

# High Prevalence of Tobacco Use and Associated Oral Mucosal Lesion Among Interstate Male Migrant Workers in Urban Kerala, India

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## Abstract

**Background:** Kerala is a highly urbanized state in India and interstate migrant laborers working there forms a marginalized community. It was generally perceived that use of tobacco and alcohol was high among the workers, but there are no epidemiological studies assessing the actual burden.

**Objectives:** To estimate the prevalence of use of tobacco and also the prevalence of oral mucosal lesions associated with such use consumption among the adult male interstate migrant workers in North Kerala.

**Materials and Methods:** A cross sectional study was carried out among male migrant workers above 18 years working in different factories in urban parts of Kannur district. Total of 244 participants attending routine health check-up camp were assessed for the use of tobacco/alcohol, type, frequency and duration of their use by a questionnaire. The trained dental interns conducted oral cavity examination for detecting oral mucosal lesions associated with tobacco use.

**Results:** The prevalence of current use of smoked tobacco, smokeless tobacco and alcohol use were 41.8%, 71.7% and 56.6%, respectively among migrants. Oral mucosal lesions (OML) were seen in 36.3% of participants. Among smokeless tobacco users, 44.6% had lesions. Adjusted odds ratio for OML was 4.5 (CI: 1.9 - 19.84) among smokeless tobacco users.

**Conclusions:** The current use of smokeless tobacco and oral mucosal lesions are highly prevalent among migrant workers.

**Keywords:** Tobacco, Oral Mucosal Lesions, Kerala, India

## 1. Background

Use of tobacco and alcohol has been associated with many adverse health consequences including cancer. Oral cancer is the second most common cancer among males in India and the main cause attributed to this is the use of smokeless tobacco (1-3). The concomitant use of alcohol along with tobacco use has a multiplicative effect on risk of getting oral carcinoma (4). Oral mucosal lesions like leukoplakia, erythroplakia, sub-mucous fibrosis etc. are considered as precancerous lesions associated with the use of tobacco. As a secondary prevention strategy, identification and management of precancerous lesions is important to reduce the incidence oral cancers (5).

Kerala is a unique state in India with more than 50% of its total population (32 million) living in urban area with low population growth (6). There are around 2.5 million migrant laborers from other states (interstate migrants) working in Kerala (7). In terms of health care utilization, Interstate Migrant workers form a marginalized community in Kerala. The utilization of public health care services is limited due to several factors like lack of awareness regarding the health facilities, inconvenient timing of clinics, language, and cultural barriers. Working con-

dition and nature of migration can also be a barrier for access to health care (8). Their health status and health related behaviors may be different from the natives and needs to be explored. It was generally considered that use of tobacco and alcohol was high among these workers. However, no prior epidemiological studies had been carried out to quantify the burden.

## 2. Objectives

Hence this study was carried out with the specific objectives to estimate the prevalence of use of tobacco and also the prevalence of oral mucosal lesions associated with such use among the adult male interstate migrant workers in North Kerala.

## 3. Materials and Methods

For estimating the prevalence of tobacco and alcohol use, a cross sectional study was carried out among the male migrant worker aged above 18 years in Azhikode, an industrial area in Kannur district, Kerala in March 2013. These migrants were working in different plywood and

tile factories. Since the location of these workers were scattered in different parts of the study area, the study participants were recruited from a routine medical check-up camp organized by the labor department for the migrants. A sample size of 225 was estimated after considering the prevalence of tobacco use among adult males in India (47 %) as per Global Adult tobacco survey with 15 % relative precision and 10 % non response rate (9).

Participants were assessed for the use of tobacco and alcohol, type, frequency, and duration of use by a semi-structured questionnaire after obtaining verbal consent for participating in the study. The use of tobacco and alcohol were classified into current user, ex- user and non-user. Those who had used tobacco or alcohol within last one year were termed as current user. Those users, who had used tobacco or alcohol in their lifetime, but have abstained from the use in past one year, were classified as ex-user. The trained dental interns conducted oral cavity examination for detecting oral mucosal lesions associated with tobacco use. Intra-oral examination was conducted to detect white and red mucosal lesions, ulcers, and abnormal growths. The lesion in the mouth like leukoplakia, keratosis, leucoedema, candidiasis, lichen planus, linea alba, erythroplakia etc., can be classified as white and red oral mucosal lesions lesions (10, 11). The examination was done using spatula for tissue retraction, mouth mirror for indirect vision, and gauze for drying the oral mucosa under adequate illumination using natural and artificial light. The lesions were reported as oral white mucosal lesion, oral red mucosal lesions and oral ulcers. The identified cases were referred to a tertiary care center for confirmation and management.

