Original Article

Workplace based Potentially Malignant Oral Lesions Screening among Tobacco Consuming Migrant Construction Site Workers in Chennai, South India: A Pilot Study

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Abstract

Context: Vulnerable population groups such as migrant workers are identified as emerging high-risk groups for oral cancer owing to the high prevalence of smokeless tobacco consumption. Premature deaths due to oral cancer can be prevented by screening the population with high tobacco consumption practices and detecting early reversible stages of oral mucosal cavity lesions and facilitating linkages for further care. **Aim:** To assess prevalence of potentially malignant oral mucosal cavity lesions among tobacco consuming migrant construction workers in sub-urban Chennai, India. **Settings and Designs:** A workplace based cross-sectional study design. **Materials and Methods:** A cross-sectional study was conducted at workplaces i.e., construction sites for screening potentially malignant oral mucosal cavity lesions among migrant workers across 23 construction sites of Chennai during September 2019 - February 2020. An onsite, group health education session was provided about the harms of tobacco use to the migrants. **Statistical Analysis Used:** Data entered in MS Excel was analysed using SPSS and multivariate analysis was performed. **Results:** Among 640 migrants included in the study, 411 (64.2%) were less than 30 years of age, 623 (97.4%) were from north-eastern states of India such as West Bengal, Bihar, Rajasthan, Uttar Pradesh, Jharkhand. A considerable size (272, 42.5%) could not read or write and 355 (55.4%) earn a monthly income of less than ten thousand rupees. Current tobacco users were 619 (96.7%), smokeless tobacco users (463, 72.34%), smokers (206, 32.2%) and dual users (52,8.12%). Inflammatory mucosal lesions in the oral cavity were 70.97% and more among smokeless tobacco users comparable to 22.58% among tobacco smokers and was significantly associated with up to 20 years of tobacco consumption. **Conclusions:** Prevalence of Potentially malignant oral lesions among smokeless tobacco using interstate migrant construction site workers is very high and need urgent interventions.

Keywords: Construction site workers, migrants, oral mucosal lesions, potentially malignant lesions, smokeless tobacco, workplace

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Introduction

Tobacco remains the leading cause of preventable mortality and morbidity in India, with 266.8 million current tobacco consumers in

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all forms.[1] The rising burden of upper aero-digestive tract cancers in India and tobacco-related cancers constituting 30% of total cancer by 2020 were widely reported which makes "oral cancer" the leading cancer site for men across India.[2] Oral cancer is ranked among top three of all cancers in India and could be explained by the twice common use of smokeless tobacco (SLT) products, such as khaini, gutkha, and pan masala as well as smoking cigarettes and beedis.[2] According to World Cancer Report, in 2018 India reported 1.16 million new cancer cases and 784,800 deaths related to cancer in a population of 1.3 billion.[3] Approximately, about one-third of cancers at global level are preventable in scope with appropriate leveraging of current knowledge and technology.[4] The lack of facilities and infrastructure for early diagnosis in low and middle income countries contributes heavily toward cancer-related mortality. Primary health-care systems in these countries with strengthened robust systems along with trained primary health-care providers should plan for screening of asymptomatic target population groups, such as migrants for oral cancer and are highly recommended by World Health Organization (WHO).[5] Screening and early diagnosis for cancer are components of continuum of care for cancer control as identified by WHO and thus recognized as an integral component for achieving universal health coverage.

Vulnerable population groups such as migrant workers were identified as emerging high-risk groups for oral cancer owing to the high prevalence of smokeless tobacco consumption. A study by Parashar M Dwiwedi among construction site workers in Delhi identified tobacco use among 90% of participants, of which 49% were smokeless tobacco users, 29%-smoking/beedi users, and 22%- dual users.[6] In a study by Hallikeri *et al.*, in Dharwad of Karnataka, oral mucosal lesions among smokeless tobacco users were found to be highly significant among males and at age of second to fourth decade.[7]

Oral cancer is the third most common type of cancer reported in India accounting to 40% cancer-related mortality.[8] Studies also identified low-income group populations at highest risk of exposure to smokeless tobacco forms and are also commonly missed out group from early screening and prevention services.[9,10] Screening of oral cavity for mucosal lesions might offer a window of opportunity to detect patients with abnormal or potentially malignant lesions thus prevent oral cancer in this group. In 2005, WHO considered oral premalignant lesions and conditions under a single group of disorders known as oral potentially malignant disorders-OPMD.[11] These disorders consist of leukoplakia, erythroplakia, oral lichen planus, oral submucous fibrosis, and other miscellaneous lesions. Higher rates of tobacco consumption have been reported among construction site workers and migration to urban cities necessitating lifestyle and behavioral changes has been identified as contributing cause.[11]

The poor utilization of health services due to the status of "migrant" imposes barriers in accessing promotive and preventive health services owing to language barriers and irregular work shifts. Attempts to study the knowledge, attitude, and behaviors related to tobacco consumption among the migrant, construction site workers in India date back a decade. Premature deaths due to non-communicable diseases such as oral cancer can be averted if screening for oral cancers is performed to detect early oral mucosal cavity lesions and link the target population with abnormal features in lesions for further care thereby preventing oral cancer.

