to be statistically significant. All the analyses were carried out by using SPSS version 25.0 (IBM SPSS Statistics, Version 25.0, Armonk) SPSS IBM Corp. Released in 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

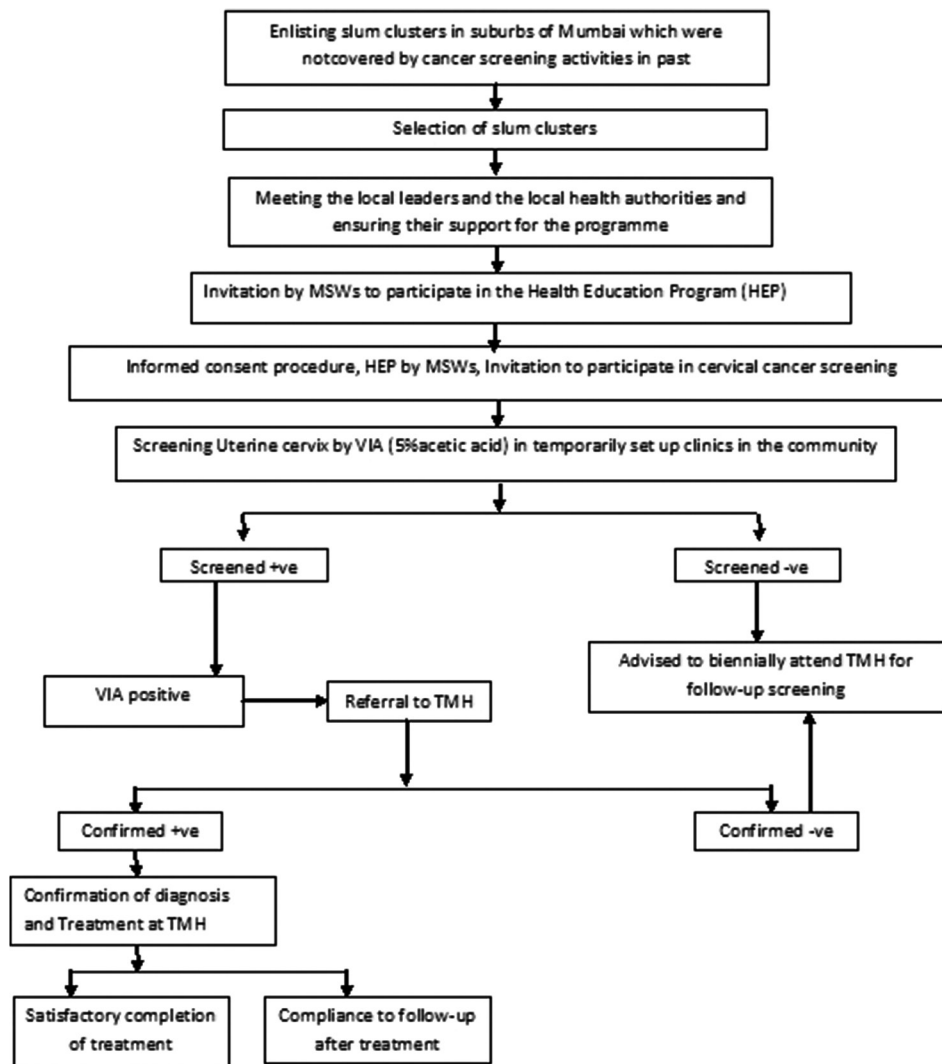


Figure 1: Fieldwork strategy

## RESULTS

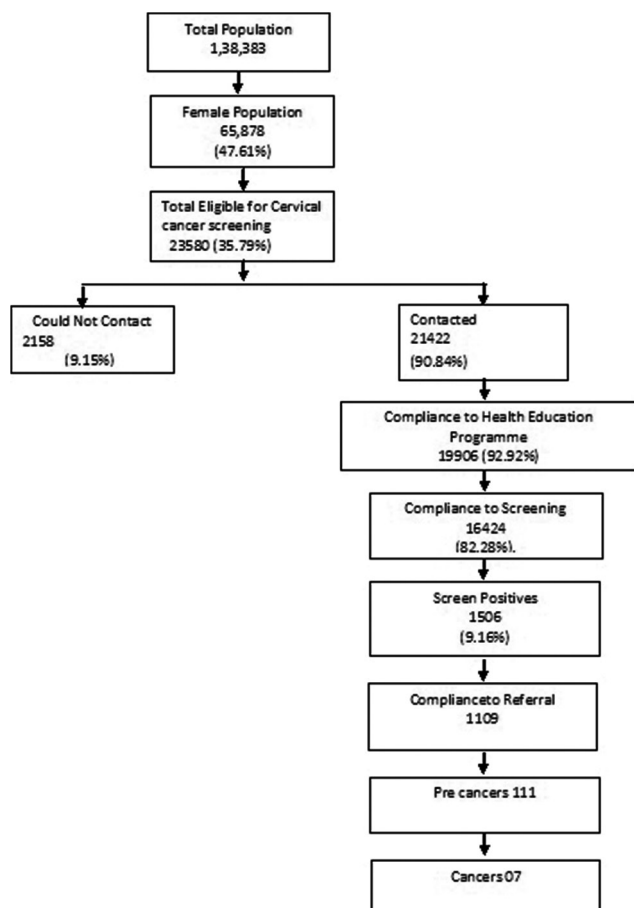
Initially, door-to-door survey was conducted in the selected areas covering 138,383 population in Mumbai. As presented in Figure 2, there were 23,580 (35.79%) eligible participants and 2158 (9.15%) women could not be contacted at the time of detailed interview. Total eligible contacted women were 21,422 (90.84%), among whom 19,906 (92.92%) women received health education and 16,424 (82.28%) participated in cervical cancer screening.

The sociodemographic characteristics of 21,422 eligible contacted participants by important sociodemographic variables are enlisted in Table 1. The mean age of eligible women was  $42.47 \pm 8.637$  years. Univariate and multivariate logistic regression analysis was performed to identify the various sociodemographic factors influencing compliance to uterine cervical cancer screening [Table 2]. According to the results of univariate and multivariate analysis, women belonging to age group of 30–39 (80.69%), literate women

with school level or education up to senior college (78.97% and 80.86%) (OR, 1.323;  $P \leq 0.001$ ) and (OR, 1.402;  $P \leq 0.001$ ), belonging to Hindu religion (77.20%), speaking Marathi (77.07%), and with a family history of cancer (81.93%) had higher participation for screening, while women belonging to Muslim community (73.95%) (OR, 0.743;  $P \leq 0.001$ ), speaking other than Marathi and Hindi language (73%) (OR, 0.872;  $P = 0.017$ ), illiterate women (70.71%), and graduate women (70.78%) had lower participation. Women's occupation did not have any impact on participation in cervical cancer screening.

## DISCUSSION

In the present article, compliance to cervical cancer screening organized in low socioeconomic settings of Mumbai is being discussed. Compliance of 82% was achieved for cervical cancer screening in this program, which is in coherence with the first round of randomized controlled trials (RCT) on cervical cancer screening (75.1%) in Mumbai, India.<sup>[14]</sup>



