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Original Research Article

Opportunistic screening of suspected oral precancerous lesions among patients attending outpatient department of primary health centres, Puducherry

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ABSTRACT

Background: Oral cancer ranks among the top three types of cancer in India. Opportunistic screening of the oral cavity at an early stage could potentially offer long-term survival, improve treatment outcomes, and makes health care affordable for oral cancer patients. The objective is to determine the proportion of suspected oral precancerous lesions among the patients attending the outpatient department of the Primary Health Centres of Puducherry (PHC) by opportunistic screening through visual inspection.
Methods: This study was a facility-based cross-sectional study, conducted at the outpatient department of one urban and one rural primary health centre of Puducherry. Twelve hundred individuals aged above 18 years were opportunistically screened at the outpatient department using systematic random sampling. The oral examination was done through visual inspection, and socio-demographic characteristics were collected using a semi-structured questionnaire.
Results: The prevalence of suspected oral precancerous lesions was 14.3%, of which (18.5%) in rural areas and (10%) in urban areas. The study revealed that 32.1% of the study participants were in 46-60 years with female predominance of 63.3%. A high prevalence of suspected oral precancerous lesions was seen among the age group >60 years (21.8%) and males (19.1%). Smoking, chewing tobacco/betel quid, and alcohol consumption were the risk factors associated with the prevalence of suspected oral precancerous lesions.
Conclusions: Further confirmation of those diagnosed positive for suspected precancerous oral lesions, appropriate follow-up, and treatment of the lesions. Opportunistic screening for all individuals above 30 years of age for suspected oral precancerous lesions is recommended and feasible in primary healthcare settings.

Keywords: Opportunistic screening, Primary health centers, Suspected oral precancerous lesions

INTRODUCTION

According to the world cancer report, oral cancer is the seventh most common cancer, and the prevalence of oral cancer is higher among men.[1] In South-Central Asia, cancer of the oral cavity is the 3rd most common type of cancer.[2] In India, the age-standardized incidence rate of oral cancer is 12.6 per 1,00,000 populations.[2] Oral cancers are preceded mainly by clinically visible precancerous or premalignant lesions.[3] The most common premalignant lesions/precancerous lesions are erythroplakia, leukoplakia, lichen-planus, and oral submucous fibrosis.[4] The prevalence of leukoplakia in India ranges from 0.2% to 5.2%.[5] The prevalence of oral submucous fibrosis (OSMF) in India varies between 0.03% and 3.2%.[5] A cohort study in the Ernakulam district of Kerala showed that 79% of oral cancers arise from pre-existing precancerous lesions/conditions.[6]

In India, the prevalence of premalignant lesions varies with the screening setting, such as hospitals, communities, and primary care facilities. This variation in the prevalence of premalignant lesions can be attributed to regional, life style practices, cultural differences and the prevalence of tobacco or alcohol use.[7-9] The prevalence of precancerous lesions among patients attending hospitals in certain places of India varies from 2.5% to 8. 4%.[5] A study done in rural Puducherry found that the prevalence of oral precancerous lesions to be 10% among tobacco users aged above 60 years. [10]

Screening the population in the community setting has the disadvantage of missing out on a working population. A similar disadvantage occurs during camp-based screening.[11] Opportunistic screening at PHC served as an alternative to camp-based screening and circumvented the underrepresentation of the working population. Oral examination and identification of premalignant lesions by screening at the primary health centre gave an opportunity for providing de-addiction and counseling. It also facilitates appropriate treatment at the earliest. Hence, the study was planned to do an opportunistic screening of suspected oral lesions among the individuals who attend the outpatient Department of Primary Health Centers of Puducherry, intending to determine the proportion of people with suspected precancerous lesions in the oral cavity through visual inspection.