The data were inserted into Microsoft excel sheet 2007 and analyzed using EpiInfo 7.1.1.14 (CDC, Atlanta). The descriptive statistics like proportion were used to present prevalence. Inferential statistics like chi square were used to test association of different factors with oral mucosal lesion. Logistic regression was used to estimate the effect of various variables on prevalence of oral mucosal lesions.

#### 4. Results

A total of 244 male migrant workers residing in the study area were included in the study. Majority of the study participants were less than 30 years of age (67.2%). Out of the total, 13.1 % were in the age group 31 - 40 years and 19.7% were above 40 years of age. Most of the participants were from two northern states, Uttar Pradesh (UP) (46.3%) and Bihar (40.6%). The rest were from Assam, Odisha, Madhya Pradesh, and Chhattisgarh.

The prevalence of use of tobacco and alcohol is given in Table 1. The study shows that 71.7% of the male migrant worker in the study area were current users of smokeless tobacco products and 41.8 % were current smokers. The prevalence of current alcohol use among the male migrant worker was 56.6%. Concurrent use of alcohol and tobacco was present in 45.5% of the study participant.

**Table 1.** Use of Tobacco and Alcohol Among Male Migrant Worker, Kerala, India (N = 244)

Substance Used/ Status	Value <sup>a</sup>
<b>Smoking</b>	
Current smoker	102 (41.8)
Ex smoker	17 (7.0)
Non smoker	125 (51.2)
<b>Smokeless tobacco use</b>	
Current user	175 (71.7)
Ex user	12 (4.9)
Non user	57 (23.4)
<b>Alcohol</b>	
Current user	138 (56.6)
Ex user	15 (6.1)
Non user	91 (37.3)

<sup>a</sup>Data are presented as No. (%).

Among the current smokers, 90.2 % use cigarettes only, 4.5% use beedi only and 5.4% use both beedi and cigarettes. The mean age of initiation of smoking was 25.6 (SD 7.6). Around one-third (30.7%) of the study participants were found to be recent users (less than one year duration from initiation). Duration of smoking was between 1 to 5 years in 43.3 % of the participants and more than 5 years in 26% of the participants.

Among the current users of smokeless tobacco, 37.7% were using products containing plain tobacco leaves. Khaini was used by 26.9 %, pan masala by 28 %, zarda by 6.1% and gutka by 2.9% of the current users. Frequency of use was found to be two or more per day in 86.7% of the current users. The mean age of initiation of use was 23.3 years (SD: 6.6). Majority (44.7%) of the current users were using this for more than 5 years. Duration of use was less than 1 year in 14% and between 1 to 5 years in 41.4% of current users. The practice of chewing tobacco was seen in 77.9% of UP migrants and 70.1% of Bihar migrants.

Eighty percent of current alcohol users were using products having alcoholic content with more than 40% alcohol (brandy-52%, whisky-18.3%, rum-8.3%). Local alcoholic product, toddy, was used by 11.3% and beer by 9.2% of the current users. Duration of use of alcohol was less than 1 year in 18.1%, 1 to 5 years in 52.9% and more than 5 years in 29% of the current alcohol users. The mean age of initiation of alcohol was 27.9 years (SD: 8.1).

Oral mucosal lesions (OML) were found in 89 (36.3 %) of the study participants. Out of this, 80 (90%) of the lesions where white lesions and 3 (3.3%) were oral ulcers. Univariate analysis showed that mucosal lesions were significantly ( $P = 0.006$ ) more among workers above 30 years (51.2%) when compared to those below 30 years (29.3%). Mucosal lesions were significantly more prevalent among current users of smokeless tobacco when compared to non user (44.6% vs 12.3%, ( $P$  value = 0.001) (Table 2). Also the lesions were more common among current alcohol users (42.8%) when compared to non user (12.3%) ( $P$  value = 0.006). After adjustment for age and use of

**Table 2.** Prevalence and Risk of Oral Mucosal Lesions Among Male Migrant Worker, Kerala, India

	Prevalence of Oral Mucosal Lesion	Crude Odds Ratio	95% Confidence Interval	Adjusted Odds Ratio	95% Confidence Interval	P Value
<b>Smokeless tobacco</b>						.001
Current user	44.6	5.74	2.47 - 13.37	4.54 <sup>a</sup>	1.9 - 19.84	
Ex user	33.3	3.57	0.85 - 15.04	2.95 <sup>a</sup>	0.67 - 13.08	
Non user	12.3	NA	NA	NA	NA	
<b>Smoking</b>						.5
Current smoker	40.2	1.32	0.77 - 2.28	1.01 <sup>b</sup>	0.54 - 1.88	
Ex smoker	35.3	1.08	0.37 - 3.12	0.68 <sup>b</sup>	0.21 - 2.19	
Non smoker	33.6	NA	NA	NA	NA	
<b>Alcohol</b>						.006
Current user	42.8	2.34	1.30 - 4.21	1.55 <sup>c</sup>	0.79 - 3.03	
Ex user	53.3	3.58	1.17 - 11.01	2.71 <sup>c</sup>	0.78 - 9.39	
Non user	24.2	NA	NA	NA	NA	

Abbreviation: NA, not available.

