

Prevalence of Wasting Diseases and Oral Hygiene Practices among Construction Workers: A Cross-Sectional Study

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ABSTRACT

Background: Oral health holds equal significance to general health and is an invaluable asset for every individual. The evidence of occupation of people and oral health hazards related to construction sites instills a harmful environment which may contain abrasive particles in the form of silica and other mineral dust. Loss of tooth surface may be seen in different forms like attrition, abrasion, erosion etc., which could be attributed to occupational exposure. Tooth Wear, Gingival recession, clinical attachment loss were the common manifestations seen in construction workers due to the exposure of dust. Aphthous ulcer, caries, plaque, bleeding gums, poor periodontal status is the usual findings in construction workers. The prevalence of occupational diseases in India corresponds to 20% of the world's occupational diseases. **Materials and Methods:** The study included a total of 422 construction workers. Both males and females of the age group 18-45 years participated. Demographics details, oral hygiene practices and habits were asked to each participant. The data were analyzed using SPSS Software Version 23.0, and a Chi-square test was conducted to assess the association between variables. **Results:** The results of the study indicate that wasting diseases are more prevalent among males of middle age (26-35 years) with education level till middle school along with a habit history of tobacco chewing. The oral hygiene status was fair among the construction workers and they were also associated with adverse habits. **Conclusion:** The findings from the study suggest that due to lack of knowledge and exposure towards the importance of oral hygiene practices the prevalence of wasting diseases are more commonly seen in construction workers. Awareness and education has to be given regarding oral hygiene and maintenance to reduce the prevalence of wasting diseases among construction workers.

Keywords: Wasting diseases, Oral hygiene practices, Occupational health, Oral health disparities, Construction workers.

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INTRODUCTION

The overall health status of an individual is significantly shaped by their surrounding environment, which varies across different geographical regions and has a substantial impact on both general and dental health (Gambhir *et al.* 2014). The advent of the industrial revolution has spurred the growth of numerous industries, which in turn has elevated the standard of living for many. However, it has also led to increased exposure of vulnerable populations to harmful environmental factors, including hazardous dust particles that can negatively affect overall health (Patil *et al.* 2012). Exposure to various agents in the workplace-whether chemical, physical, or biological-can result in a range of adverse health outcomes. These outcomes can vary

from minor issues such as discomfort and irritation to serious occupational diseases, including lung fibrosis, hearing loss, organ damage, and cancers affecting different parts of the body.

Just as systemic health is crucial for the well-being of an individual, dental health also plays a vital role. Good oral health is integral to overall health, underscoring the need for comprehensive health management that includes both general and dental care (Goldstein *et al.* 2001). The impact of occupational hazards on health highlights the importance of monitoring and mitigating risks in the workplace to protect workers' health, both at a systemic and oral level. Effective occupational health policies and practices should be established to minimize exposure to harmful substances, promote safety, and support the overall well-being of employees in various industrial settings.

The World Health Organization (WHO) defines Occupational health as the effort to achieve and maintain optimal physical, mental, and social well-being for workers across all occupations (Allebeck *et al.* 2010). In the realm of occupational health, Oral



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health is an essential aspect, particularly among construction workers who frequently exhibit signs of gingivitis, periodontal diseases, dental caries, and tooth wear due to the nature of their work environment and lifestyle factors (Singh *et al.* 2021) (Aranha *et al.* 2021). Periodontal disease is recognized as a widespread public health issue, with evidence indicating that lifestyle choices and habitual behaviors, such as smoking, poor diet, and inadequate oral hygiene, significantly contribute to its onset and progression (Krisdapong *et al.* 2014).

To effectively address these concerns, it is essential to implement comprehensive health policies that encourage workers to prioritize their oral health. Such policies could motivate employees to allocate both time and financial resources toward maintaining good oral hygiene practices, thereby improving their overall oral health status and preventing disease (Hong *et al.* 2013). The incidence of dental caries, particularly on the buccal surfaces among bakery workers, serves as a pertinent example of how specific occupational exposures can lead to distinct dental health issues, underlining the importance of recognizing and addressing these conditions as occupational health concerns. This recognition not only underscores the necessity of tailored workplace interventions but also promotes the integration of oral health into broader occupational health and safety programs.