**Figure 2:** Compliance to a cervical cancer screening program

The results were reproducible only because of the similar geographic distribution of the enrolled participants, experiences gained from previously conducted RCTs, and dedicated staff working for these projects. Good acceptability of VIA has been reported in rural Thailand where almost 100% of participating women were highly satisfied with the procedure.<sup>[15]</sup> Women belonging to the age group of 30–39 (80.69%), years had higher compliance for cervical cancer screening. The findings of our study are similar to the findings of a study conducted in Kerala by Aswathy *et al.* In the Kerala study, the participation was three times higher among women in the age group of 35–50 years.<sup>[16]</sup> Women who received school level, secondary, and senior college education had a higher level of participation 78.97%, 80.86%, and 79.38% as compared to illiterate women (70.71%). The low participation among illiterate women may be due to poor awareness regarding risk factors and importance of cervical cancer screening and early detection. The other reason may be prioritization of work compared to health care, as most of them work on daily wages. Similar findings can be noted from the study conducted by Nene *et al.* and Sankaranarayanan *et al.*<sup>[17,18]</sup> The participation dropped among graduate women (70.78%). This may be because the graduate women may prefer getting screened in a health clinic setting. Our findings are similar to the study by Aswathy *et al.* which also demonstrates greater participation among the

**Table 1: Characteristics of eligible participants by important sociodemographic variables**

Total	Variables	Participants (n=21,422), n (%)
Age group (years)	30–39	9058 (42.28)
	40–49	7481 (34.92)
	50–59	3815 (17.81)
	60 and above	1068 (04.99)
	Mean age	42.47 SD±8.637
Education	Illiterate	5053 (23.59)
	Literate without formal education	1260 (05.88)
	Primary (1–4)	1880 (08.78)
	Secondary (5–10)	11,508 (53.72)
	High secondary (11–12)	998 (04.66)
	Sr. College (13–15)	480 (02.24)
Religion by birth	Graduates and above	243 (01.13)
	Hindu	16,650 (77.72)
	Muslim	2572 (12.01)
	Others	2200 (10.27)
Occupation	Housewife	17,082 (79.74)
	Manual labor	2866 (13.38)
	Service	874 (04.08)
	Self-employed	600 (02.80)
	Mother tongue	Marathi
Hindi		3888 (18.15)
Others		1841 (08.59)
Family history of cancer	Yes	1710 (07.98)
	No	19,712 (92.02)

SD: Standard deviation

secondary and higher secondary level educated women.<sup>[16]</sup> The participation rates for screening were highest among women belonging to the Hindu religion (77.20%). The findings of our study are similar to the findings of RCT conducted by Dinshaw *et al.*<sup>[14]</sup> Similar findings were noted in the pilot study conducted by Matin and LeBaron.<sup>[19]</sup> Higher participation rates were seen by the women speaking the Marathi language. Marathi is the local language of Maharashtra. Most eligible women (73%) were Marathi speaking, and as natives, most MSWs also spoke Marathi, which indeed facilitated in easy understanding of HEP. Hindi being the national language and most popularly understood, HEP was provided in Marathi and Hindi by the MSWs. These findings are similar to the findings by Dinshaw *et al.* Women with a family history of cancer had much higher participation (81.93%) as compared to women without a family history (76.20%). The findings may be due to anxiety associated with a family history or increased awareness leading to more participation. Our study results are comparable to the review conducted by Williams *et al.*,<sup>[20]</sup> wherein African-American women were 76% more likely to have had a recent Pap test if they had a positive family history of cancer. In our study, occupation of the women had no impact on compliance to cervical cancer screening. In some cytology-based programs, higher income was associated with higher compliance with screening.<sup>[21,22]</sup> Findings from the rural south Indian study<sup>[18]</sup> suggest that higher income was inversely



**Table 2: Sociodemographic characteristics of participants and predictors of participation in cervical cancer screening: results of univariate and multivariate logistic regression analysis**

