

# Dental health status and treatment needs of transport workers of a northern Indian city: A cross-sectional study

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## Abstract

**Aim:** To assess the dental health status and treatment needs of transport workers working in Chandigarh Transport Undertaking (C.T.U.) buses, Chandigarh. **Materials and Methods:** A cross-sectional study was conducted on all the available C.T.U. workers at all three bus depots. The data were recorded on a modified W.H.O. format (1997). A total of 1008 subjects constituted the final sample size. **Results:** The mean age of the subjects was  $45.3 \pm 7.8$  years, and 97% (978) were males. Prevalence of dental caries was 63.4% and mean DMFT was 5.02. 47.6% of subjects needed some prosthesis in the maxillary arch while 53.3% needed some prosthesis in the mandibular arch. Regarding highest CPI (Community Periodontal Index) score, 8.13% of the subjects had healthy periodontium while maximum subjects (73.2%) had a score 2 (Calculus). **Conclusion:** Mean DMFT (Decayed, Missing and Filled Teeth) was satisfactory. Prosthetic need of the subjects was high with only a few subjects possessing prosthesis. Advanced periodontal disease (CPI score, 4) affected small number of subjects with maximum subjects (73%) having a CPI score of 2.

**Key words:** Dentition status, oral health, prosthetic needs, transport workers, treatment needs

## INTRODUCTION

Health continues to be a neglected entity despite continuous efforts for health promotion, worldwide. Health is often taken for granted, and its value is not fully understood, until it is lost.<sup>[1]</sup> Oral health is an integral part of general health and a valuable asset for any individual. The occupational environment is one of the major determinants for health. There are certain working classes who spend most of their time on wheels, travelling from one place to another, without regular food, rest, recreation and even sleep.

These people work in odd climate conditions with a frequent change in their day and night shifts leading to a change in their schedules of their life-styles which is compounded by delays and breakdowns.<sup>[2]</sup>

Chandigarh, a Union territory, is the capital city of two states, Haryana and Punjab. Chandigarh has a great network of local bus transport system known as Chandigarh Transport Undertaking (C.T.U.) with staff strength of 2100 people at 3 bus depots. CTU's staff ratio per bus is the lowest in the country: Just 5.54 employees per bus compared with Mumbai 10.99, Delhi's 9.16, Calcutta's 11.66 and Ahmedabad's 10.33.<sup>[2]</sup>

40-45% of the subjects in Chandigarh (35-44 years) reported oral health complaints in one year (2009).<sup>[3]</sup> The adult population of Chandigarh (35-44 years) had a mean DMFT of 9.5 which is higher as compared to the other states of India. Highest caries prevalence of 99.7% was also found in the adult population of Chandigarh in the

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age-group of 65-74 years as compared to states like Kerala having the lowest value.<sup>[3]</sup> 76% of the subjects in the similar age-group reported having suffered from hypertension. 20-25% of subjects (35-44 years) in Chandigarh used to smoke tobacco in the form of bidi followed by cigarette and 33% of subjects used to consume alcohol.<sup>[3,4]</sup>

In an era of evidence based medicine and oral health, scientifically testing such a fundamental concept of the prevalence of caries and periodontal disease among specific occupational people, should be given highest research priority as very few researches dealing with the prevalence of dental disorders have been carried out among Indian population, especially among subjects in specific occupations. Literature on the oral hygiene status of transport employees is almost non-existent. The aim of this paper was to assess the oral health status and treatment needs of staff of Chandigarh Transport Undertaking (C.T.U.) buses, Chandigarh.

## MATERIALS AND METHODS

### Study population

This study was conducted after obtaining ethical clearance from the Institutional Review Board of M.M.C.D.S. and R. and with prior permission from the Director Transport, C.T.U. A pilot study was conducted on 40 subjects to assess the feasibility of the study. Informed consent was taken from each subject prior to recording oral health. The study was conducted from August, 2008 to February, 2009 at all the three C.T.U. bus depots of Chandigarh. The study did obtain confidential demographic information such as income or educational level. The study was conducted from 9 A.M. to 4 P.M.; hence the subjects who were available during this time period comprised the study population and 1008 subjects constituted the final sample size.

