

Determinants of Compliance to Population-Based Oral Cancer Screening Program among low Socioeconomic Women in Mumbai, India

Gauravi A. Mishra, Heenakauser A. Shaikh, Sharmila A. Pimple, Aanchal A. Awasthi¹, Vasundhara Y. Kulkarni

Departments of Preventive Oncology, Centre for Cancer Epidemiology, and ¹Clinical Research Secretariat, Tata Memorial Hospital, Tata Memorial Centre, Homi Bhabha National Institute (HBNI) Parel, Mumbai, Maharashtra, India

Abstract

Background: The use of tobacco, especially smokeless variety, is common and culturally accepted among Indian women. Hence, oral cavity cancers rank as the fourth most common cancers among Indian women. **Objectives:** The objectives of this study were to study factors determining compliance of women for oral cancer screening in a population-based program in Mumbai and to create awareness among women regarding ill effects of tobacco and importance of oral cancer screening. **Materials and Methods:** This is a community-based organized service program for awareness and screening of oral cavity cancers among women residing in low socioeconomic areas of Mumbai, India. Screening was conducted by oral visual inspection by trained primary health workers (PHWs). Univariate and multivariate logistic regression analyses were conducted to identify predictors of participation in oral cancer screening. **Results:** 138,383 population was surveyed, out of which 13,492 eligible women were enlisted for oral cancer screening. Among these, 12,495 were contacted and 11,895 (95.12%) women participated in a cancer awareness program and 11,768 (94.18%) participated in oral cancer screening. According to results of multivariate logistic regression analysis, women belonging to Hindu religion 94.57%, with mother tongue Marathi 94.76%, and with family history of cancer 95.84% complied significantly higher to oral cancer screening as compared to other women. **Conclusion:** This program has assisted in identifying predictors of compliance to oral cavity screening. Furthermore, it demonstrates that good compliance can be achieved through multiple household visits, personal invitation during camps, organizing well-planned Health Education Program, and the use of simple, low-cost visual inspection test performed by trained PHWs.

Keywords: Compliance, oral precancer, oral visual inspection, screening

INTRODUCTION

Globally, lip and oral cavity cancers have been estimated to be responsible for 354,864 incident cases and 177,384 deaths.^[1] Cancers of the lip and oral cavity are common in South Asian countries.^[2] India reports the highest number of oral cavity cancer cases globally. Annually, 27,981 cases of lip oral cavity cancers, amounting to 4.8% of total cancers among women, are estimated in India.^[1] The higher incidence of oral cancer and precancer lesions has been linked with habit of betel quid and tobacco chewing.

Smokeless tobacco use is maximum among urban slum dwellers.^[3] As per the Global Adult Tobacco Survey (GATS), 2016–2017, for India, 42.4% of men and 14.2% of women accounting for 266.8 million adults currently use tobacco in

some form.^[4] Female tobacco users bear additional health risks. They need to be specifically protected, as tobacco industry is targeting women for initiating tobacco habit.^[5] In India, tobacco consumption, mainly in the application forms, is culturally accepted even among women. Research over the past decade has shown that the use of smokeless tobacco products among Indian women is substantial^[4,6,7] and

Address for correspondence: Dr. Gauravi A. Mishra, Department of Preventive Oncology, Centre for Cancer Epidemiology, Tata Memorial Centre, Homi Bhabha National Institute, Mumbai, Maharashtra, India. E-mail: gauravi2005@yahoo.co.in

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Mishra GA, Shaikh HA, Pimple SA, Awasthi AA, Kulkarni VY. Determinants of compliance to population-based oral cancer screening program among low socioeconomic women in Mumbai, India. Indian J Community Med 2021;46:210-5.

