

Original Research Article

Defining the socio-economic and environmental determinants for high tobacco consumption behaviors among interstate migrant construction workers in Chennai: an observational analysis

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ABSTRACT

Background: Global Adult Tobacco Survey-2 (GATS) reveals significant improvements in the decline of tobacco consumption in the past decades, however vulnerable population groups such as migrant construction workers tobacco consumption behaviors in Chennai remain understudied, thus the study was planned to estimate the socio-economic and environmental determinants for high tobacco consumption behaviors among interstate migrant construction workers in Chennai.

Methods: A cross sectional survey was undertaken using a pre-tested structured questionnaire adapted from GATS survey questionnaire assessing the socio-demographic and environmental determinants for tobacco use among study population across 13 construction sites in Chennai during May-September 2019. Data was entered in MS-Excel and analysed using SPSS.

Results: Among 345 migrant construction workers, mean age of the subjects was 28.42±8.7 years, 338 (98%) were current tobacco users by smoking, chewing, snuffing, of whom 198 (58.6%) used smokeless forms of tobacco like gutkha, khaini, chewing tobacco leaves, betel quid, tobacco snuff, 98 (29%) were smokers and 42 (12.4%) were dual users i.e. both cigarettes and beedis. Khaini (57%) is the dominant form of tobacco used among migrant construction workers. Mean age of initiation of tobacco use was 21.58 years and 21.17, and 22.73 and 19.5 years for smoking, SLT and dual users respectively. The migrant construction workers with no formal literacy ($p=0.000$), monthly income of more than 10000 ($p=0.020$) Indian rupees and migrants for less than one year duration ($p=0.05$) were more likely using the smokeless tobacco than any other socio demographic group.

Conclusions: Tobacco prevalence especially smokeless tobacco use is alarmingly high among interstate migrant construction workers to Chennai.

Keywords: Construction worker, Current users, Migrants, Smoking, Smokeless tobacco, Tobacco usage

INTRODUCTION

Tobacco kills a million Indians annually and an additional 200000 due to smokeless tobacco (SLT) use. According to Global Adult Tobacco Survey (GATS-2), 42.4% of men, 14.2% of women, 28.6% (266.8 million) of all adults currently use tobacco.¹ Among these, 24.9% (232.4

million) are daily tobacco users, 3.4% (34.4 million) are occasional users. Another 3.5% are dual users who use both smoking and smokeless forms of tobacco. One in three adults in rural areas and every fifth adult in urban areas use tobacco.^{1,2} In Tamil Nadu, prevalence of current tobacco smoking was 10.5% and 10.6% for SLT.¹ In a study from Chennai (2013), the prevalence of tobacco use

was 23.7% in rural sections compared to semi-urban (20.9%) and urban (19.4%) areas (p value <0.001).³ Tobacco smoking prevalence was found to be 14.3%, 13.9% and 12.4% in rural, semi-urban and urban areas respectively and for smokeless tobacco use were 9.5%, 7.0% and 7.0% respectively.³

According to GATS-2 survey in India, the prevalence of smokeless tobacco (SLT) use among adults was 21.4% in 2017 which translates to 199 million adults, forming the largest SLT population of any country. The most commonly used tobacco product in India is Khaini, a tobacco-lime mixture that is used by every ninth adult (11.2%). Gutkha, a tobacco, lime, areca nut mixture, ranks third (6.8%) and betel quid with tobacco ranks fourth (5.8%). SLT use is mostly common among populations with low household incomes, women and adolescents. Smokeless tobacco products which contain nitrosamines and other carcinogens are known to be causing high rates of oral cancer in India and also contribute to tobacco related mortality and morbidity. According to WHO, the death toll due to tobacco usage is predicted to be about 8 million deaths every year by 2030 and most of these deaths are anticipated to occur in developing nations, like India.⁴ In India, 100 million premature deaths among adult men aged 35 years and above are attributed to smoking forms of tobacco such as cigarettes and bidis during 1910-2010.⁵