The occupational environment encompasses the array of external conditions and influences present in a workplace that directly impact the health of its workers (Gambhir *et al.* 2014). A significant dental issue in workplace environments is dental erosion, which is characterized by the gradual and irreversible loss of dental hard tissue resulting from chemical processes, often due to exposure to acids that are not produced by plaque bacteria (Amin *et al.* 2001) (Johansson *et al.* 2005). Among the various forms of dental wear, such as attrition, abrasion, and erosion, dental erosion has been identified as the most prevalent issue, particularly among workers in acid manufacturing industries (Kim *et al.* 2006) (Kim *et al.* 2003).

Research conducted by Kovacevic and Belojecic in 2006 highlighted another occupational hazard: noise pollution. Their study revealed a significant association between noise pollution in industrial environments and dental attrition, especially among female employees exposed to such conditions (Kovacevic *et al.* 2006). Furthermore, evidence suggests that the duration of employment in construction sites is directly correlated with the risk of enamel loss. The longer an individual works in such environments, the greater the cumulative impact on enamel, indicating that time is a critical factor influencing enamel degradation (Ghasemi *et al.* 2022).

These findings underscore the importance of recognizing and addressing occupational hazards that can adversely affect both general and dental health. Implementing protective measures and health policies tailored to specific occupational settings can help

mitigate these risks and safeguard the oral health of the working population.

Sleep bruxism, characterized by the grinding or clenching of teeth during sleep, has been linked to psychological job stress, suggesting that the mental pressures experienced at work may manifest as dental issues (Alajbeg *et al.* 2012) (Giraki *et al.* 2010). Previous research has demonstrated that the provision of proper oral hygiene instructions, coupled with regular dental evaluations, can significantly enhance the oral health status of workers. These interventions are particularly effective in preventing and managing dental conditions prevalent in occupational settings (Dannan *et al.* 2010).

Given the limited amount of literature addressing the specific oral health challenges faced by construction workers, this study was undertaken to fill that gap. The main objective of this research is to evaluate the prevalence of dental wasting diseases, such as attrition, abrasion, and erosion, and to evaluate the overall status of oral health of individuals employed in the construction industry. By focusing on this population, the study aims to provide a clearer understanding of the occupational health risks they face and to inform the development of targeted interventions to improve their oral health outcomes.

MATERIALS AND METHODS

This cross-sectional study was carried out among construction workers in Chennai, India, from December 2023 to March 2024. Before initiating the research, ethical approval was granted by the Institutional Review Board at Saveetha University, SIMATS, confirming that all procedures complied with ethical standards. Prior to participation, the construction workers were thoroughly briefed about the study's objectives, procedures, and the voluntary nature of their involvement. Participants were guaranteed that their involvement would be kept confidential and that they could withdraw from the study at any time without facing any consequences.

To formalize their participation written informed consent was acquired from each worker. Consent forms were created in several languages-Tamil, English, and Hindi-to cater to the diverse linguistic backgrounds of the workers, ensuring they could fully understand and agree to the terms. The study's sample size was established based on calculations from a prior pilot study, yielding a final total of 422 participants (Tomita *et al.* 2005). To attain this sample size, a simple random sampling method was utilized to choose four construction companies from which participants were recruited. This method ensured that the sample was representative of the larger population of construction workers in Chennai, allowing for more generalizable and reliable study results.

Eligibility criteria

Inclusion criteria: Construction workers between the ages of 18 and 45 who have lived in Chennai for over one year.

Exclusion criteria: Construction workers who did not provide consent and were unwilling to participate in the study.

The clinical assessment of the construction workers was conducted to evaluate their oral health status using the OHIS index, and instances of wasting disease were also noted. A Type III examination was performed on the workers utilizing a plain mouth mirror and a WHO probe. The study followed all established protocols and standard procedures to maintain infection control.

Statistical Analysis

The collected data were systematically organized in an Excel spreadsheet and then imported into SPSS statistical software (IBM SPSS Statistics Version 23) for analysis. The categorical data, presented as frequencies, were assessed for significance using the Chi-square test to determine associations. Additionally, Pearson correlation was performed to evaluate the relationships between variables, with a p -value of <0.05 indicating statistical significance.

