

Research Article

# Oral Health Assessment and Smokeless Tobacco Related Habits among the Employees of Public Transport Workers in Western Maharashtra (India): A Cross-Sectional Study

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## Introduction

The oral cavity has been described as “the window of general health” [1]. The oral health adverse effects due to tobacco including common diseases, and rare conditions have been reported in various authors like Reibel J, Dhama B in their article.

The city of Western part of Maharashtra, where transport workers like bus conductors and drivers who work prolong hours and constitute an essential part of urban informal sector, where health is undervalued.

The socioeconomically factor, illiteracy, poverty, work stress is a constant physical and psychological due to changing shift, prolong working hours and lack of knowledge about hazards of tobacco, which all leads to habits which are majority of being tobacco use [2,3].

There are various studies in relation to oral health and tobacco, which was carried out in laborers, coal mine and seafarers, these all belong to low socioeconomic status, however their results have been similar [4-6].

There are a total of 5309 combined bus conductors and drivers working in city of Western part of Maharashtra, the aim of the study is to assess oral health status and tobacco related habits, its types, duration, frequency, it's a Cross-Sectional Analytical Study carried out to assess the oral health status and tobacco related habits, type of tobacco, its duration, frequency, type of lesions seen in bus conductors and drivers due to tobacco habit.

## Material and methods

The present study was a Cross-Sectional Analytical Study assessing the oral health status and tobacco related habits, type of tobacco, duration, frequency and oral lesions in bus conductors and drivers in a city of Western Maharashtra.

The Ethical clearance was obtained from the Institutional Research Board (IRB) and Institutional Ethical Committee (IEC). The other related permissions from the Chief Executive Officer Public Transport Organization.

The study was conducted at all the 7 bus depots of a city in Western part of Maharashtra. On extensive literature search, limited literature was found on prevalence of dental disease in public transport worker population. Hence, P=prevalence of 50% was taken since there was no study was conducted previously in this population of this area. The sample size was determined by using the Single Proportional formula,  $(n=[Z\alpha/2]^2 P(1-p)/d^2)$  at 95% confidence interval, where,  $Z\alpha/2=1.96$ ,

P = prevalence of 50% is taken since there is no similar study in the area and d = 5% of marginal error was taken.

Using this calculation, a sample size of 384 was obtained which was rounded off to 500 i.e. 500 Conductors and 500 Drivers making it a total of 1000 participants.

## Systematic random sampling

The public transport organization in the city has a total of 7

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bus depots accounting a total of 8610 bus conductors and drivers out of which 5309 were permanent.

A total of 500 Conductors and 500 Drivers were included in the study. From the list obtained at the depots, every  $k^{\text{th}}$  member was included in the study till a sample size of 71 conductors and 72 drivers was obtained at each depot alternately. Thus, making it a total sample size of 143 in each depot. The  $k^{\text{th}}$  value for each depot was different. This was done for uniform sampling at all the 7 bus depots.

The total permanent (bus conductors and drivers) in each depot was 5309 as follows.

**Table 1:** List of total number of bus conductors and bus drivers in each depot.

Bus depots	Total number of bus conductors and drivers
Depot 1	918 (376D+ 542C)
Depot 2	843 (317D+526C)
Depot 3	753 (252D+501C)
Depot 4	459 (243D+216C)
Depot 5	570 (248D+322C)
Depot 6	823 (285D+538C)
Depot 7	943 (383D+561C)
TOTAL	5309

Footnote: C: Conductor; D: Driver.

### Inclusion criteria

Study participants who are willing to give voluntary written informed consent, age group of 22-55 years with a minimum of 5 years' service experience in the same occupation

### Exclusion criteria

Study participants not willing to undergo examinations, who had quit tobacco 1 yr ago were not included in the study.

### Systematic random sampling

Was carried out in each depot and every ' $k^{\text{th}}$ ' study participant was selected for the study in each depot. The ' $k^{\text{th}}$ ' value was different for bus conductors and bus drivers in each depot. This was based upon the total number of bus conductors and bus drivers in the respective depots.