Variables	Eligible women	Compliers to screening (%)	Univariate analysis			Multivariate analysis		
			OR	95% CI	P	OR	95% CI	P
Age group (years)								
30-39	9058	80.69	1			1		
40-49	7481	76.97	0.800	0.742-0.862	<0.001	0.839	0.776-0.906	<0.001
50-59	3815	69.31	0.540	0.496-0.589	<0.001	0.590	0.539-0.647	<0.001
60 and above	1068	66.76	0.481	0.419-0.552	<0.001	0.539	0.467-0.622	<0.001
Education								
Illiterate	5053	70.71	1			1		
Literate without formal education	1260	76.59	1.355	1.174-1.565	<0.001	1.208	1.043-1.399	0.011
Primary (1-4)	1880	76.49	1.348	1.192-1.523	<0.001	1.253	1.107-1.419	<0.001
Secondary (5-10)	11,508	78.97	1.556	1.443-1.677	<0.001	1.323	1.220-1.435	<0.001
High secondary (11-12)	998	80.86	1.750	1.478-2.072	<0.001	1.402	1.176-1.671	<0.001
Sr. college (13-15)	480	79.38	1.594	1.268-2.005	<0.001	1.263	0.996-1.600	0.054
Graduates and above	243	70.78	1.003	0.756-1.332	0.981	0.803	0.600-1.074	0.139
Religion by birth								
Hindu	16,650	77.20	1	1		1		
Muslim	2572	73.95	0.839	0.762-0.922	<0.001	0.743	0.652-0.848	<0.001
Other	2200	75.86	0.929	0.837-1.030	0.163	0.986	0.871-1.076	0.546
Occupation								
Housewife	17,082	76.72	1			1		
Manual labor	2866	77.60	1.051	0.956-1.156	0.301	1.079	0.980-1.188	0.121
Service	874	75.17	0.919	0.785-1.076	0.292	0.859	0.730-1.011	0.068
Self-employed	600	73.00	0.820	0.683-0.986	0.035	0.868	0.720-1.046	0.136
Mother tongue								
Marathi	15,693	77.07	1			1		
Hindi	3888	76.80	0.985	0.906-1.071	0.724	1.183	1.052-1.331	0.005
Others	1841	73.00	0.805	0.721-0.898	<0.001	0.872	0.779-0.976	0.017
Family history of cancer								
Yes	1710	81.93	1			1		
No	19,712	76.20	0.698	0.614-0.793	<0.001	0.700	0.615-0.797	<0.001

CI: Confidence interval, OR: Odds ratio

associated with participation. In the present study, we have not considered the income of the women, as all the participating women belonged to the low socioeconomic slums. According to Coffey *et al.*, the uptake of cancer screening depends on the knowledge about the disease, familiarity with the concept of prevention, geographic and economic accessibility of health care, quality of services, and support from families and communities.<sup>[23]</sup> The good compliance to screening in the present program could be attributable to intricate mapping of the areas, good rapport with the local leaders, awareness about signs, symptoms, and risk factors that were created through effective HEP in local languages. The success of this screening program could also be attributed to the fact that it was well organized and implemented taking care of all intricacies and was entirely implemented by women staff who were sensitive to the issues and queries raised by the eligible women and belonged to similar cultural background. These findings are similar to the findings from the review by Bradley *et al.*<sup>[24]</sup> Women actively participated in screening as the screening services were provided in their vicinity. All phases of the screening program, right from area selection, selection of

eligible participants, setting up of temporary clinics, screening by VIA, and transit of participants to nodal hospital for further diagnostic procedures were explicitly planned and implemented. Al Riyami *et al.* have shown that autonomy of a woman to make decisions is positively associated with use and availability of reproductive health services.<sup>[25]</sup> Various measures such as re-contacting the participants by visiting their homes, discussing with their family members to understand the barriers, and involving the community and religious leaders were undertaken. Several mop-up camps and screening camps during the late evenings were organized for working women. The limitation of our study is in the selected population, most of the women were Hindus (78%) and Marathi speaking (73%).

## CONCLUSION

Our results imply that screening for cervical cancers by PHWs is acceptable to the Indian population when conducted in the vicinity and backed by a good health education program. It is feasible to integrate cervical cancer screening with other common cancer screening and other noncommunicable disease

screening as the risk factors addressed in the health education program are similar.

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### Conflicts of interest

There are no conflicts of interest.

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