<sup>a</sup>adjusted for age, smoking and alcohol.

<sup>b</sup>adjusted for age, smokeless tobacco use and alcohol.

<sup>c</sup>adjusted for age, smokeless tobacco use and smoking.

alcohol and smoking, the odds ratio for having oral mucosal lesion with use of smokeless tobacco was 4.54 (95%CI: 1.9 - 19.84). The odds of having OML increased with concomitant use of smokeless tobacco and alcohol. The OR for OML among those who only use smokeless tobacco was 3.19 (95% CI: 1.37 - 7.48) and those who use alcohol plus tobacco was 4.85 (95%CI: 2.06 - 11.44) against those who do not use tobacco and alcohol.

## 5. Discussion

The study shows that the prevalence of current use of smokeless tobacco product was 71.7% among the male migrant workers in the area. This was more than 5 times the prevalence among males of Kerala state (13.1%) as shown in global adult tobacco survey in 2010. The prevalence was also higher than northern states of UP (35.4%) and Bihar (62.1%) from which majority hail from (12). The prevalence of smoking was also high among the study participant (41.8%) when compared to the state statistics (27.9%) and national statistics (24.3%) for males. The study also shows that alcohol use among migrants (56.6%) was again higher than the alcohol use among males of the states of Kerala (42.5%), UP (25.3%) and Bihar (34.9%) (13).

The prevalence of oral mucosal lesions among the male migrant worker was 36.3%. The prevalence of these lesions considered for the study was higher than those reported among males in a study conducted in north India (12.1%) (14). South Indian Dental hospital based studies done by Saraswathi et al. (0.59%) and Mathew et al. (28.2%) also reports a prevalence of OML lower than that found in the present study (15, 16). The difference can be explained by the lower rate of use of tobacco among the study participants which was 6.9% in Saraswathi et al. and 21% in

Bhatnagar et al. (14) The results of the present study was comparable to the prevalence reported by Sujatha et al. (36.1 and in males) and Patil et al. (54.1% in males) for lesions considered in the study (17, 18).

The high prevalence of tobacco use and associated oral mucosal lesions among migrants has serious health implications. The wide spread use of tobacco products will increase the incidence of tobacco related cancer in the state and can over burden the state's health system.

The sale of smokeless tobacco has been banned in the state since May 2012 (19). The present study showed that in spite of the ban, the use of smokeless tobacco products was high among male migrants. The study also shows that one -third of smokers started smoking recently within last one year while they had been using smokeless tobacco for many years. This change in behavior may have been due to the effect of ban on sale of smokeless tobacco. It is observed that migration increases the use of tobacco as the prevalence of use is higher than the prevalence in their native state. This may be related to various stress factors related to migration.

The strength of the study was that, to the best of our knowledge, this was the first study done in the state to assess the burden of tobacco use and oral mucosal lesions among migrant workers in Kerala. However, as the workers are not registered in state labor registries, there was an absence of sampling frame for random sampling. The convenient sampling of the study participants may affect the generalization of the results of the study to whole migrant population.

In order to control the situation, health promotion activities directed toward tobacco and alcohol cessation should be actively carried out among the migrant laborers by the health staffs of primary health centers in their

field area. Behavior changing communication (BCC) materials for tobacco and alcohol cessation should be made available in their native languages. To control the use of smokeless tobacco products, strict enforcement of ban on sales of smokeless tobacco can also be done. For prevention, early detection and control of oral cancers, the routine health camps organized by the health departments for migrants should also include screening for oral cancer.

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## Footnotes

**Authors' Contribution:** OPA, SP, LP, AKJ designed the study. OPA, SP, LP collected the data. OPA prepared the draft manuscript. OPA, SP, LP, AKJ revised the manuscript.