### Recording and diagnosis criteria

On each visit, all the available drivers and conductors were interviewed and a clinical examination was conducted and data regarding oral health status and treatment needs was recorded on modified W.H.O. format [Table 1].<sup>[5]</sup> The diagnosis of oral lesions was carried out using WHO criteria<sup>[6]</sup> and Pindborg Color Atlas.<sup>[7]</sup> The socio-economic status was evaluated using modified B.G. Prasad's classification.<sup>[8]</sup> Periodontal status was assessed using the community periodontal index of treatment needs (CPITN) procedure of the World Health Organization (WHO).<sup>[5]</sup> It was used in this study since it proved to be a simple and effective method for measuring and monitoring the severity of periodontal disease at the community level.<sup>[9]</sup> In addition the International Classification of Diseases for Dentistry (ICD-DA) was also used for the same.<sup>[10]</sup>

### Examiner calibration

A single trained examiner (RSG) who was calibrated in the department conducted all the examinations. Intra examiner calibration was undertaken by examining 40 subjects followed by their re-examination a week later which resulted in 87% of diagnostic acceptability with a kappa value of 0.84. A well trained assistant was also taken for recording the data. Dental examination was conducted in the bus depot using additional artificial light. For the diagnosis of dental caries, WHO type III examination was done using mouth mirrors and sharp probes.<sup>[9]</sup>

### Statistical analysis

The data were analyzed using SPSS package version 13.0. One-way analysis of variance (ANOVA) and Z-test was used to determine differences at the 5 percent significance level ( $P < 0.05$ ) whereas proportions were compared by the use of Chi-square test.  $P < 0.05$  was selected to denote statistical significance.

## RESULTS

Subjects' mean age was  $45.3 \pm 7.8$  years. A total of 97% (978) males and 3% (30) females were interviewed and examined. As the number of female subjects was almost negligible as compared to their male counterparts, no attempt was made to relate gender to any of the findings of the study.

Majority of the subjects, 51.3% (518) belonged to lower middle class and 55.4% (558) were educated till high school. Among the self-reported systemic conditions, 12.5% reported to be suffering from hypertension and 4.9% with diabetes mellitus. 55.2% (556) of the subjects were alcoholics and 19.8% (187) of the subjects had a habit of using tobacco. 88.7% of the subjects used to brush their teeth at least once a day.

**Table 1: Variables used for collecting information from the subjects**

#### Based on the interview of the subjects

Age	Gender	Educational qualification
Designation at CTU	Marital status	Income per capita
Oral hygiene practices	Diet (Veg/Mixed)	Deleterious habits

#### Based on the examination of the subjects

Body mass index	Anemia	Varicosity of veins in legs
Oral mucosal lesions	Dentition status and treatment needs	Prosthetic status
Prosthetic needs	Periodontal status (CPI) without loss of attachment	Dental fluorosis

CTU: Chandigarh transport undertaking, CPI: Community periodontal index

On examination, 40.6% (409) of the subject were found to be in the range of normal body mass index (18.5-24.99) while 56.5% (570) belonged to over-weight category (25-29.99).

### Distribution of oro-mucosal lesions

The prevalence of oro-mucosal lesions was 1.6%, out of which leukoplakia and lichen planus constituted 0.4% and 0.2% respectively. Sulci and buccal mucosa were the most predominant sites for the occurrence of oral lesions. Regarding age, majority of the oro-mucosal lesions (50%) were found in the age group of 41-50 years.

### Dental caries

Table 2, depicts the prevalence of dental caries and mean DMFT according to age. Mean DMFT of the study population was 5.02. Mean number of decayed and missing teeth were  $1.67 \pm 2.16$  and  $1.46 \pm 2.8$ , respectively and their relation with age was found to be statistically significant ( $P < 0.01$ , ANOVA). Subjects with post-graduation had lesser mean number of decayed ( $1.15 \pm 1.32$ ) as well as teeth missing due to caries ( $0.3 \pm 0.82$ ) as compared to subjects with high school education ( $1.76 \pm 2.12$  and  $1.64 \pm 3.1$ , respectively). Subjects in upper high socio-economic class had a lower mean number of decayed teeth ( $0.75 \pm 0.5$ ) and missing teeth (due to caries  $1.25 \pm 1.5$ , due to other reason  $0.75 \pm 0.95$ ) as compared to the poor socio-economic class ( $1.42 \pm 1.81$ ,  $1.45 \pm 2.95$ ,  $0.85 \pm 1.85$ , respectively). Mean number of teeth requiring one surface filling, two surface filling and extraction were  $0.26 \pm 0.74$ ,  $0.36 \pm 0.72$  and  $1.1 \pm 1.81$  respectively [Table 3]. Proportionally more elderly than younger adults needed extraction, and caries was the major indication for extraction in all age groups.