Greater Chennai Corporation has an estimated population of 6.5 million and its three major districts Kancheepuram, Chennai and Tiruvallur are home for 51.3% of migrant population in Tamil Nadu state.⁶ The interstate migrants hailing from states such as Bihar, Jharkhand, Orissa, West Bengal, and Assam to Chennai in search for better job and earning opportunities in real estate, metro construction, textiles and manufacturing industries. However, the majority of these migrants remain unregistered in the Tamil Nadu Construction Workers Welfare Board and are subjected to poor and unhygienic living conditions. Majority of migrants do not seek promotive and preventive health services due to the demanding work schedules and language barriers in accessing health services.⁷⁻⁹ Tobacco consumption practices among migrants of South Indian states of Kerala and Karnataka are reported in literature but to our knowledge this area remains under studied in Tamil Nadu. High prevalence of tobacco is among migrants is widely reported by authors and in Kerala the prevalence of current use of smokeless tobacco was 71% among males and was found to be five times higher than general male population in the state.^{7,10-14} Smokeless tobacco such as ghutkha, khaini and pan masala are banned in major Indian states including Kerala and Tamil Nadu but it appears to be poorly implemented and less monitored public health tobacco policy. Understanding the burden of tobacco use among interstate migrants to Chennai is an essential public health activity to propose preventive strategies to reduce tobacco use and also provide support systems to aid in tobacco cessation efforts.

Objective of the study was to define the socio-economic and environmental determinants for high tobacco consumption behaviours among interstate migrant construction workers in Chennai.

METHODS

A cross-sectional study was conducted involving interstate migrant construction workers across thirteen construction sites in Chennai, chosen by simple random sampling method, during the period of May to September 2019. A sample size of 300 was estimated after considering the prevalence of tobacco use among adult males in India 42.4% (GATS-2) with 6% absolute precision and 10% non-response rate. A survey was completed among 345 migrant construction workers

Inclusion criteria

Migrant construction workers currently working at construction sites in Chennai metropolitan city covering Old Mahabalipuram Road, Kolapakkam, Chromepet, Pallavaram, Palavanthangal, Perungudi in the range of 30 kilometres distance from rural and urban health and training centres attached to Department of Community Medicine, Tagore Medical College and Hospital, Rathinamangalam, Chennai.

Exclusion criteria

Migrant construction workers not available at their site for 3 consecutive visits and those who not willing to participate.

A pre-tested structured questionnaire was adapted from Global Adult Tobacco Survey -GATS survey Version 2.1 June 2014.¹⁵

The questionnaire consists of three sections as listed below.

Socio-demographic profile: Questions on age, sex, education, occupation, income, marital status, migrant status with duration.

Current tobacco use status in any form: Questions on current tobacco use, form of tobacco used, frequency of use, age at which tobacco use was initiated, and how soon they were consuming tobacco after waking up.

Former tobacco uses in any form: Similar to section 2 and additionally period for which tobacco use was discontinued.

After obtaining approval from, Institution Ethics Committee (IEC) of Tagore Medical College Hospital, Chennai required permissions from the construction site engineers or safety officers were sought and with verbal informed consent the workers were administered the questionnaire by trained researchers including principal

investigator and trained interns of Community Medicine from the department of Community Medicine, Tagore Medical College Hospital, Chennai. Personal interviews ranging from fifteen to twenty minutes were conducted using the survey tool in Hindi language after obtaining informed verbal consent. Translation was required for few migrants (Orissa and Bengal states) who were unable to understand Hindi language aided by the co-workers fluent in Hindi and other regional languages and these interviews took about twenty to thirty minutes.

The migrant workers with intention to quit were identified from the survey and counselling session was provided for the migrant workers during the survey. After the interview, health education session was conducted on the survey day at construction site on the harmful effects of tobacco, mortality and morbidity risks with oral cancer, cardio vascular diseases and was actively encouraged to quit the usage of tobacco. The support received from the management of construction sites enabled for smooth conduction of the camps without major disruption to the productivity at these sites.

The data collected was entered in Standard Microsoft Excel 2007 and statistical analysis was conducted using SPSS computer package version 21.0 (SPSS Inc., IL, USA). The descriptive statistics were measured and differences between socio-economic variables and tobacco consumption were assessed by Chi-Square test and a significance level of $p < 0.05$ was set.