METHODS

This study was a facility-based cross-sectional study carried out in selected urban (Mettupalayam) and rural (Bahour) Primary Health Centres (PHC) of Puducherry from 1st August 2016 to 30th September 2016. Individuals above 18 years of age, seeking health care services from outpatient department of two feasibly selected Primary health centers in Puducherry were selected. The Urban Health Center at Mettupalayam caters to a population of around 69,000. The Rural Health Center Bahour caters to a population of nearly 31,000. The daily OPD attendance in each of the PHC varies from 100-200. Twelve hundred participants aged 18 years and above, seeking health care service from the outpatient department of selected PHC was screened opportunistically for suspected precancerous lesions after obtaining a written informed consent Known cases of oral cancer were excluded from the study. Patients were selected by applying the systematic random sampling technique. Data was collected over one month from each PHC. Every tenth patient seeking care from the Primary Health Centre (PHC) was interviewed and examined for suspected oral precancerous lesions during the study period.

The sample size was calculated using OpenEpi Version 3.0. The minimum sample size was estimated to be 1200, assuming the proportion of oral precancerous lesion to be around 2.6%, absolute precision of 0.9% at a confidence interval of 95%.[4] After obtaining written informed consent, data were collected using a pre-tested semi-structured questionnaire for socio-demographic details, tobacco use, and alcohol use. This was followed by clinical examination by visual inspection of the oral cavity for erythroplakia, leukoplakia, lichen planus, and oral sub mucous fibrosis (OSMF).

Training of the investigator

The screening was done by the 1st author, who is a trained nurse. She was trained for oral examination under an experienced otolaryngologist and dentist for five days to identify the oral precancerous conditions (erythroplakia, leukoplakia, lichen planus, and oral sub mucus fibrosis). Those participants' findings were cross-verified by a dentist from State Mobile Dental Clinic, Puducherry. The intraoral cavity (buccal mucosa, tongue, the floor of the mouth, hard and soft palate, tonsils) was thoroughly examined using a tongue depressor/wooden spatula, torchlight, and mouth mirror. An operational definition for suspected oral precancerous lesion. A positive suspicious oral lesion was defined as a white patch or a red patch during the visual, oral examination.[4] The investigator looked for red and white lesions of the oral mucosa and indurated and fixed masses through palpation. All those with oral lesions were counseled and referred to the mobile dental unit for further management.

Data were analysed using EpiData Analysis version 2.2. Prevalence of suspicious lesions was expressed as proportion with 95% Confidence Interval (CI). Association between socio-demographic and clinical characteristics; and tobacco use and oral lesions was expressed as the prevalence ratio with 95% confidence intervals. Log binomial regression were performed by including the risk factors for oral premalignant lesions among tobacco and alcohol users and calculated CI. The measure of association used for identifying possible risk factors for precancerous lesions was PR with 95% CI. Written informed consent was obtained from the study participants before enrolment into the study.

RESULTS

We present here analysis of the 1200 patients attending the OPD of urban (n =600, 50%) and rural (n=600, 50 %) Primary Health Centre of Puducherry underwent opportunistic screening for suspected oral precancerous lesions. The mean age of the study subjects was 51±17 years. Approximately two-third (n=760, 63.3%) of the participants were women and one-third (n=385, 32.1%) were in the age group 46-60 years. More than one-third of the population (35.3%) was illiterate with illiteracy being higher in rural areas as compared to urban (44.2 % vs 26.3%). Nearly, three fourth of the (70.1%) of the participants belonged to the below poverty line, which was higher in rural areas (82.5%). The current users of smokeless tobacco were higher in rural area (22.1%), whereas alcohol users were higher in the urban area (18.8%) (Table 1).

Table 1: Socio-demographic and behavioral characteristics of participants screened for suspected oral precancerous lesions in the outpatient department of rural and urban PHC (n=1200).