Received: 29-03-20, **Accepted:** 24-11-20, **Published:** 29-05-21

Access this article online

Quick Response Code:



Website:
www.ijcm.org.in

DOI:
10.4103/ijcm.IJCM_190_20

increasing, with negative consequences for both oral morbidity and perinatal health.^[8-12] The link between smokeless tobacco and oral cancer has been well established. The proportion of oral cancer cases diagnosed at an early and localized stage is still <50%.^[13]

Primary prevention, by avoidance of tobacco, early detection of precancers, and appropriate treatment are important control measures. Oral cancer is considered to be a suitable disease for screening, in view of the recognizable precancer lesions and improved survival after treatment of early-stage disease. The most widely used screening test for oral neoplasia is oral visual inspection (OVI). The test performance is satisfactory in terms of sensitivity, specificity, and predictive value, and it is therefore a suitable and cost-effective screening test for oral cancer.^[14,15] Furthermore, OVI can reduce mortality in high-risk individuals and has the potential of preventing at least 37,000 oral cancer deaths worldwide.^[16] In developing countries like India, the health services rely on PHWs for provision of primary health care,^[17] and hence, training and utilization of PHWs for early detection of common cancers has been proposed in such situations. For a screening program to be successful, good efficacy of screening test and good compliance to screening are important. The current area that we selected for our program was never exposed to any cancer screening or awareness program in the past. Currently, the public health-care system in India does not implement oral cancer awareness or screening program. This paper discusses participation rates, factors determining the participation, and measures for improving participation in oral cancer screening among women in a community-based program in Mumbai.

MATERIALS AND METHODS

This is a population-based service program conducted between the period of January 2010 and March 2017. This program was organized for screening of common cancers (breast, cervical, and oral cavity cancers) among women in low socioeconomic areas of Mumbai, India. As this was a service program and not a research trial, ethics committee approval was not sought. The entire program design and methodology has been published in our earlier paper along with the interim results.^[18] The methodology relevant to current paper objectives is depicted in Figure 1 and described below.

This is a cancer awareness and screening program covering a total population of 138,383 over a period of 5 years. Women of any age who were current tobacco users or who had consumed tobacco for at least 3 consecutive years in the past were eligible for oral cancer screening. The exclusion criteria were women with history of oral cavity cancer and women not using tobacco. Fieldwork was mainly conducted by the medical social workers (MSWs) and the PHWs trained for these activities.^[19]

A house-to-house survey was conducted by MSWs in the selected clusters to collect baseline information, and a list of eligible women was compiled. MSWs invited eligible women

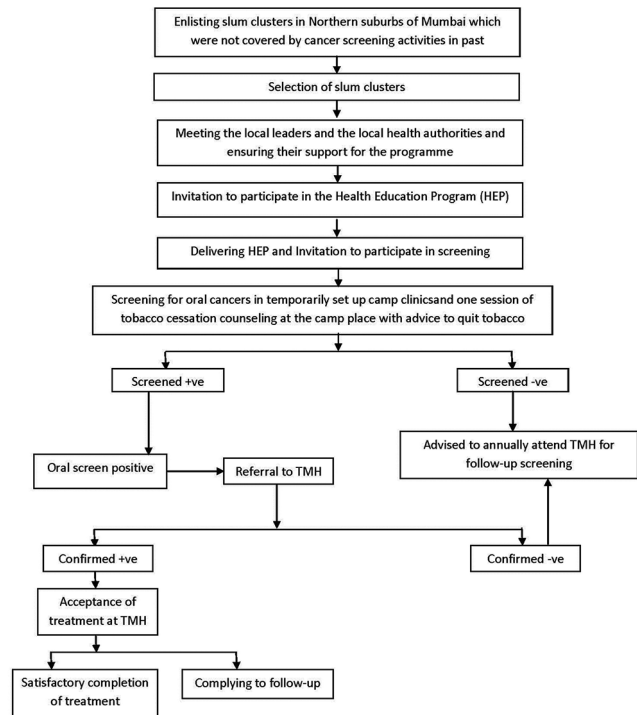


Figure 1: Field Work Strategy

to participate in the program after obtaining written informed consent. The MSWs interviewed eligible women and recorded sociodemographic details and then invited them to participate in the Health Education Program (HEP).