RESULTS

About 345 male, migrant construction site workers in the age groups of 14-55 years were surveyed in thirteen construction sites from May to September 2019. Interstate migrants to Chennai were native rural residents of Northern (Assam, Orissa, Bihar, Jharkhand and Bengal) and North-eastern states (Meghalaya) of India. Majority, 179 (51.9%) were about 21 to 30 years of age. Mean age of the subjects was 28.42 years and mean age at initiating of tobacco 21.85 years (Smoking tobacco: 21.17 years, smokeless tobacco: 22.73 years and for dual users: 19.5 years). Half of the study subjects 175 (50.7%) were illiterate with no formal schooling and 228 (66.1%) earn a monthly income less than 10000 Indian rupees and another 33.6% earned incomes in the ranges of 10000-20000 Indian rupees. Majority migrants 224 (64.9%) were married, another third of the subjects 114 (33.1%) were unmarried and significantly high number 148 (42.9%) of migrants in this study population migrated to Chennai under less than one year. Among 345 study subjects, 338 (98%) were currently using tobacco in any form including smoking (cigarettes, bidis) and SLT forms (chewing crushed tobacco leaves, consumption of banned products of khaini, gutkha, pan masala and snuffing). Approximately 198 (58.6%) used SLT like gutkha, chewing tobacco leaves, betel quid, tobacco snuff i.e. pacing pellets of tobacco mixture under the upper lip, 98 (29%) were smokers (cigarettes and beedis) and 42 (12.4%) were dual users of both smoke and smokeless forms of tobacco (Figure 1).

Table 1: Demographic profile of migrant construction workers participating in the survey (n=345).

Variable	SMT*	SLT*	Dual use
	N (%)	N (%)	N (%)
Age group (in years)			
Less than 20	18 (18.4)	28 (14.1)	11 (26.2)
21 to 30	47 (48.0)	109 (55.1)	19 (45.2)
31 to 40	20 (20.3)	43 (21.7)	10 (23.8)
41 to 50	9 (9.2)	16 (8.1)	1 (2.4)
More than 50	4 (4.1)	2 (1)	1 (2.4)
Total	98	198	42
Indian state			
North-Bihar, Orissa, Jharkhand, West Bengal	98 (100)	188 (94.9)	41 (97.6)
North-east, Assam,	0 (0)	7 (3.6)	1 (2.4)
South-Andhra Pradesh	0 (0)	3 (1.5)	0 (0)
Total	98	198	42
Residence			
Rural	97 (99)	195 (98.5)	42 (100)
Urban	1 (1)	2 (1)	0 (0)
Semi-urban	0 (0)	1 (0.5)	0 (0)
Total	98	198	42
Read and write			
Yes	20 (20.4)	125 (63.1)	21 (50)
No	78 (79.6)	73 (36.9)	21 (50)
Total	98	198	42
Monthly Income (in Indian Rupees)			
Less than 10000	69 (70.4)	119 (60.1)	36 (85.7)
More than 10000	29 (29.6)	78 (39.4)	6 (14.3)
More than 50000	0 (0)	1 (0.5)	0 (0)
Total	98	198	42
Marital status			
Single	34 (34.7)	70 (35.4)	15 (35.7)
Married	64 (65.3)	128 (64.6)	27 (64.3)
Total	98	198	42
Migrant duration			
Less than one year	30 (30.6)	93 (47.0)	20 (47.6)
1 - 5 years	41 (41.8)	68 (34.3)	16 (38.1)
More than 5 years	27 (27.6)	37 (18.7)	6 (14.3)
Total	98	198	42

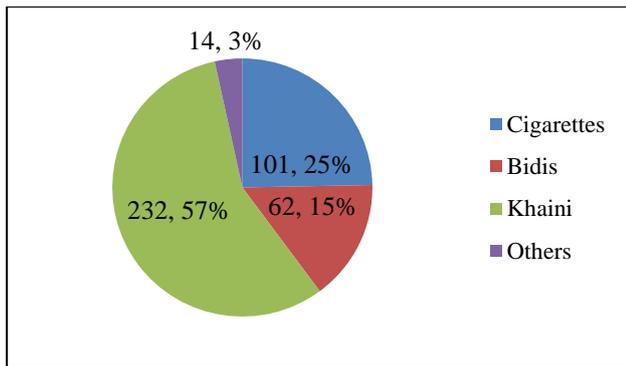


Figure 1: Distribution of tobacco products among current users of migrant construction workers (n=409 including multiple product use by one tobacco user).