**Conflict of Interest:** None declared.

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## References

1. International Agency for Research on Cancer, WHO *GLOBOCAN 2012-age specific incidence rates of cancer in India*. 2015. Available from: [http://globocan.iarc.fr/old/bar\\_sex\\_pop.asp?selection=89356&title=India&statistic=2&number=20&window=1&grid=1&color1=5&color2=4&color2e=&submit=Execute](http://globocan.iarc.fr/old/bar_sex_pop.asp?selection=89356&title=India&statistic=2&number=20&window=1&grid=1&color1=5&color2=4&color2e=&submit=Execute).
2. Mishra A, Meherotra R. Head and neck cancer: global burden and regional trends in India. *Asian Pac J Cancer Prev*. 2014;**15**(2):537-50. [PubMed: 24568456]
3. Mahapatra S, Kamath R, Shetty BK, Binu VS. Risk of oral cancer associated with gutka and other tobacco products: a hospital-based case-control study. *J Cancer Res Ther*. 2015;**11**(1):199-203. doi: 10.4103/0973-1482.143332. [PubMed: 25879362]
4. Zheng TZ, Boyle P, Hu HF, Duan J, Jiang PJ, Ma DQ, et al. Tobacco smoking, alcohol consumption, and risk of oral cancer: a case-control study in Beijing, People's Republic of China. *Cancer Causes Control*. 1990;**1**(2):173-9. [PubMed: 2102288]
5. Neville BW, Day TA. Oral cancer and precancerous lesions. *CA Cancer J Clin*. 2002;**52**(4):195-215. [PubMed: 12139232]
6. Government of India. *Census of India 2011, Chapter II - Kerala Size, Growth and Rural-Urban Distribution of Population*. New delhi: 2011. Available from: [www.censusindia.gov.in/2011-prov-results/.../kerala/Chapter\\_II.pdf](http://www.censusindia.gov.in/2011-prov-results/.../kerala/Chapter_II.pdf).
7. India's National Magazine *Study on the Domestic Migrant Labour in Kerala*. 2015. Available from: [http://www.minister-labour.kerala.gov.in/index.php?option=com\\_content&view=article&id=120:study-on-the-domestic-migrant-labour-in-kerala&catid=34:frontslider](http://www.minister-labour.kerala.gov.in/index.php?option=com_content&view=article&id=120:study-on-the-domestic-migrant-labour-in-kerala&catid=34:frontslider).
8. Kumar NA. *Vulnerability of Migrants and Responsiveness of the State : the Case of Unskilled Migrant Workers in Kerala , India Responsiveness of the State*. 2011. Available from: <http://cseindia.org/admin/modules/cms/docs/publication/29.pdf>.
9. Palipudi K, Rizwan SA, Sinha DN, Andes LJ, Amarchand R, Krishnan A, et al. Prevalence and sociodemographic determinants of tobacco use in four countries of the World Health Organization: South-East Asia region: findings from the Global Adult Tobacco Survey. *Indian J Cancer*. 2014;**51** Suppl 1:S24-32. doi: 10.4103/0019-509X.147446. [PubMed: 25526244]
10. Sridharan G. Epidemiology, control and prevention of tobacco induced oral mucosal lesions in India. *Indian J Cancer*. 2014;**51**(1):80-5. doi: 10.4103/0019-509X.134651. [PubMed: 24947102]
11. Bhattacharya I, Cohen DM, Silverman S. Red and white lesions of oral mucosa. In: Martin G, Glick M, editors. *Burket's Oral medicine Diagnosis and treatment*. Spain: BC decker; 2003.
12. International Institute for Population Sciences. Ministry of Health and Family Welfare, Government of India . Mumbai: International Institute for Population Sciences; 2010. Global adult tobacco survey India 2009-2010.
13. International Institute for Population Sciences . *National Family Health Survey (NFHS-3)*. Mumbai: 2007 . Available from: <http://www.rchiips.org/nfhs/nfhs3.shtml>.
14. Bhatnagar P, Rai S, Bhatnagar G, Kaur M, Goel S, Prabhat M. Prevalence study of oral mucosal lesions, mucosal variants, and treatment required for patients reporting to a dental school in North India: In accordance with WHO guidelines. *J Family Community Med*. 2013;**20**(1):41-8. doi: 10.4103/2230-8229.108183. [PubMed: 23723730]
15. Saraswathi TR, Ranganathan K, Shanmugam S, Sowmya R, Narasimhan PD, 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. [PubMed: 17176828]
16. Mathew AL, Pai KM, Sholapurkar AA, Vengal M. The prevalence of oral mucosal lesions in patients visiting a dental school in Southern India. *Indian J Dent Res*. 2008;**19**(2):99-103. [PubMed: 18445924]
17. Sujatha D, Hebbar PB, Pai A. Prevalence and correlation of oral lesions among tobacco smokers, tobacco chewers, areca nut and alcohol users. *Asian Pac J Cancer Prev*. 2012;**13**(4):1633-7. [PubMed: 22799380]
18. Patil S, Yadav N, Patil P, Kaswan S. Prevalence and the relationship of oral mucosal lesions in tobacco users and denture wearers in the North Indian population. *J Family Community Med*. 2013;**20**(3):187-91. doi: 10.4103/2230-8229.122009. [PubMed: 24672277]
19. Arora M, Madhu R. Banning smokeless tobacco in India: policy analysis. *Indian J Cancer*. 2012;**49**(4):336-41. doi: 10.4103/0019-509X.107724. [PubMed: 23442395]