The community-based HEPs were conducted with the aid of posters and flip charts. The contents of a HEP included introduction to anatomy of oral cavity, information about risk factors, methods for primary prevention, early signs and symptoms, methods for early detection, and secondary prevention of oral cavity cancers. Information about difficulties in treatment of advanced stages of oral cavity cancer was shared. Women were then invited to participate in oral cancer screening. The PHWs conducted screening of the oral cavity by OVI. As per their examination findings and referral chart, they were instructed to refer screen-positive participants to PO Screening Outpatient Department (OPD).

A trained medical officer (MO) randomly re-examined 5%–10% of the women examined by PHWs for quality check independently. The agreement between the PHWs and MO in identifying lesions by OVI was nearly perfect ($\kappa = 0.942$, confidence interval [CI] = 0.957–0.909, $P < 0.001$). All cases those were screen positive either by PHWs or by MO were considered as screen positive and referred to PO Screening OPD for further evaluation and management. The entire investigation and treatment cost at hospital was covered by project funds.

Data collection, data entry, and analysis

Data were collected from community on a predesigned

questionnaire and were recorded in the MYSQL version 2.11.6. Descriptive statistics were used to represent the characteristics of the women. Sociodemographic and reproductive characteristics of women were evaluated to understand the determinants of compliance to screening. The determinants of compliance were analyzed by univariate and multivariate logistic regression analyses. Odds ratio (OR) for compliance with their 95% CI was reported. $P < 0.05$ was found to be statistically significant. All the analysis was carried out using SPSS version 25.0 (IBM SPSS Statistics, version 25.0, Armonk, NY, USA: IBM Corp.).

RESULTS

The total contacted eligible women were 12,495. Among the eligible women, 75.33% of women were Hindu by religion and 81% were Marathi speaking. The women were mainly housewives (81%). The main form of tobacco use by women was Masherī – 66% (burnt smokeless tobacco for application to teeth). The different forms of tobacco used by women are depicted in Figure 2.

The compliance achieved to various aspects of a population-based oral cancer screening program is shown in Figure 3. The characteristics and prevalence of screen-positive participants for oral precancer and cancer by important sociodemographic variables are shown in Table 1.

The sociodemographic determinants of participation in oral cancer screening are shown in Table 2. Univariate and multivariate logistic regression analyses were performed to identify the various sociodemographic factors influencing compliance to oral cavity screening. According to the results of univariate and multivariate analysis, women with age <34 (96.91%) and >65 (98.60% [OR: 3.189, 95% CI: 1.908–5.332], $P < 0.001$), women with high secondary school level education (96.83% [OR: 2.232, 95% CI: 1.128–4.414], $P < 0.001$), women belonging to Hindu religion (94.57%), women with Marathi mother tongue (94.76%), and women with family history of cancer (95.84%) had higher participation in oral cancer screening. Whereas, women between the ages of 35–44 (OR: 0.476, CI: 0.369–0.615, $P < 0.001$), 45–54 (OR: 0.461, CI: 0.369–0.615, $P < 0.001$), and 55–64 (OR: 0.435, CI: 0.326–0.581, $P < 0.001$), having mother tongue other than Marathi (OR: 0.651, CI: 0.491–0.865, $P = 0.003$), and belonging to Muslim religion (OR: 0.653, CI: 0.464–0.919, $P = 0.014$) had lower participation to screening.

DISCUSSION

In this paper, the compliance to oral cancer screening in a population-based service program is discussed. Herein, very high compliance to oral cavity screening was obtained

Table 1: Characteristics and prevalence of screen-positive participants for oral precancer and cancer by important sociodemographic variables