Characteristics	Urban n (%)	Rural n (%)	Total n (%)
Gender			
Male	248 (41.3)	192 (32.0)	440 (36.7)
Female	352 (58.7)	408 (68.0)	760 (63.3)
Age (in completed years)			
18-30	96 (16.0)	70 (11.7)	166 (13.8)
31-45	153 (25.5)	125 (20.8)	278 (23.2)
46-60	180 (30.0)	205 (34.2)	385 (32.1)
>60	171 (28.5)	200 (33.3)	371 (30.9)
Educational status			
Illiterate	158 (26.3)	265 (44.2)	423 (35.3)
Class 1 to class 10	339 (56.5)	277 (46.1)	616 (51.4)
Higher secondary and above	103 (17.2)	58 (9.6)	160 (13.4)
Occupation#			
Unemployed	332 (55.3)	329 (54.8)	661 (55.1)
Unskilled	101 (16.8)	110 (18.3)	211 (17.6)
Skilled/semi-skilled	126 (21.0)	61 (10.1)	187 (15.6)
Clerical, shop owner, farmer	28 (4.7)	96 (16.0)	124 (10.3)
Semi-professional and professional	13 (2.1)	4 (0.7)	17 (1.4)
Socio economic status*			
Below poverty line	346 (57.7)	495 (82.5)	841 (70.1)
Above poverty line	207 (34.5)	95 (15.8)	302 (25.2)
Could not be ascertained	47 (7.8)	10 (1.7)	57 (4.8)
Smoking			
Never users	502 (83.7)	520 (86.7)	1022 (85.2)
Current users**	40 (6.7)	50 (8.3)	90 (7.5)
Past users**	58 (9.7)	30 (5.0)	88 (7.3)
Smokeless tobacco use			
Never users	489 (81.5)	420 (70.0)	909 (75.8)
Current users	96 (16.0)	169 (28.2)	265 (22.1)
Past users	15 (2.5)	11 (1.8)	26 (2.2)
Alcohol use			
Never users	456 (76.0)	500 (83.3)	957 (79.8)
Current users	130 (21.7)	97 (16.2)	226 (18.8)
Past users	14 (2.3)	3 (0.5)	17 (1.4)

*Classified based on the card used by Public Distribution System. Red Card indicates Below Poverty Line; Yellow card indicates Above Poverty Line.

Modified Kuppuswamy Classification

**Current users: those who smoke/drink at the time of data collection are current users

**Past users: those who were ever users but quit for at least 6 months were considered as past users.

The prevalence of suspected oral precancerous lesions among the study participants was 14.3% (95% CI=12.3, 16.2). Prevalence was higher in rural area (18.5%; 95% CI=15.6, 21.8)) compared to urban area (10.0 %; 95% CI=7.8-12.6) (Table 2).

Sub group analysis of prevalence of suspected oral precancerous lesions in rural and urban area is depicted in Table 3. In the rural and urban areas, participants with higher age, male gender, and substance abuse had a higher prevalence of suspected oral precancerous lesions. The prevalence ratio of suspected oral precancerous lesions for current smokers and alcohol users was higher in urban area. The higher prevalence ratio for a smokeless form of tobacco was observed in rural area. Prevalence of oral precancerous lesions in rural area was high compared to urban among current smokeless tobacco (41.4%) and smokers (44.0%).

Adjusted prevalence ratio by multivariable analysis showed that the participants from the rural PHC had a 1.9 times higher prevalence of suspected oral precancerous lesions than those from the urban PHC. In multivariable analysis, it was also observed that males, those aged above 30 years and tobacco users (smoke or smokeless form) have a higher prevalence of suspected oral precancerous lesions. (Table 4).

Table 2: Prevalence of suspected oral precancerous lesions who underwent opportunistic screening for suspected oral precancerous lesions in OPD of rural and urban PHC (n=1200).

Residence	Prevalence of suspected oral precancerous lesions		
	N	%	95% CI
Urban	60	10.0	7.8, 12.6
Rural	111	18.5	15.6, 21.8
Total	171	14.3	12.3, 16.2

Table 3: Association of demographic behavior characteristics in suspected oral precancerous lesions in OPD of rural and urban PHC (n=1200).