To our knowledge, our study is first and unique to undertake workplace (construction site) based screening for oral mucosal cavity lesions among migrant construction site workers with tobacco consumption behaviours in Tamil Nadu. This is an essential feature as it may not be practically feasible for migrant workers to attend hospital-based screening due to work-timings and at risk of potential loss of the daily wages. Identifying potentially malignant oral lesions among migrant construction site workers will enable to attempt successful reversal of the mucosal changes aided by tobacco cessation and linking them to further care for prevention of oral cancer in this vulnerable group.

Objectives

1. To assess the tobacco consumption practices among migrant construction site workers.
2. To estimate the prevalence of potentially malignant oral lesions with tobacco use among interstate migrant construction site workers in Chennai.

Methodology

This cross-sectional study was conducted to assess the prevalence of potentially malignant oral lesions among tobacco consuming migrant construction site workers in Chennai during September 2019-February 2020. Necessary approvals were obtained from Institutional Ethics Committee of Tagore Medical College Hospital, Chennai (Ref No: 01/Sep/2019) and management of the construction sites (23 sites) for conducting the screening camps. A sample size of 640 was estimated with a prevalence of oral cavity lesions among adult males in India 42.4% and 6% absolute precision and 10% non-response rate.[12] A pre-tested structured questionnaire was adapted from Global Adult Tobacco Survey Version 2.1, June 2014.[13] After obtaining the oral informed consent from the migrants, the questionnaire was administered by principal investigator and trained field researchers (interns posted in department of Community Medicine) in Hindi language. The administration of oral informed consent, interview process and data collection took approximately 10–15 minutes.

The screening camps for oral cavity mucosal lesions were conducted at 23 construction sites in Chennai at geo-localities of Kelambakkam Sholinganallur, Kolapakkam, Pallavaram, Palavanthangal, Perungudi, in field practice areas of rural and urban health and training centres attached to Department of Community Medicine, Tagore Medical College and Hospital, Rathinamangalam, Chennai.

Oral Cavity examination and cytology

Trained interns under supervision of oral pathologist conducted

oral cavity examination to identify types of oral cavity mucosal lesions associated with tobacco use, such as ulcers, white and red mucosal lesions, tobacco pouch keratosis. Before oral cavity screening, all the migrants were explained about the risk of developing oral mucosal lesions and subsequently oral cancer with continued use of smokeless tobacco and oral informed consent was obtained. Clinical intraoral examination was done using mouth mirrors under adequate illumination. Oral mucosal cavity lesions, such as white and red lesions, ulcers and discolouration of cavity were identified. The biological material was obtained by using wooden ice-cream sticks after tissue retraction with spatula. All the samples of oral swabs were collected and stored in ethyl alcohol in coplin jars, transported, and deposited in the pathology laboratory. The slides were stained with eosin and hematoxylin stains and observed under microscope and interpreted. The lesions were categorized as inflammatory and non-inflammatory, such as normal smears, bacterial colonies, actinomycosis, etc.

Statistical analysis

The data were entered in Microsoft Excel sheet (Version 2007) and statistical analysis was performed in SPSS computer package version 21.0 (SPSS Inc., IL, USA). The descriptive statistics were measured to assess the prevalence of oral mucosal cavity lesions and inferential statistics, i.e., to assess the type of tobacco product consumed by the migrant construction workers and inflammatory lesions in oral mucosal cavity, analysis of variance test was performed with the cut off value of $P < 0.05$.

Results

Male interstate migrant construction site workers (640) from native rural parts of Northern (Uttar Pradesh, Rajasthan, Orissa, Bihar, Jharkhand and West Bengal) and North- eastern states (Assam) of India working in 23 construction sites were included in this study. Mean age of the subjects was 29.95 years, majority (411, 64.2%) study participants was less than 30 years of age. Out of 640, 272 (42.75%) self-reported inability to read or write in their native language and earn a monthly income less than 10000 Indian rupees (355, 55.5%) and unmarried (222, 34.68%). Most of the migrants were in Chennai for more than 3 years of duration (299, 46.72%) and 246 (38.44%) for less than a year as seen in Table 1.