The formula applied for systematic randomized sampling was:

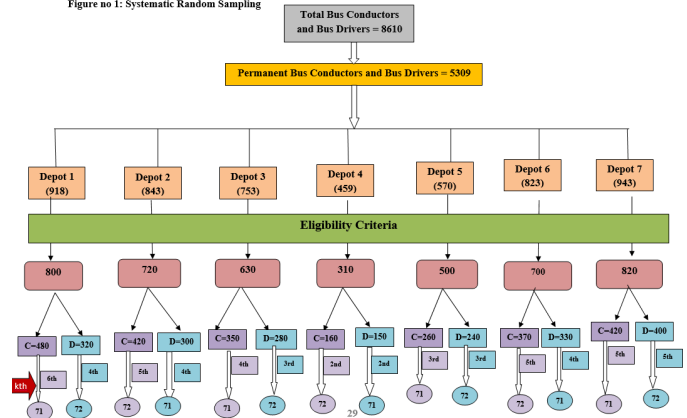
Total population of bus conductors / drivers in the respective bus depot

$$k = \frac{\text{After inclusion and exclusion criteria}}{\text{Desired sample size of bus conductors/drivers}}$$

Where,  $k$  = interval at which bus conductor/bus driver were selected.

The sampling technique is illustrated in the following figure 1.

Figure no 1: Systematic Random Sampling



### Training and calibration of principal investigator

Training and calibration of the principal investigator was done to overcome the difficulties in scoring the different levels of diseases correctly. Intra-examiner calibration was undertaken by examining 30 individuals followed by their re-examination a week later which resulted in 87% of diagnostic acceptability with a kappa-value of 0.84.

### Recording clerk and organizing clerk

Organising clerk duties were performed by the interns and assistant provided by depot manager, however recording clerk i.e. the intern who was also trained and calibrated and made familiar with the preform in the Department of Public Health prior to the conduction of the study.

### Physical arrangements

Dental examination were conducted in the bus depots in a mobile college dental van provided by the college administration.

### Nature of information collected

The eligible and selected participants were approached as follows:

Participant information and consent form: The participant information sheet explaining the details of the study purpose (Socio-demographic data, change in shift, details of tobacco consumption, type, frequency, duration of consumption) and procedure and informed consent in either English, Hindi or Marathi language (as per convenience of the patient) was provided to the participants.

### Data collection form and data collection procedure

The Oral Health Status of bus conductors and drivers were recorded using WHO Oral Health Assessment Form 1997.

A Type-III clinical examination (American Dental Association 1970) was carried out using a mouth-mirror and a CPI probe under good illumination carried out by the principal investigator. The examination was carried out in these depots till the estimated sample size of 71 drivers and 72 conductors alternately were obtained from each depot. The study involved the assessment of the bus conductors and drivers based on general information, extra-oral examination, oral mucosal assessment were recorded.

## Method of data analysis

Following data collection, the responses were appropriately coded, compiled systematically and entered into Microsoft Excel Spreadsheet (Version. 8.1). Statistical analysis was done using IBM Statistical Package for Social Sciences (SPSS) software (Version 21.0. Armonk, NY: IBM Corp).

The *p* value less than 0.05 was considered statistically significant at confidence interval of 95%.

The following statistical tests were used for analysis of the data:

### Descriptive analysis

Unpaired t-test: It was used to compare the continuous variables between bus conductors and drivers.

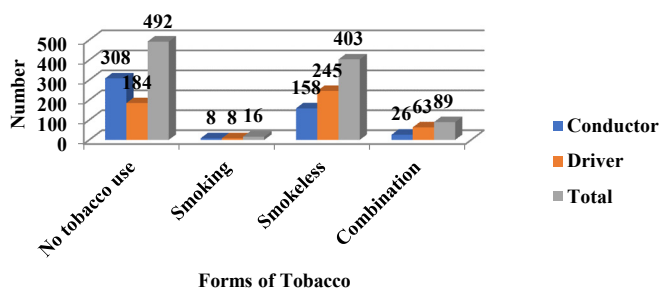
**Pearson's correlation test:** To assess the correlation between Demographic status and oral health status and

Tobacco habits and oral health status.

## Results

**Table 2:** Distribution of study participants based on form of Tobacco use.

Form of Tobacco	Conductor N (%)	Driver N (%)	Total N (%)
No tobacco use	308(61.6)	184(36.8)	492(49.2)
Smoking	8(1.6)	8(1.6)	16(1.6)
Smokeless	158(31.6)	245(49)	403(40.3)
Combination	26(5.2)	63(12.6)	89(8.9)



**Figure 1:** Distribution of Study Participants according to form of tobacco.

Out of total 1000 study participants, a majority were habitual to Smokeless tobacco form 403(40.3%) as compared to that of Smoking 16(1.6%). This difference was statistically significant ( $p < 0.05$ ). However, combined smokeless and smoking tobacco was seen in 89 participants (8.9%).