Total	Variables	Participants (377)	Percentage	Prevalence (%)
Age group (years)	≤34	82	21.75	3.04
	35-44	114	30.24	3.42
	45-54	104	27.59	3.59
	55-64	44	11.67	2.93
	≥65	33	8.75	2.46
	Education	Illiterate	178	47.21
Primary (1-4)		41	10.88	3.57
Secondary (5-10)		146	38.73	2.61
High secondary (11-12)		8	2.12	2.91
Sr. college (13-15)		3	0.80	4.35
Graduates and above		1	0.27	3.45
Religion by birth	Hindu	278	73.74	3.12
	Muslim	45	11.94	3.83
	Buddhist	51	13.53	3.10
	Other	3	0.80	6.67
Occupation	Housewife	294	77.98	3.08
	Manual labor	69	18.30	4.24
	Service	4	1.06	1.32
	Self-employed	10	2.65	3.56
Monthly family income (Rs.)	<2000	3	0.80	1.41
	2001-5000	175	46.42	3.96
	5001-10,000	194	51.46	3.01
	10,001-15,000	5	1.33	1.58
Mother tongue	Marathi	299	79.31	3.12
	Hindi	58	15.38	3.76
	Other	20	5.31	3.09

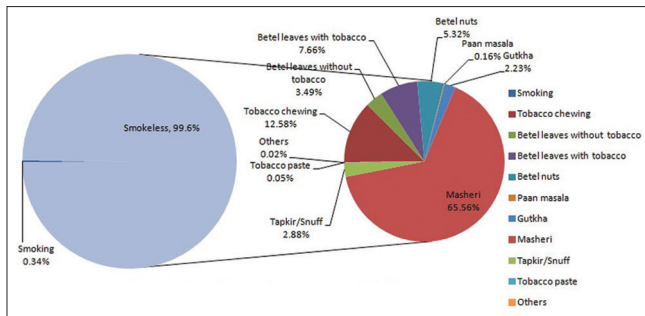


Figure 2: Tobacco habits among the eligible women

among women who participated in HEP (nearly 99%). The two studies of Kerala, India, based on oral cancer screening by OVI showed good compliance rates. One of them was conducted by local volunteers and another was conducted by trained PHWs. The compliance rates achieved were 95.07% and 91%, respectively.^[20,21] These findings are comparable with the findings of our program. Both current program and Kerala studies were systematically planned organized programs and were exclusively for cancer screening. Again, oral cavity screening is an easily accessible site and the screening procedures as such do not involve a high level of discomfort. These may be some of the important reasons for high compliance rates. This shows that an organized, well-conducted HEP clarifies the women's doubts, allays her fears, and further motivates them to participate in screening. To obtain good compliance rate for screening, identification of different reasons for noncompliance and undertaking corrective measures is vital.

In this program, women of age 35 and 65 years, educated up to graduation and above, Muslim women and women speaking languages other than Marathi had lesser compliance. However, women with education up to higher secondary school level had the best compliance. Women below the age of 34 years and above the age of 65 years had better compliance for screening. This result is unlike the previous studies. In the Kerala study, increasing age was positively related to screening uptake, except for the category corresponding to the older age group 65+.^[20] Nagao and Waranaklasuriya, who analyzed sociodemographic determinants of oral screening re-attendance in Japan, also noted increasing age to be positively related to screening uptake, except for the category corresponding to the older age group 65+.^[22] However, in our study, women below the age of 34 years had a compliance rate of 96.91% which gradually decreased as the age increased and women between the ages of 55 and 64 years had compliance of 91.52%. Women above the age of 65 years again had a high level of compliance 98.60%. In the initial phase of the program, participation of women above 65 years was less. As elderly women were finding difficult to reach camp place, an examination for this group of women was organized at the woman's home by PHWs.