### Prosthetic status and needs

Table 4, depicts the prosthetic status and needs of subjects. The percentage of subjects possessing prosthesis was 7.8% (79) in the maxillary arch and 4% (40) in the mandibular arch. As compared to the prosthesis present (prosthetic status), the need for a prosthesis was very high. Prosthetic needs for maxillary arch were higher in all age-groups as compared to the mandibular arch ( $P < 0.05$ , Chi-square).

### Periodontal status

Out of the 1008 subjects, 10 (0.99%) were excluded from the CPI computations either because of edentulousness or because extractions indicated for remaining teeth would have rendered the subjects edentulous. Table 5, illustrates the periodontal status of the study population and shows a high prevalence of periodontal disease. Periodontal condition as measured by maximum CPITN

**Table 2: Dental caries prevalence and DMFT according to age**

Age (in years)	N	Mean DMFT	Dental caries prevalence	
			N	%
≤20	6	0.16	6	16.6
21-30	43	1.74	43	53.4
31-40	209	2.66	209	57.8
41-50	457	4.59	457	63.2
51-60	289	8.06	289	70.5
61-70	4	1.25	4	50
Total	1008	5.02	1008	63.4

N=Number of subjects in each age-group; DMFT=Decayed, missing and filled teeth

**Table 3: Comparison of age of study population with treatment needs**

Age	N	Mean and SD	One surface filling	Two surface filling	Extraction
≤20	6	Mean	0.0	0.0	0.0
		SD	0.0	0.0	0.0
21-30	43	Mean	0.39	0.44	0.30
		SD	0.82	0.73	0.96
31-40	209	Mean	0.37	0.33	0.53
		SD	0.82	0.65	1.0
41-50	457	Mean	0.24	0.36	1.14
		SD	0.75	0.74	1.9
51-60	289	Mean	0.20	0.39	1.59
		SD	0.65	0.74	2.05
61-70	4	Mean	0.0	0.0	1.25
		SD	0.0	0.0	1.5
Total	1008	Mean	0.26	0.36	1.1
		SD	0.74	0.72	1.81

N=Number of subjects; SD=Standard deviation

**Table 4: Distribution of subjects according to prosthetic status and prosthetic needs**

Prosthetic status and need	Maxilla		Mandible	
	No.	%	No.	%
Prosthetic status	79	7.8	40	4
Prosthetic need	482	47.6	540	53.3

**Table 5: Distribution of subjects according to highest CPI score**

CPI Score	Number	Percentage
0 (Healthy)	82	8.13
1 (Bleeding)	3	0.3
2 (Calculus)	738	73.2
3 (Pocket≤4-5 mm)	148	14.6
4 (Pocket≥6 mm)	27	2.6
X (Excluded)	10	0.99
Total	1008	100

CPI=Community periodontal index

score per person showed that in the group studied there were statistically significant association of socio-economic status with the CPI score ( $P < 0.05$ ). When education was compared with the health of the supporting structures, it

was found that 25.9% of the post graduates had healthy periodontium as compared to the 7.8% among the high school ones ( $P < 0.001$ ). But CPITN scores were non-significant in relation to frequency of brushing and habits like chewing and smoking tobacco.

Most of the subjects (74.3%) had no dental fluorosis with only a few having questionable (16.7%) and very mild (6.6%) dental fluorosis.

## DISCUSSION

The intention of study was to provide systematic information on oral health of transport workers in a region that would aid in the planning and evaluation of oral health promotion programs. Moreover, a comparable prevalence data have not been recorded previously; hence the study was conducted to gather this data for comparing prevalence of lesions among other population of India and other countries. Rationale for this comparison was to assess the impact of differences in occupation, lifestyle and healthcare utilization on dental health. The comparison of present study can be done with other workers like factory and industrial workers and general adult population as no previous comparable data is available.