Table 2: Distribution of consumption of tobacco after waking in morning among current tobacco users (n=338).

Consumption after waking in morning	Smoking tobacco (N)	Smokeless tobacco (N)	Dual user (N)	Total N (%)
Within 5 minutes	15	20	11	46 (13.60)
5-30 minutes	29	56	14	99 (29.29)
31-60 minutes	14	37	7	58 (17.16)
>60 minutes	40	85	10	135 (39.94)
Total	98	198	42	338

Table 3: Association of socio demographic variables and type of tobacco product consumption among migrants (n=345).

Variable	SMT N (%)	SLT N (%)	Dual use N (%)	Chi-square value	P value
Age group (in years)					
Less than 20	18 (18.4)	28 (14.1)	11 (26.2)		
21 to 30	47 (48.0)	109 (55.1)	19 (45.2)		
31 to 40	20 (20.3)	43 (21.7)	10 (23.8)	9.232	0.323
41 to 50	9 (9.2)	16 (8.1)	1 (2.4)		
More than 50	4 (4.1)	2 (1)	1 (2.4)		
Total	98	198	42		
Indian states					
North* Bihar, Orissa, Jharkhand, West Bengal	98 (100)	188 (94.9)	41 (97.6)		0.218
North - east* Assam,	0 (0)	7 (3.6)	1 (2.4)	5.76	
South* Andhra Pradesh	0 (0)	3 (1.5)	0 (0)		
Total	98	198	42		
Residence					
Rural	97 (99)	195 (98.5)	42 (100)		
Urban	1 (1)	2 (1)	0 (0)	1.141	0.888
Semi-urban	0 (0)	1 (0.5)	0 (0)		
Total	98	198	42		
Read and write					
Yes	20 (20.4)	125 (63.1)	21 (50)		
No	78 (79.6)	73 (36.9)	21 (50)	47.892	0
Total	98	198	42		
Monthly income (in Indian Rupees)					
Less than 10000	69 (70.4)	119 (60.1)	36 (85.7)		
More than 10000	29 (29.6)	78 (39.4)	6 (14.3)	11.636	0.02
More than 50000	0 (0)	1 (0.5)	0 (0)		
TOTAL	98	198	42		
Marital status					
Single	34 (34.7)	70 (35.4)	15 (35.7)	0.18	0.991
Married	64 (65.3)	128 (64.6)	27 (64.3)		
Total	98	198	42		

Out of 345 migrants, 11 (3.2%) of them were former tobacco users. Among them 5(1.4%) migrants used SLT daily and 3 (0.9%) of them used it less than daily. About 4 (1.2%) migrants used to smoke daily in the past. Only one subject (0.3%) used both smoke and smokeless forms of tobacco daily. Majority (54.5%) have stopped using tobacco for years and 4 (36.4%) in months and 1 person (0.3%) has restricted its use since 2 months (Table 1).

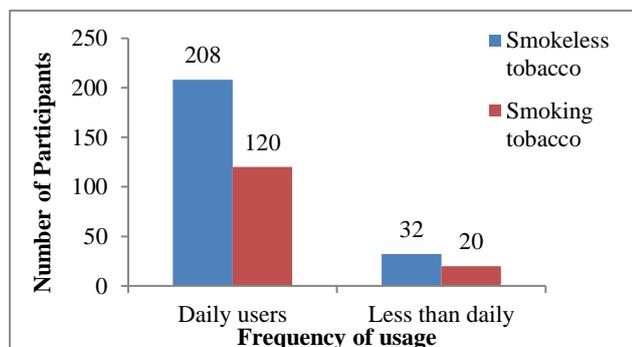


Figure 2: Frequency of consumption of tobacco among migrant construction workers (n=345).