Best compliance has been noted among women with higher secondary education. This may be because graduate women

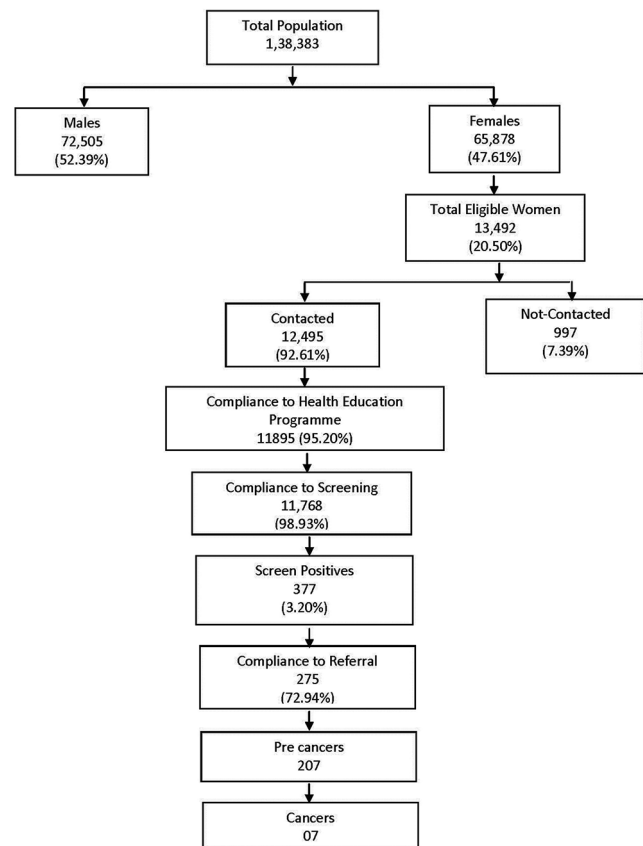


Figure 3: Compliance to Oral Cancer Screening Program

may not be keen to get screened in camp setups. Similar findings have been observed in a community-based randomized trial of breast and cervical cancer screening conducted in Mumbai.^[23] Women with Muslim religion participated less in this screening program. However, in an earlier breast and cervical cancer screening program in Mumbai, women of religion other than Hindus and Muslim had shown poor compliance.^[23] Women speaking Marathi language had the best participation. Marathi and Hindi are common local languages, and HEP and counseling was conducted by MSWs in these languages. Marathi was also the mother tongue of many MSWs. This explains better compliance for oral cancer screening among women speaking Marathi as compared to women speaking other languages. Women with family history of cancer are better sensitized about cancer as a disease and hence participated more.

There could be various barriers to uptake of cancer screening including the absence of knowledge about the disease, lack of familiarity with the concept of prevention, geographic and economic inaccessibility of health care, poor quality of services, and lack of support from families and communities.^[24] In this service program, we could effectively take care of these barriers through various means such as repeated household visits, personal invitation during camps, organizing well-planned HEP delivered by trained MSWs to cover the concept of prevention, knowledge about disease and importance of screening, providing