Characteristics	Urban n=600		Rural n=600	
	Presence of suspected oral precancerous lesion N (%)	PR (95% CI)	Presence of suspected oral precancerous lesion N (%)	PR (95% CI)
Gender				
Male	41 (16.5)	3.1 (1.8, 5.1) *	43 (22.4)	1.3 (1, 1.8) #
Female	19 (5.4)	1	68 (16.7)	1
Age (in completed years)				
18-30	2 (2.1)	1	1 (1.4)	1
31-45	16 (10.5)	5.02 (1.2,21.3)	8 (6.4)	4.5 (0.6, 35.1)
46-60	19 (10.6)	5.1 (1.2, 21.3)	43 (21.0)	14.7 (2.1, 104.6) $
>60	23 (13.5)	6.5 (1.6, 26.8) *	58 (29.5)	20.4 (2.8, 144.5) $
Smoking				
Never users	34 (6.8)	1	81 (15.6)	1
Past users	15 (25.9)	3.8 (2.2, 6.6) $	8 (26.7)	1.7 (0.9, 3.2)
Current users	11 (27.5)	4.1 (2.2, 7.4) $	22 (44.0)	2.8 (1.9, 4.1) $
Smokeless tobacco use				
Never users	35 (7.2)	1	37 (8.8)	1
Past users	2 (13.3)	1.9 (0.5, 7.0)	4 (36.4)	4.1 (1.8, 9.6) *
Current users	23 (24.0)	3.4 (2.1, 5.4) $	70 (41.4)	4.7(3.3, 6.7) $
Alcohol use				
Never users	30 (6.6)	1	85 (17.0)	1
Past users	2 (14.3)	2.2 (0.6, 8.2)	0	
Current users	28 (21.5)	3.3 (2.0, 5.3) $	25 (26.0)	1.6 (1.1, 2.3) #

#p<0.05, *p<0.01, $p<0.001.

Table 4: Multivariable analysis of factors associated with demographic and behavioral characteristics of suspected oral precancerous lesions (n=1200).

Variables	Presence of suspected oral precancerous lesions N (%)	Un adjusted PR (95% CI)	Adjusted PR (95% CI)
Residence			
Rural	111 (18.5)	1.9 (1.4, 2.5) $	1.9 (1.3, 2.8) *
Urban	60 (10.0)	1	1
Gender			
Male	84 (19.1)	1.7 (1.3, 2.2) $	2.1 (1.2, 3.5) *
Female	87 (11.4)	1	1

Continued.

Variables	Presence of suspected oral precancerous lesions N (%)	Un adjusted PR (95% CI)	Adjusted PR (95% CI)
Age (years)			
>30	168 (16.2)	8.9 (2.9, 27.8) $	8.6 (2.5, 29.3) $
<=30	3 (1.8)	1	1
Smoke form			
Current users	33 (36.7)	2.9 (2.2, 4.0) $	3.5 (1.9, 6.4) $
Never and past users	138 (12.4)	1	1
Smokeless tobacco use			
Current users	93 (35.1)	4.2 (3.2, 5.5) $	7.2 (4.8, 10.7) $
Never and past users	78 (8.3)	1	1
Alcohol use			
Current users	54 (23.8)	2.0 (1.5, 2.6) $	1.3 (0.7, 2.2)
Never and past users	117 (12.0)	1	1

#p<0.05, *p<0.01, $p<0.001. +Calculated using Log-binomial Regression; P value significant at the level of <0.05.

DISCUSSION

We undertook an opportunistic screening for suspected oral precancerous lesions at the outpatient department of an urban and a rural Primary Health Center of Puducherry. The prevalence of suspected oral precancerous lesions was 14.3% (95% CI: 12.3, 16.2), which was similar to that observed in a population-based survey conducted in Indore (13.7%) India.[8] However, the prevalence varied from 2.3% to 51.1% in India which could be attributed to variations in tobacco/betel quid chewing habits, culture and environmental factors.[6-9] It is also due to the differences in operational definition, study population, and study setting.[5,7-10,12-14] In our study, the most common precancerous lesion was leukoplakia (71%), followed by lichen planus (8%) similar to that noticed in other research works.[7,10,15-19] However, a screening programme in dental hospital noted that oral submucosal fibrosis were the most common precancerous lesion.[7]