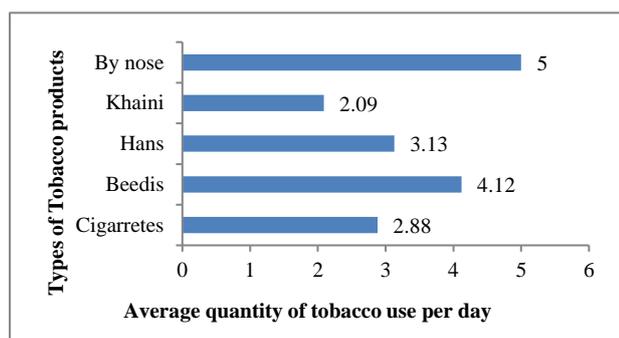


Figure 3: Quantum of tobacco intake among current users (smoking and SLT) (n=264)*.

Among 240 (198±42) smokeless tobacco users, 208 of them (86.7%) use SLT daily and 32 (13.3%) use it less than daily. Of 140 (98±42) smokers, 120 (85.71%) are daily smokers, 20 (14.3%) smoke less than daily. Majority of the study population, 197 (57.1%) were smoking tobacco in the range of 1 to 5 years, mean duration for smokers, smokeless tobacco and dual users is 7.06, 6.04, 6.13 years respectively (Figure 2).

Among daily SLT users, 87 (36.25%) use 2.09 pellets of khaini, 61 (25.41%) consume 3.13 pellets of HANS product (popular brand of khaini). On a daily basis among smokers, 74 (52.85%) migrants consume an average 2.88 cigarettes, 41 (29.28%) consume an average 4.12 beedis. Only one subject uses snuff five times daily (Figure 3).

On an average day, 46 migrants (13.61%) consume tobacco in less than five minutes, 99 (29.29%) up to 30 minutes, 58 (17.16%) 31-60 minutes, and 135 (39.94%) after 60 minutes of waking up consecutively (Table 2).

To assess the risk factors among socio-economic variables and the type of tobacco product consumed by the migrant construction workers, ANOVA test was performed with the cut off value of $p < 0.05$. The migrant construction workers with no formal literacy ($p = 0.000$) and income of more than 10000 (p.0.020) Indian rupees per month and migrants for less than one year duration ($p = 0.05$) were more likely using the smokeless tobacco than any other socio demographic group (Table 3).

DISCUSSION

The current study describes the tobacco consumption practices among 345 migrant construction workers in Chennai. Mean age of the subjects was 28.42 ± 8.7 years, mean duration for smokers, smokeless tobacco and dual users is 7.06, 6.04, 6.13 years respectively.

Earlier studies reported mean age of workers as 32.1 ± 11.6 years and 26.3 ± 8.5 years which is similar to that reported in this study.^{12,17} The prevalence of current tobacco use among migrant construction site workers was 98%, 58.6% for smokeless tobacco (SLT), 29% for smoking forms and 12.4% for dual use of both smoking and smokeless forms of tobacco. This was double than national figures (29.6%) for SLT among adult men as reported in latest global adult tobacco survey and similar to higher rates reported in migrants studied in Kerala (71.7%), Delhi (90%), and Mysore (49%) among construction workers.^{1,10,12,14} In a study among industrial workers including migrants, the prevalence was also high.¹³ The prevalence rates of SLT/smoking in this group of migrants is also several folds higher compared to prevalence in the states of Assam (41.7%/13.3%), Bihar (23.5%/5.1%), West Bengal (20.1%/16.7%), Orissa (42.9%/7%), Jharkhand (35.4%/11.1%) and is of great public health concern for outcomes related to tobacco use such as cancer, cardiovascular disease.¹