Table 2: Sociodemographic characteristics of participants and predictors of participation in oral cancer screening: Results of 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)								
<34	2781	96.91	1			1		<0.001
35-44	3576	93.29	0.444	0.345-0.570	<0.001	0.476	0.369-0.615	<0.001
45-54	3141	92.19	0.381	0.296-0.489	<0.001	0.461	0.355-0.599	<0.001
55-64	1639	91.52	0.344	0.261-0.454	<0.001	0.435	0.326-0.581	<0.001
>65	1358	98.60	2.249	1.362-3.712	0.002	3.189	1.908-5.332	<0.001
Education								
Illiterate	5032	92.43	1					<0.001
Primary (1-4)	1221	94.02	1.288	0.995-1.668	0.055	1.331	1.023-1.731	0.033
Secondary (5-10)	5847	95.70	1.826	1.550-2.152	<0.001	1.783	1.492-2.131	<0.001
High secondary (11-12)	284	96.83	2.503	1.278-4.902	0.007	2.232	1.128-4.414	0.021
Sr. college (13-15)	77	89.61	0.707	0.337-1.480	0.357	0.679	0.320-1.442	0.314
Graduates and above	34	85.29	0.475	0.183-1.234	0.127	0.363	0.136-0.969	0.043
Religion by birth								
Hindu	9412	94.57	1			1		0.023
Muslim	1286	91.37	0.608	0.491-0.753	<0.001	0.653	0.464-0.919	0.014
Buddhist	1747	94.28	0.946	0.758-1.179	0.619	0.860	0.686-1.078	0.190
Others	50	90.00	0.517	0.204-1.307	0.163	0.596	0.229-1.553	0.290
Occupation								
Housewife	10,116	94.44	1			1		
Manual labor	1739	93.50	0.846	0.687-1.043	0.118	1.003	0.811-1.240	0.981
Service	328	92.68	0.745	0.488-1.139	0.174	0.763	0.495-1.176	0.220
Self-employed	309	90.94	0.590	0.397-0.879	0.009	0.757	0.505-1.134	0.177
Monthly family income (Rs.)								
<2000	224	94.76	1			-	-	-
2001-5000	4795	92.17	1.482	0.901-2.437	0.121	-	-	-
5001-10,000	7048	91.54	1.426	0.872-2.332	0.158	-	-	-
10,001-15,000	350	90.26	0.967	0.524-1.786	0.915	-	-	-
Above 15,000	78	90.40	1.049	0.401-2.744	0.923	-	-	-
Mother tongue								
Marathi	10,108	94.76	1			1		
Hindi	1673	92.17	0.651	0.534-0.794	<0.001	0.928	0.670-1.284	0.651
Other	714	90.76	0.543	0.416-0.710	<0.001	0.651	0.491-0.865	0.003
Family history of cancer								
Yes	770	95.84	1			1		
No	11,725	94.07	0.688	0.479-0.988	0.043	0.635	0.440-0.915	0.015
Cancer screening in the past								
Yes	210	96.19	1			-	-	-
No	12,285	94.15	0.637	0.313-1.297	0.214	-	-	-

OR: Odds ratio, CI: Confidence interval

screening at no cost, and enlisting support and co-operation from local leaders including local general practitioners. Organized HEP delivered by trained MSWs along with screening by trained PHWs has resulted in a high level of compliance to various aspects of this program. MSWs conducted multiple house visits to invite eligible participants for screening. All participants visiting camp place received detailed HEP. Screening camps were organized in evenings and on weekends and public holidays to increase compliance of women going out for work during the weekdays. The screening camp was held for several days in one locality to make it possible for maximum number of

women to comply. All these factors have contributed for high compliance rates.

Finally, the program has assisted in identifying predictors of compliance to oral cavity screening. However, the compliance rate is higher than 90%, and there are very limited variances across the different categories, so we were unable to capture the ceiling effect. This is a limitation of our study.

CONCLUSION

This program has assisted in identifying predictors of

compliance to oral cavity screening. Furthermore, it demonstrates that good compliance can be achieved through multiple household visits, personal invitation during camps, organizing well-planned HEP, and the use of simple, low-cost visual inspection test performed by trained PHWs.

Acknowledgment

The authors gratefully acknowledge the funding support from the Department of Atomic Energy under the eleventh 5-year plan period as well as the staff and patient treatment support provided by Tata Memorial Hospital and Women's Cancer Initiative (WCI).