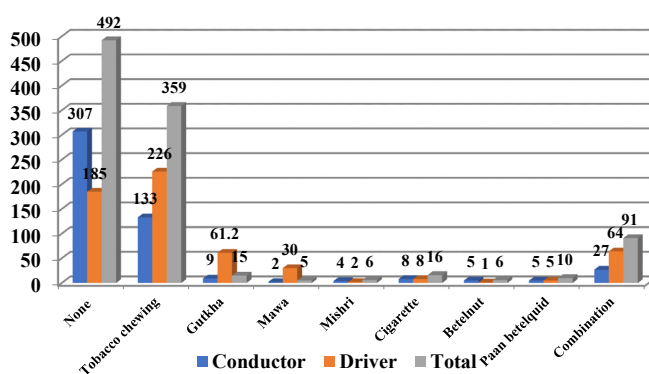
### Distribution of study participants based on type of tobacco: (Table 2, Figure 2)

Out of total 500 bus conductors, 133(26.6%) had a habit of chewing tobacco, whereas only 8(1.6%) smoke cigarettes. Around 307 (61.4%) conductors were not using any form of tobacco.

Out of total 500 bus drivers, it was seen that 226(45.2%) had a habit of chewing tobacco whereas 8(1.6%) smoke only cigarettes. Around 185(37%) drivers were not using any form of tobacco.

**Table 3:** Distribution of study participants according to tobacco habits.

Tobacco	Conductor n (%)	Driver n (%)	Total N(%)
<b>Type of tobacco use</b>			
None	307(61.4)	185(37)	492(49.2)
Tobacco chewing	133(26.6)	226(45.2)	359(35.9)
Gutkha	9(1.8)	6(1.2)	15(1.5)
Mawa	2(0.4)	3(0.6)	5(0.5)
Mishri	4(0.8)	2(0.4)	6(0.6)
Cigarette	8(1.6)	8(1.6)	16(1.6)
Betelnut	5(1)	1(0.2)	6(0.6)
Paan betelquid	5(1)	5(1)	10(1.0)
Combination	27(5.4)	64(12.8)	91(9.1)
<b>Tobacco frequency</b>			
Never	308(61.6)	185(37)	493(49.3)
1-5 times	129(25.8)	142(28.4)	271(27.1)
6-10 times	39(7.8)	116(23.2)	155(15.5)
11-15 times	19(3.8)	36(7.2)	55(5.5)
16-20 times	3(0.6)	5(1)	8(0.8)
21-25 times	2(0.4)	7(1.4)	9(0.9)
<b>Tobacco duration (in Years)</b>			
None	308(61.6)	186(37.2)	494(49.4)
1-5 years	8(1.6)	11(2.2)	19(1.9)
6-10 years	67(13.4)	116(23.2)	183(18.3)
11-15 years	51(10.2)	67(13.4)	118(11.8)
16-20 years	29(5.8)	50(10)	79(7.9)
21-25 years	18(3.6)	37(7.4)	55(5.5)
26-30 years	11(2.2)	28(5.6)	39(3.9)
31-35 years	8(1.6)	5(1.0)	13(1.3)



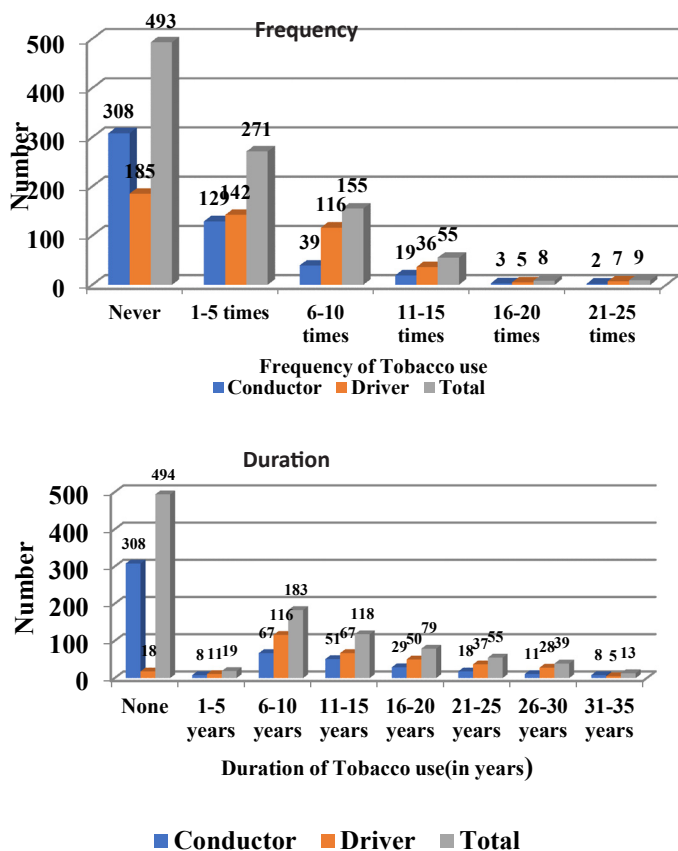
**Figure 2:** Distribution of study participants based on type of tobacco use.