RESULTS

The overall sample size was 422 construction workers from Chennai. Subjects were grouped based on demographic details, oral hygiene practices and adverse habits. Among 422 construction workers 29.1% were of age 26-35 years, 28.4% were of age 36-50 years and 21.8% were above 50 years. They were grouped based on educational status which showed 15.8% were illiterate, 26.3% studied up to middle school and 18.4% of workers have done their high schooling, only 23.2% of workers had completed a diploma and 16.1% were graduates. Among the participants, 39.3% were unmarried and 60.6% were married. Majority of the people, 42% self assessed their oral health was bad and 28.6% self assessed their oral health as good and moderate. Majority of the workers (68.2%) were in the construction line while only a few (12.7%) were in the housekeeping. Regarding the habit history of workers, the majority of them (50%) were smokers, 28.9% were using smokeless tobacco, 13% consumed alcohol, 15% had all habits and only 7% of the workers had no adverse habits. More than 68.4% used toothpaste, 20.8% used tooth powder, 1.8% used neem sticks and 1% used other methods for brushing. More than half the population (93.5%) had difficulty in brushing and only 6.5% had no difficulty in brushing. Almost 53.6% workers changed their toothbrush every 3 months, 34.6% every 6 months and 11.7% changed whenever they needed. Most of the workers (52.3%) had fair oral hygiene, 32.2% had poor oral hygiene and 15.4% had good oral hygiene. 23.4% had attrition, 23.9% had abrasion, 13% had erosion, 10.6% had combination and 39.5% had no wasting disease. A highly significant difference ($p=0.00$)

was identified in the association between wasting disease and oral hygiene practices (specifically, the frequency of toothbrush replacement) based on the Chi-square test results. Statistically significant differences were found on comparing wasting disease and OHIS ($p=0.02$), wasting disease and adverse habits ($p=0.04$), wasting disease and oral hygiene practices (what do you use to clean your teeth) $p=0.02$ on Chi square test (Table 4).

DISCUSSION

This study aimed to evaluate the prevalence of wasting diseases among construction workers. The study subjects were permanent employees of the cement factory. Association of age, gender, oral hygiene status, oral lesions and wasting diseases, frequency of brushing and methods of brushing was assessed. This study showed that most of the participants belonged to the age group of 26-35 years and among them majority completed middle school and only few have completed diploma. Most of the participants were married which is in contrast with other studies done by Hola B (Hola 2007; Measurement of Oral Health Literacy). The gender distribution of participants indicated that the study population consisted of a higher proportion of males (90.9%) compared to females (9%), a pattern that closely resembles findings from a study conducted in the Baddi-Barotiwala-Nalagarh industrial hub in Himachal Pradesh (Janapareddy *et al.* 2020).

From Table 1 it is evident that the majority of the population with middle school educational status has participated in our study. Self assessment results of the population revealed bad oral hygiene which was almost 180 people in total. Table 2 explains the assessment of oral hygiene practices methods followed by participants majorly which was cleaning their teeth using toothpaste for 3 to 6 min. The results obtained from Table 3 depicts oral health status of the study participants in relation to OHIS and wasting diseases among which 52.3% had fair oral health and 23.4% had attrition due to prolonged and improper brushing habits. The inadequate oral hygiene practices observed among the laborers in this study may stem from a lack of awareness regarding basic oral health preventive measures, particularly since most of these workers discontinued their education in middle school (Bipina *et al.* 2015, Raj *et al.* 2016). Strong scientific evidence supports a positive correlation between socio-economic status and health, a relationship that has been confirmed in multiple surveys, irrespective of the socio-economic indicators employed (da SILVA *et al.*, 2007; Gangarosa, 1968; Pinto, 2000).

A Chi-square test was conducted to evaluate the relationship between wasting diseases and oral hygiene status, resulting in a p -value of 0.02, which is considered statistically significant. The p -value for the association between wasting diseases and adverse habits was 0.04, also statistically significant. Additionally, the Chi-square test for the association between wasting diseases and oral hygiene practices yielded a p -value of 0.02, indicating statistical significance. Furthermore, the association between

wasting diseases and oral hygiene practices, analyzed using a Chi-square chart, produced a *p*-value of 0.00, confirming statistical significance.

Research done by Sakthi *et al.* revealed that the caries prevalence among a group of 321 construction workers was 67%, a figure lower than what was observed in the current study (Suresh *et al.* 2022). In this study, participants exhibited a higher mean DMFT (Decayed, Missing, and Filled Teeth) score. Sanadhya *et al.* reported a mean DMFT score of 3.94 ± 3.54 among salt workers, which is notably lower than the mean score of 6.77 ± 4.76 observed in the current study. Furthermore, the study revealed a low number of filled teeth among construction workers, highlighting a considerable need for dental treatment and suggesting potential

disparities in access to oral healthcare services for this population in Belagavi.