The prevalence of suspected oral precancerous lesions was higher in the rural area (18.3%) as compared to an urban area (10.3%). Another study done among tobacco users of age more than 60 years, residing in a rural area in Puducherry reported a prevalence of 10.2%. The higher prevalence in rural areas could be partly attributed to the practice of chewing tobacco/betel quid, which was (28%) in rural area as compared to (16%) in urban areas. However, rural residence had a relatively significant association with suspected oral precancerous lesions in the multivariate analysis also. The yield of the opportunistic screening programme would be higher when implemented in primary health centers in rural areas.

The prevalence of suspected oral lesions was higher in rural women (16.7%) as compared to women in urban PHC (5.4%). Higher prevalence of smokeless tobacco use in rural area may be the possible reason for this. In India, the smokeless form of tobacco use is common among women.[10,20] Males had a higher prevalence ratio (PR) of suspected oral lesions after adjusting for substance use. Similar male preponderance was noted in studies done at the Indore district of Madhya Pradesh.[8]

The prevalence of suspected oral mucosal lesions increases with age and is 12.2 times higher among people aged more than 60 years.[10] Similar trends were observed in our study and only three subjects (1.8%) were of age less than 30 years. In National Programme for Prevention and Control of Cancer Diabetes, Cardiovascular Disease and Stroke (NPCDCS) programme the screening for oral cancers is recommended for those above 30 years of age. This is an efficient strategy leading to better yield during the screening.[21]

In our study, smokers had a higher prevalence of suspected oral precancerous lesions than never smokers. Similar findings were reported from studies done in northern India, where smokers and tobacco/betel quid chewers had three to four times higher prevalence of precancerous lesions as compared to non-users.[8]

Substance use is an independent risk factor for oral suspicious lesions. Screening tobacco/alcohol users would increase the yield of screening. However, eliciting the correct history of substance use in outpatient department is challenging due to social desirability bias. Hence, screening all those who are aged more than 30 years would be an operationally feasible option. For diagnosis of positive oral lesion, a detailed substance abuse history could be taken and could be redirected to appropriate medical treatment and social interventions such as counselling and tobacco cessation program.

Opportunistic screening of patients attending outpatient department of the primary health centre is less resource-intensive and feasible with minimal training. Screening can be done easily through the visual inspection of the oral cavity using torchlight and disposable tongue depressors. Staining of the participant's mucus membrane by tobacco and Areca nut posed a challenge in the diagnosis of the lesions. Non-availability of confirmatory diagnosis was the limitation of this study. As the study was carried out in OPD settings of PHC, there is a

possibility of self-selection bias due to the health seeking behaviour.

CONCLUSION

Opportunistic screening for all individuals above 30 years of age for suspected oral precancerous lesions is feasible in primary healthcare settings. This could help in early identification, appropriate treatment, de-addiction services and follow up.