Out of total 500 bus conductors and 500 bus drivers, it was found that tobacco chewing habit was more likely seen in drivers 226(45.2%) as compared to that of conductors 133(26.6%).

Out of total 1000 study participants, around 359(35.9%) were addicted to tobacco chewing habit, 16(1.6%) to cigarette smoking and 91(9.1%) to a combination of both the habits. This difference was statistically significant ( $p < 0.05$ ).

Out of total 1000 study participants around 492(49.2%) were not using tobacco in any form.

The remaining 5.8% of the total study participants were using tobacco in other forms like Gutkha 15(1.5%), Mawa(0.5%), Mishri (0.6%) and about 1.6% included the tobacco along with Paan, betel nut and quid.



**Figure 3:** Distribution of study participants based on tobacco frequency and duration.

#### Distribution of study participants based on tobacco frequency and duration of tobacco use

**Tobacco frequency:** Out of total 500 bus conductors, around 129(25.8%) had a tobacco usage frequency of around 1 to 5 times a day and 22(4.4%) of using tobacco for more than 10 times a day. There were 2(0.4%) using tobacco for more than 20 times per day.

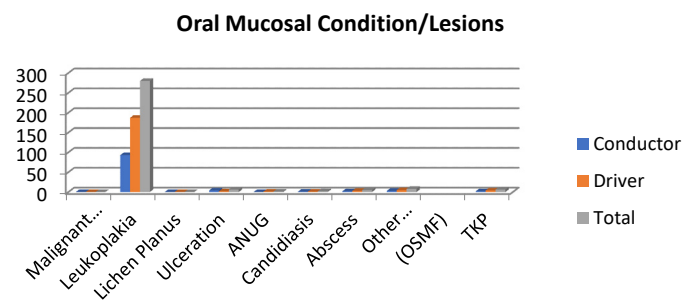
Out of total 500 bus drivers, around 142(28.4%) used tobacco for a frequency of 5 times per day whereas 41(8.2%) used tobacco for more than 10 times a day. There were 7(1.4%) bus drivers who used tobacco for more than 20 times.

**Tobacco duration:** Out of total 500 bus conductors, only 8(1.6%) used tobacco since 5 years whereas around 51(10.2%) were using tobacco for 11-15 long years and 29(5.8%) had been for a duration of long 20-30 years.

Out of total 500 bus drivers, 11(2.2%) used tobacco for a duration of 1-5 years whereas around 50(10%) used tobacco for a duration of 20 years. Around 65(13%) had been using tobacco for a duration of 20-30 years long.

**Table 4:** Distribution of study participants based on presence of oral mucosal lesions/conditions.

Oral mucosal lesions/condition	Conductor N(%)	Driver N(%)	Total N(%)
Malignant Tumor	0(0)	0(0)	0(0)
Leukoplakia	93(18.6)	187(37.4)	280(28)
Lichen Planus	0(0)	0(0)	0(0)
Ulceration	4(0.8)	2(0.4)	6(0.6)
ANUG	0(0)	1(0.2)	1(0.1)
Candidiasis	1(0.2)	1(0.2)	2(0.2)
Abscess	2(0.2)	3(0.6)	5(0.5)
Other Conditions (OSMF)	3(0.6)	5(1)	8(0.8)
TKP	2(0.4)	4(0.8)	6(0.6)
Not Recorded	0(0)	0(0)	0(0)



**Figure 4:** Distribution of study participants based on oral mucosal lesions/conditions.

#### Distribution of study participants based on presence of oral mucosal lesions (Table 3, Figure 4)

Out of total 500 bus conductors, a majority 98(18.6%) showed a presence of Leukoplakia, 3(0.6%) had Oral Submucous Fibrosis (OSMF). This difference was statistically significant ( $p < 0.05$ ).

Out of total 500 bus drivers, a majority 187(37.4%) showed a presence of Leukoplakia whereas 5(1%) had OSMF (Oral Submucous Fibrosis).

It was found that the Drivers as compared to Conductors showed more number of Pre-cancerous lesions which was predominantly Leukoplakia followed by OSMF.

Out of total 1000 study participants, 280(28%) had Leukoplakia whereas 8(0.8%) had OSMF (Oral Submucous Fibrosis). This difference was statistically significant ( $p < 0.05$ ).