Smokeless forms of tobacco is widely (57.4%) used among the study subjects and similar rates were reported 71.7%, 32.85%, 73% from among migrants across South India.^{10,11,16} We could not find similar studies from Tamil Nadu and our study establishes a dataset from which we can identify various tobacco products and preferences of use among migrants in Chennai. The above cited studies identified that SLT use is higher among subjects from states of Orissa, Bihar and UP and our study subjects are hailing from those states and this could be the reason for high use of SLT tobacco among migrants. Mean age at initiation of smoking, SLT and dual use of tobacco was 21.17, 22.73, 19.5 years which is lower than the earlier studies among migrants.¹⁶ Average duration of smoking, SLT and dual use was 7.06, 6.04, 6.13 years comparable to 6.49 years of tobacco use among migrants surveyed in Kerala.¹⁶ Our interactions with subjects also revealed that culturally SLT use is acceptable and many opined that unlike smoking the use of SLT is harmless and is used for relief from stress, recreation and as an energizing stimulant for heavy work involved with construction

activities. Also, in some of the states from where migrants are native, tobacco is a farming crop and it is widely available to these families at no cost and/or low cost and they consume it out of prolonged habit which is widely prevalent in these communities. Rameshan et al mentioned that 30% of the migrants in Kerala cited that somebody in the family uses SLT back home.¹⁶

The most commonly consumed SLT product among migrants in our study was Khaini (57%) whereas among migrants in Kerala, it was 26.9% and 50%.^{10,16} Khaini is a sun-dried or fermented tobacco product which is coarsely cut tobacco leaves with a mixture of slaked lime and available as brand names such as HANS, Swagath, etc.¹⁸ Use of khaini is more common among men than women and it is placed in the mouth between gums and cheeks and is sucked slowly for 15-20 minutes. GATS-2 survey reports that khaini is widely used SLT product among north Indian states and every 9th adult (11.2%) across India uses it followed by beedi (7.7%), gutkha, a tobacco, lime, areca nut mixture (6.8%) and betel quid with tobacco leaves (5.8%). Researchers from National Institute of Cancer Prevention and Research (NICPR) of the Indian Council of Medical Research (ICMR) have developed a comprehensive database of SLT products across Asia which identified a staggering 69 known carcinogens as classified by the International Agency for Research on Cancer.^{19,20}

In this study frequency of SLT product use was 2.09-3.13 times per day which is identical to migrants from Kerala.^{10,16} It is important to note that sale of khaini, gutkha etc was banned in 2013 in Tamil Nadu after Supreme Court ruling and across India these products remain banned in 23 states and 5 Union Territories.²¹ In spite of the bans, migrant workers are sustaining their consumption of SLT by bringing stashes of tobacco leaves and slaked lime from native states and hoarding them for periods of 3-4 months before their next trip to home. Also cheaper brands of SLT such as HANS are widely available for five Indian rupees and is consumed for 3-4 days and also widely shared among co-workers as observed in this study.

Daily use of tobacco i.e. SLT-86.66% and smoking-85.72% is higher than 25.1% and 15.2% for SLT and smoking among Indian men as reported in survey (GATS-2) and 21% by Rameshan A et al.¹⁶ Migrants (60%) were consuming tobacco within an hour of waking in the morning. Consumption of tobacco within an hour of waking up including within 5 minutes, 30 minutes, 30-60 minutes is an item in Fagerstrom Test for assessing nicotine dependence.^{22,23} Majority of the migrants reported the use of khaini within an hour of waking claiming it helps in bowel movements which is similar to observations among migrants in Kerala.¹⁶ These patterns and burden of tobacco use among the vulnerable groups such as migrants needs urgent attention from concerned authorities to be addressed through effective policy measures. As highlighted by many studies, migrants are

working and living under various stressful conditions which increase their risk for consumption of tobacco and has to be adequately addressed through targeted campaigns and workplace interventions by improving health awareness about harms of smokeless tobacco.²⁴⁻²⁷ Analysis of workplace policies at construction sites towards anti-smoking measures report minimal implementation and inadequate support services for workers intending to quit.^{28,29} Lack of such policies at workplace and poor implementation if any in Indian context escalates the tobacco epidemic and will remain unchecked and unaddressed if policy measures are not undertaken.

CONCLUSION

Alarmingly high rates of tobacco consumption are found among interstate migrant construction workers in Chennai. These findings highlight the urgent need to deliver target intervention to this population group who will benefit from health awareness campaigns about the health risks of smokeless tobacco use. Accessible and affordable tobacco cessation support services including health education, behavioural counselling, nicotine replacement therapies are to be provided at workplace (construction sites) and residential areas for the migrants through public-private partnership methods.

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