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REFERENCES

1. Stewart BW, Wild CP. World Cancer Report 2014. Geneva, Switzerland: World Health Organization, International Agency for Research on Cancer, WHO Press, 2015. Adv Nutr. 2016;7(2):418-9.
2. Petersen PE. Strengthening the prevention of oral cancer: the WHO perspective. Community Dent Oral Epidemiol. 2005;33(6):397–9.
3. Neville BW, Day TA. Oral cancer and precancerous lesions, CA Cancer J Clin. 2002;52(4):195–215.
4. Nair DR, Pruthy R, Pawar U, Chaturvedi P, Marg B. Oral cancer: Premalignant conditions and screening-an update. J Cancer Res Ther. 2012;8(Suppl 2):S57-66.
5. Joshi M, Tailor M. Prevalence of most commonly reported tobacco-associated lesions in central Gujarat: A hospital-based cross-sectional study. Indian J Dent Res. 2016;27(4):405.
6. Gupta PC, Bhonsle RB, Murti PR, Daftary DK, Mehta FS, Pindborg JJ. An epidemiologic assessment of cancer risk in oral precancerous lesions in India with special reference to nodular leukoplakia. Cancer. 1989;63(11):2247–52.
7. Gupta S, Gupta O, Singh R, Tripathi A. Prevalence of oral cancer and pre-cancerous lesions and the association with numerous risk factors in North India: A hospital based study. Natl J Maxillofac Surg. 2014;5(2):142.
8. Kumar S, Debnath N, Ismail MB, Kumar A, Kumar A, Badiyani BK, et al. Prevalence and risk factors for oral potentially malignant disorders in Indian population. Adv Prev Med. 2015;2015:1–7.
9. Goel A, Goel P, Mishra S, Saha R, Torwane N. Risk factor analysis for oral precancer among slum dwellers in Delhi, India. Ann Med Health Sci Res. 2014;4(9):218.
10. Prasad KN, Ingalgeri BM, Poovitha R, Vinayan S, PriyaK S. Prevalence of erythroplakia and leukoplakia among the tobacco users aged above 60 years in rural area of Pondicherry. Sch Acad J Biosci. 2015;3(1A):30–3.
11. Vidhubala E, Shewade HD, Niraimathi AK, Ramkumar S, Ramaswamy G, Nagalekshmi G, et al. Call for systematic population-based cervical cancer screening: findings from community-based screening camps in Tamil Nadu, India. Asian Pac J Cancer Prev. 2019;20(12):3703.
12. Narasannavar A, Wantamutte AS. Prevalence of oral precancerous lesions and conditions among tobacco consumers in rural population around Belgaum. A community based cross sectional study. IOSR J Dent Med Sci. 2014;13(4):31-4.
13. Kadam D, Chowdhary P. Awareness of ill effects of tobacco and opportunistic screening for oral cancer in patients (consuming tobacco in any form) attending urban health centre of K. IOSR J Dent Med Sci. 2016;15(4):91-5.
14. Abhishek K, Aniket L, Suchit K, Panchsheel S, Gaurav P. Oral Premalignant lesions associated with areca nut and tobacco chewing among the tobacco industry workers in area of rural Maharashtra. Natl J Community Med. 2012;3(02):333-8.
15. Deshpande A, Tandon S, Deshpande N. Low resource screening method of pre-cancerous lesions and its reversal by Triphala in teen-age Indian population. Ayu. 2014;35(2):160.
16. Patel P, Patel V. Oral Mucosal Lesions among Residence of a Town in North Gujarat. Natl J Med Res. 2011;1(1):3–6.
17. Mishra SS, Kale LM, Sodhi SJ, Mishra PS, Mishra AS. Prevalence of oral premalignant lesions and conditions in patients with tobacco and tobacco-related habits reporting to a dental institution in Aurangabad. J Indian Acad Oral Med Radiol. 2014;26(2):152-7.
18. Saraswathi T, Ranganathan K, Shanmugam S, Sowmya R, Narasimhan P, Gunaseelan R. Prevalence of oral lesions in relation to habits: Cross-sectional study in South India. Indian J Dent Res. 2006;17(3):121-5.
19. Sujatha D, Hebbar PB, Pai A. Prevalence and correlation of oral lesions among tobacco smokers, tobacco chewers, areca nut and alcohol users. Asian Pacific J Cancer Prev. 2012;13(4):1633-7.
20. Mishra GA, Kulkarni SV, Gupta SD, Shastri SS. Smokeless tobacco use in Urban Indian women: Prevalence and predictors. Indian J Med Paediatr Oncol. 2015;36(3):176-82.
21. National Health Mission. Prevention, Screening and Control of Common Non-Communicable Diseases: Hypertension, Diabetes and Common Cancers (Oral, Breast, Cervix). Government of India. 2016.

Available at: https://main.mohfw.gov.in/sites/default/files/Operational%20Guidelines%20on%20Prevention%2C%20Screening%20and%20Control%20of%20Common%20NCDs_1.pdf. Accessed on 30 September 2021.

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