#### Discussion

The study was conducted in all the bus depots of a city with the objective to gather systematic information on oral health status and tobacco habits in bus drivers and conductors in city of western Maharashtra region. Assessing the impact of occupation on lifestyle. The oral health status was assessed using WHO oral Health assessment form (1997) [32] and a general information sheet which the details of the study purpose (Socio-demographic data, change in shift, details of tobacco consumption, type, frequency and duration) was used.

It was seen in our study that almost 40.3% of the conductors and drivers had the habit of Smokeless tobacco consumption (i.e. Tobacco chewing, Gutkha, Mawa, Mishri, Paan with a mix-



ture of betel nut, lime and tobacco). On the other hand, Cigarette smoking was seen less in comparison (1.6%) in this study population as compared to smokeless form of tobacco. Similar results were seen in the study done by Reddy et al. [7]. In the group of transport workers in South India. The prevalence of tobacco use was much higher in the present study conducted in Maharashtra as compared to that of the one conducted in transport workers by Reddy et al.

In the present study, the tobacco usage was seen more in bus drivers as compared to that of bus conductors which is in consensus with results found in the study done by Reddy et al. The reason probably could be that drivers need more concentration, alertness and has more responsibility as compared to that of conductors Gambhir in North India [8].

Different levels of Sociodemographic status are associated with tobacco use in bus conductors and drivers. Among the considered factors affecting the use of tobacco other than occupation, age and education have substantial effect on its usage. They surely have an influence on tobacco usage. It was more prevalent above the age 26 years.

Mandibular sulcus region was the most common site of ulceration in this study and in an influence on tobacco usage. It was more prevalent above the age 26 years.

Oral mucosal conditions and lesions could be due to infection (bacterial, viral, fungal), local trauma and or irritation (traumatic keratoses, fibroma, burns), systemic disease (metabolic or immunological), or relate to lifestyle factors such as the usage of tobacco, areca nut, betel quid, or alcohol. Important oral mucosal lesions were observed in the study which is in contradiction to study reports on an adult population [9-11]. Increase in prevalence of oral mucosal lesions with age was reported in the present study and in another study conducted elsewhere. The most common oral mucosal lesion in the study was leukoplakia which is in consensus with the studies [7,8]. Mandibular sulcus region was the most common site of ulceration in this study and in another study conducted on workers engaged in some other occupation [12,13]. This may be due to the habit of keeping the tobacco quid most of the times in the mandibular sulcus region. The tobacco frequency and duration was significantly associated with the oral mucosal lesions.

In the present study which was conducted in 1000 bus conductors and drivers of all 7 bus depots in a city, the bus conductors and drivers were made aware of their oral status and treatment needs. They were given the referral cards according to their treatment needs. The participants were also provided the oral health education along with the tobacco cessation counseling for the tobacco users and creating awareness of oral cancer using posters, flipcharts and lectures.

#### Limitations of the study

In this cross sectional study we could not limit the Social Desirability Bias where an individual gives a desired response, which may have introduced while filling up the additional proforma. Also there was a possibility of occurrence of Hawthorne effect while asking for deleterious habits.

#### Summary

The study sample of public transport workers i.e. bus conductors and bus drivers provided a unique opportunity to study

a population from diverse socioeconomic and geographic backgrounds. Hence, an attempt was made by taking up the study to assess the oral health status and tobacco related habits, its types, duration, frequency, in bus conductors and bus drivers in all the bus depots of a city. The current study highlighted the oral health status and tobacco habits its adverse effects on the people of this specific population. It is the first study of its kind as no other information is published regarding the oral health status and tobacco habits of this specific population group in this region and state.

#### Conclusion

The study concludes that occupational and environmental stress promoted the excessive use of smokeless tobacco (40.3%) among the bus drivers and bus conductors all long day.

The prevalence of oral mucosal lesions was high amongst the study population. The most common oral mucosal lesion present was Leukoplakia (18.6%) followed by Oral Sub mucous Fibrosis (OSMF) (0.6%) and most common location for the presence of oral mucosal lesions was buccal mucosa observed during study.

There was a high prevalence of tobacco in this study population group which comprised of smoking, smokeless and a combination of both smoking and smokeless form of tobacco use.

Smokeless form of tobacco is more commonly used which is 40.3%. As reported by the study participants, deleterious habits like tobacco started either for pleasure or peer influence but with time it turned into a habit. Majority of the bus drivers and also bus conductors reported their use in order to reduce tension, work pressure and maintain alertness.

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