As seen in Table 2, most of the migrants were current tobacco users (619,96.7%) of whom current smokers were (206,32.18%), current smokeless tobacco users (463,72.3%), and dual users, i.e., using both smoking and smokeless forms of tobacco were (52,8.12%). Current daily smokeless tobacco users were predominant (416,65%) compared to current daily smokers (174,27.18%)

Among 619 migrants who were tobacco users, 179 (27.9%) self-reported that they tried to quit tobacco in the previous one year, of whom 10 (1.5%) used few methods to quit. Majority of migrants (426, 66.56%) did not attempt to quit [Table 3].

Table 1: Socio-demographic characteristics of the migrant construction site workers

Variable	Frequency	Percentage
Age		
Age less than 30 years	411	64.22
Age more than 30 years	229	35.78
Nativity		
*North	623	97.34
*North east	15	2.35
*Others	2	0.31
Literacy		
Read and write	368	57.5
Doesn't read or write	272	42.5
Income group		
Less than 10000	355	55.46
More than 10000	285	44.54
Marital status		
Unmarried	222	34.68
Married	418	65.32
Duration of migration		
<1 year	246	38.44
1-3 years	95	14.84
>3 years	299	46.72

*North: West Bengal, Bihar, Orissa, Rajasthan, Jharkhand, Uttar Pradesh, North-East-Assam Others-Andhra Pradesh

Table 2: Tobacco consumption practices among migrant construction site workers

Variable	Frequency	Percentage
Current users	619	96.71
Current smokers	206	32.18
Current smokers- daily	174	27.18
Current smokers -less than daily	47	7.34
Current smokeless tobacco users	463	72.34
Current smokeless tobacco daily	416	65
Current smokeless tobacco-less than daily	47	7.34
Current dual users	52	8.12
Former users	23	3.28
Former smoker	8	1.25
Former smoker daily	5	0.78
Former smokers -less than daily	2	0.31
Former smokeless tobacco users	17	2.65
Former smokeless tobacco daily	16	2.5
Former smokeless tobacco-less than daily	1	0.15
Former dual users	2	0.31

Among 211 oral samples, smokeless tobacco consumers had 70.97% had inflammatory lesions compared with 22.58% in tobacco smokers as seen in Table 4.

The inflammatory lesions associated with chronic consumption of smokeless tobacco were found to be significant ($p < 0.019$) [Table 5].

Discussion

The current study is first as per our knowledge with a large sample describing the tobacco consumption practices and potentially malignant oral mucosal lesions among 640 migrant construction site workers in Chennai, Tamil Nadu. The prevalence of current

tobacco use (96.7%) especially smokeless tobacco (72.3%) among migrant construction site workers is alarmingly high and in concurrence with GATS-2, global adult tobacco survey.[14] Similar studies among migrants to south Indian states of Kerala and Karnataka reported high use of tobacco thus identifying their increased risk for oral cancers.[15-17]

In this study, majority (66.56%) have not attempted to quit tobacco consumption. Earlier studies identified that populations from lower socio-economic status have higher inclination toward tobacco consumption and quit attempts were likely to be less successful.[18] This is comparable to a study among migrants in Mysore and Kerala (54%, 88%) and needs to be further studied.[15,17] In India, determinants of SLT use include wealth index, marginalized populations, such as scheduled tribe, peer pressure, lack of awareness, and misconceptions about SLT.[19] The inability to quit and chronic duration SLT use is associated with development of potentially malignant disorders of oral cavity leading to cancers of oral cavity, esophagus, and pancreas.[20]

Table 3: Efforts/attempts by tobacco consuming migrant construction site workers to quit tobacco

Variable	Frequency	Percentage
Tried to stop in the last year	179	27.96
Used any methods to stop	10	1.56
Not tried to stop	426	66.56
Not used any methods	595	92.96
Refused to answer	33	5.15