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 2018;68:394-424.
2. Warnakulasuriya S. Global epidemiology of oral and oropharyngeal cancer. *Oral Oncol* 2009;45:309-16.
3. Gupta V, Yadav K, Anand K. Patterns of tobacco use across rural, urban, and urban-slum populations in a North Indian community. *Indian J Community Med* 2010;35:245-51.
4. Global Adult Tobacco Survey India Report (GATS India), International Institute for Population Sciences. Ministry of Health and Family Welfare (MoHFW). Mumbai: Government of India; 2016-17.
5. Bansal R, John S, Ling PM. Cigarette advertising in Mumbai, India: Targeting different socioeconomic groups, women, and youth. *Tob Control* 2005;14:201-6.
6. Reddy KS, Gupta PC. Report on tobacco control in India. In: Ministry of Health and Family Welfare, Government of India and Centers for Disease Control and Prevention. U. S. A: World Health Organisation; 2004.
7. International Institute for Population Sciences (IIPS) and Macro International. National Family Health Survey (NFHS-3), India, 2005-06: Maharashtra. Mumbai: International Institute for Population Sciences; 2008.
8. Boffetta P, Hecht S, Gray N, Gupta P, Straif K. Smokeless tobacco and cancer. *Lancet Oncol* 2008;9:667-75.
9. Gupta PC, Ray CS. Smokeless tobacco and health in India and South Asia. *Respirology* 2003;8:419-31.
10. Jacob BJ, Straif K, Thomas G, Ramadas K, Mathew B, Zhang ZF, *et al.* Betel quid without tobacco as a risk factor for oral precancers. *Oral Oncol* 2004;40:697-704.
11. Rastogi T, Devesa S, Mangtani P, Mathew A, Cooper N, Kao R, *et al.* Cancer incidence rates among South Asians in four geographic regions: India, Singapore, UK and US. *Int J Epidemiol* 2008;37:147-60.
12. Sankaranarayanan R, Dinshaw K, Nene BM, Ramadas K, Esmay PO, Jayant K, *et al.* Cervical and oral cancer screening in India. *J Med Screen* 2006;13 Suppl 1:S35-8.
13. Saleh A, Yang YH, Wan Abd Ghani WM, Abdullah N, Doss JG, Navonil R, *et al.* Promoting oral cancer awareness and early detection using a mass media approach. *Asian Pac J Cancer Prev* 2012;13:1217-24.
14. Mathew B, Sankaranarayanan R, Sunilkumar KB, Binu K, Pisani P, Krishnan Nair M. Reproducibility and validity of oral visual inspection by trained health workers in the detection of oral precancer and cancer. *Br J Cancer* 1997;76:390-4.
15. Subramanian S, Sankaranarayanan R, Bapat B, Somanathan T, Thomas G, Mathew B, *et al.* Cost-effectiveness of oral cancer screening: Results from a cluster randomized controlled trial in India. *Bull World Health Organ* 2009;87:200-6.
16. Sankaranarayanan R, Ramadas K, Thomas G, Muwonge R, Thara S, Mathew B, *et al.* Effect of screening on oral cancer mortality in Kerala, India: A cluster-randomised controlled trial. *Lancet* 2005;365:1927-33.
17. Mishra A. 'Trust and teamwork matter': Community health workers' experiences in integrated service delivery in India. *Global Public Health* 2014;9:960-74.
18. Mishra GA, Dhivar HD, Gupta SD, Kulkarni SV, Shastri SS. A population-based screening program for early detection of common cancers among women in India Methodology and interim results. *Indian J Cancer* 2015;52:139-45.
19. Ramadas K, Lucas E, Thomas G, Mathew B, Balan A, Thara S, *et al.* A Digital Manual for the Early Diagnosis of Oral Neoplasia. Lyon, France: IARC; 2008.
20. Ramdas K, Arrossi S, Thara S, Thomas G, Jissa V, Fayette JM, *et al.* Which socio-demographic factors are associated with participation in oral cancer screening in the developing world? Result from a population based screening project in India. *Cancer Detect Prevent* 2008;32:109-15.
21. Mathew B, Wesley R, Dutt SC, SreedeviAmma N, Jacob R, Jyothirmayi R, *et al.* Cancer screening in a tribal village of Kerala using local volunteers. *World Health Forum* 1996;17:377-8.
22. Nagao T, Warnakulasuriya S. Annual screening for oral cancer detection. *Cancer Detect Prev* 2003;27:333-7.
23. Dinshaw K, Mishra G, Shastri S, Badwe R, Kerkar R, Ramani S, *et al.* Determinants of compliance in a cluster randomised controlled trial on screening of breast and cervix cancer in Mumbai, India. 1. Compliance to screening. *Oncology* 2007;73:145-53.
24. Coffey P, Arrossi S, Bradley J, Dzuba I, White S. Community Involvement Affinity Group. Improving Screening Coverage Rates of Cervical Cancer Prevention Programs: A Focus on Communities. Seattle: ACCP; 2004.