There is a strong correlation between socio-economic status and health. Income level is positively correlated with health status. Lower the income; the lower is the status of health. This situation is compounded by the fact that people on low income are less able to buy goods and services related to health and less able to pay the costs involved in accessing them. This could be explained on the basis of statistically significant association between socio-economic status and maximum CPITN score in the present study. Further more than 50% of the study subjects were suffering from pre-obesity and obesity, which is a significant issue of concern as it could impact oral health. This could be due to intake of fat rich food by the people of Punjab and Haryana states.<sup>[11]</sup>

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 by Kikwilu *et al.*<sup>[12]</sup> on an adult population. Increase in prevalence of oral mucosal lesions with age was reported in the present study and in another study conducted elsewhere.<sup>[13]</sup> The most common oral mucosal lesion in

the study was leukoplakia. Mandibular sulcus region was the most common site of ulceration in this study and in another study conducted by Fahmy<sup>[14]</sup> on workers engaged in some other occupation. This may be due to the habit of keeping the tobacco quid most of the times in the mandibular sulcus region.

The Decayed Missing Filled Surfaces/Teeth (DMF) index has been in use for about 65 years, and is well established as the leading measure of caries experience in dental epidemiology.<sup>[15]</sup> The comparison of present study can be done with other workers and general adult population as no previous comparable data is available for this specific occupation group. Similar prevalence of dental caries was found in the present study and in some other study conducted on two industrial population groups.<sup>[16]</sup> But, a higher and a lower prevalence was noted by some authors in a study conducted on some other population group.<sup>[17,18]</sup> The frequency of decayed tooth and average DMFT in the study population was very less as compared to the findings in some mill workers.<sup>[19]</sup> The mean DMFT value in the study was very less as compared to the study by Tomita *et al.*<sup>[20]</sup> on construction workers but the DMFT index showed an increase in age in all age-groups in both the studies. The mean number of teeth lost per worker showed a significant increasing trend with age which was similar with a study conducted previously.<sup>[21]</sup> Regarding the dentition status, filled teeth were the lowest in all the categories in the present study and in a study conducted on sweet and cable industry workers<sup>[22]</sup> but decayed component in the subjects was higher as compared to a study done in some other part of India.<sup>[23]</sup>

Gordon *et al.*<sup>[24]</sup> reported in his study that oral surgical needs and fixed and removable prosthetic need increased with age, the older group requiring more treatment than the younger age-group which is in agreement with this study also. This could be due to lack of time for dental treatment and accumulation of treatment needs over a period of time.

Percentage of subjects free from any signs of periodontal disease was also similar with some other study.<sup>[25]</sup> More number of subjects in the study had disease confined to reversible gingivitis which is contrary to that reported by some other studies.<sup>[25,26]</sup> This could be due to the reason that large percentage of subjects used to brush their teeth at least once a day. The most prevalent treatment need in the study was plaque control and scaling which was also in agreement with the results a study conducted by Roman.<sup>[27]</sup> Calculus and shallow pockets observed were same with the some other study also<sup>[28]</sup> but lesser percentage of subjects in the study had deep pockets.

Periodontal treatment needs increased with increasing age in the study is as similar to that reported by a study done in Finland.<sup>[29]</sup> In the current study, the relatively small numbers of patients with a CPITN score of 4 may have led to the finding of no statistically significant difference between the smoking and non-smoking group. This was in contrast to some other study.<sup>[30]</sup>

## CONCLUSION

The sample of transport workers provides a unique opportunity to study a population from diverse socio-economic and geographic back grounds. Economic road transport is almost impossible without these people. These people take the responsibility for carrying us safe and sound from one place to another. Therefore maintenance of general health as well as oral health of these workers falls under the responsibility of the Transport Authorities. Free dental services should be provided to these people in the government hospitals. A small health care centre should be established inside every Bus Depot including a dental health centre where periodic health and oral health check-ups of drivers, conductors and their dependents can be performed along with dental health education. We conclude that in such population's continuous research and interventions are needed to improve the overall health status of these specific occupational subjects. Tools for intervention, rehabilitation and prevention includes public policies to discourage and restrict tobacco use through taxation, special measures should be evolved to prevent oral problems among this specific occupational group.

## Clinical significance

The current study highlighted the oral health status and important treatment needs of the people of this specific occupational. It the first study of its kind as no other information is published elsewhere regarding the oral health status of this neglected group of people.

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