The prevalence of inflammatory oral mucosal cavity lesions among migrant construction site workers was 70.97%. This is similar to the studies reported by Aslesh *et al.* (2015) in their study from Kerala.[14,15] Ali *et al.* (2018) in their study among construction site workers reported leukoplakia and oral submucous fibrosis as most common lesions associated with smokeless tobacco use.[15] This is higher than the studies reporting oral mucosal lesions in general male populations in hospital settings from both north and South Indian studies.[21-23] These differences in prevalence of oral cavity lesions between migrants and general population can be explained by the quantum and frequency of tobacco consumption. There is correlation between SLT use and oral mucosal disorders and stronger association between tobacco use, young adults with lower educational attainment, belonging to below the poverty line.[7,24] Khan *et al.* (2018) calculated the meta odds ratio for any oral potentially malignant diseases (OPMD) with the use of smokeless tobacco product as 15.5 (95% confidence interval (CI), 9.9-24.2), thus a great opportunity for both tobacco and oral cancer control.[25]

The sale of smokeless tobacco products such as gutkha and pan masala has been banned in the state of Tamil Nadu since 2013. Vindhubala *et al.* (2016) reported that ban is systematically violated in Chennai, as it is cheaply and widely available lacking information about the contents in the product and warnings of health damage.[26] In our study in 2020, the higher use of smokeless tobacco among migrants establishes the failure of regulatory system in curbing the access to these products despite the ban in the state. The state of Kerala has banned smokeless

Table 4: Characteristics of oral cavity mucosal lesions among tobacco consuming migrant construction site workers

Type of tobacco Consumed	Oral samples collected	Inflammatory Lesions	Others
Smoking tobacco	44 (20.85%)	14 (22.58%)	30 (20.13%)
Smokeless tobacco	145 (68.72%)	44 (70.97%)	101 (67.79%)
Combination of both	22 (10.43%)	4 (6.45%)	18 (12.08%)
Total	211 (100%)	62 (100%)	149 (100%)

Table 5: Association of tobacco consumption behaviour and characteristics of oral cavity mucosal lesions among tobacco consuming migrant construction site workers

Tobacco consumption	Non-inflammatory	Inflammatory	Chi square value	*p*
Tobacco user				
Daily users	136 (91.28%)	57 (91.94%)		
Less than daily users	13 (8.72%)	5 (8.06%)	0.024	0.876
Total	149 (100%)	62 (100%)		
Frequency of use in a day				
Less than 5	99 (66.44%)	39 (62.90%)		
More than or equal to 5	50 (33.56%)	23 (37.10%)		
Total	149 (100%)	62 (100%)	0.242	0.622
Consumed after waking up				
Within 30 minutes	61 (40.94%)	22 (35.48%)		
After 30 minutes	88 (59.06%)	40 (64.52%)	0.546	0.460
Total	149 (100%)	62 (100%)		
Years of consumption				
Less than 20 years	137 (91.95%)	50 (80.65%)		
More than 20 years	12 (8.05%)	12 (19.35%)	5.547	**0.019**
Total	149 (100%)	62 (100%)		

tobacco since 2012 but studies identified high use of smokeless tobacco among migrants and one-third have shifted from smokeless tobacco to smoking signalling impact of ban.[14] There is need for further studies to understand the implementation of these policies at regional level and also explore the pathways of accessibility and acquisition of the smokeless tobacco products for consumption among migrant population.

This high burden of tobacco and increased potential for development of oral cancer among migrants is emerging as an explosive twin epidemic and urgent policy measures aiming at prevention of tobacco-related mortality and morbidity among migrant population are the need of the hour. The State of Kerala is the first state in India to enact Kerala Migrant Workers Welfare Scheme beginning in 2010 with medical benefits up to 25,000 rupees for registered migrants.[27] Inclusion of prevention and early diagnosis through oral cavity screening for tobacco-related health including oral health issues in the migrant population health schemes is essential to adequately address this burden in these vulnerable populations. Behavior change communication aids such as posters in native languages of migrants can be displayed widely in the working areas, canteens, and living spaces at construction sites to educate the migrants about the harm of tobacco consumption in any form.

Conclusion

The study findings reveal high rates of smokeless tobacco consumption as well as higher prevalence of inflammatory mucosal cavity lesions among interstate migrant construction workers in Chennai. Understanding the multi-dimensional factors such as migration, access to wide varieties of smokeless tobacco in Chennai, Tamil Nadu for migrants and special focus with targeted interventions for workplace-based early screening for oral cancers is key to comprehensive tobacco control strategies addressing these health inequities among vulnerable populations such as migrants.

Limitations

The strength of this study was, to our knowledge this was the first large sample, population-based study conducted at construction sites to assess the burden of smokeless tobacco and screen for oral mucosal lesions among interstate migrant population in Chennai, Tamil Nadu. Though convenient sampling is utilized in this study as we sampled across 23 construction sites we believe these findings represent the migrant population across the South India.

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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.

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Conflicts of interest

There are no conflicts of interest.

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