The high prevalence of dental caries among construction workers in Belagavi may be linked to a combination of occupational and environmental factors. These workers often endure demanding working conditions that can lead to inadequate oral hygiene practices, as the nature of their job may hinder their ability to maintain consistent dental care routines. This highlights the importance of addressing occupational health challenges

Table 1: Sociodemographic variables of the study participants.

Sl. No.	Demographics	n (%)
1	Age	
	18-25 years	87(20.8%)
	26-35 years	123(29.1%)
	36-50 years	120(28.4%)
	>50 years	92(21.8%)
2	Gender	
	Male	384(90.9%)
	Female	38(9%)
3	Education	
	Illiterate	67(15.8%)
	Middle school	111(26.3%)
	Higher secondary	78(18.4%)
	Diploma	98(23.2%)
	Graduate	68(16.1%)
4	Marital status	
	Unmarried	166(39.3%)
	Married	256(60.6%)
5	Self-assessment of oral health	
	Good	121(28.6%)
	Moderate	121(28.6%)
	Bad	180(42.6%)
6	Occupation type	
	Workers/Production line	288(68.2%)
	Administration line	80(18.9%)
	Housekeeping line	54(12.7%)
7	Adverse habits	
	Chewing tobacco	122(28.9%)
	Smoking tobacco	212(50%)
	Liquor	55(13%)
	All	65(15%)
	None	33(7%)

Table 2: Assessment of oral hygiene practices among study participants.

Questions about oral hygiene practices	N (%)
Do you clean your teeth?	
Yes	390(92.4%)
No	32(7.5%)
What do you use to clean your teeth?	
Toothpaste	289(68.4%)
Toothpowder	88(20.8%)
Neem stick	8(1.8%)
Any other	5(1%)
Do you face any difficulty in brushing your teeth?	
Yes	365(93.5%)
No	25(6.5%)
How frequently do you change your toothbrush?	
Every 3 months	155(53.6%)
Every 6 months	100(34.6%)
Whenever needed	34(11.7%)
How many min you brush your teeth	
1 min	22(7.6%)
2-3 min	10(3.4%)
3-6 min	101(34.9%)
>6 min	156(53.9%)

Table 3: Oral health status of the study participants in relation to OHIS and wasting diseases.

Oral health status	n (%)
Oral hygiene index-Simplified	
Good	65(15.4%)
Fair	221(52.3%)
Poor	136(32.2%)
Wasting diseases	
Attrition	99(23.4%)
Abrasion	101(23.9%)
Erosion	55(13%)
Combination	45(10.6%)
None	167(39.5%)

Table 4: Association of the variables using chi-square test.

Variables	Chi-square value	p value
Wasting diseases and Oral hygiene status simplified	12.344	0.02*
Wasting diseases and adverse habits	9.876	0.04*
Wasting diseases and oral hygiene practices (What do you use to clean your teeth?)	11.786	0.02*
Wasting diseases and oral hygiene practice (How frequently do you change your toothbrush?)	14.675	0.00*

*Statistically significant ($p < 0.05$).

and improving access to dental healthcare for this vulnerable population (Prabakar *et al.* 2023).

A study by Bipina *et al.* found that 79.41% of construction workers had poor oral hygiene, with those brushing their teeth just once a day being more likely to suffer from poor oral health and periodontitis (Bipina *et al.* 2015, Sathya *et al.* 2023). Many of these workers come from rural areas where they might not be fully aware of proper oral hygiene practices. Often, they use whatever materials are available instead of a toothbrush and toothpaste, primarily because these products might be hard to find or too expensive. This situation likely contributes significantly to their oral health issues.

Additionally, the work environment has a noticeable impact on their oral health. The demands of their jobs and related factors, like insufficient sleep, can affect their daily habits. This suggests that the limited brushing frequency among construction workers may be tied to their challenging work conditions, making it harder for them to maintain good oral hygiene.

In this study, chi-square test indicated a highly significant association ($p = 0.00$) between wasting diseases and oral hygiene practices, particularly regarding the frequency with which participants replaced their toothbrushes. This indicates a strong connection between the management of oral hygiene tools and the prevalence of wasting diseases (Table 4).

Further analysis showed statistically significant differences in several areas. There was a notable correlation between wasting diseases and the Oral Hygiene Index Simplified (OHIS), with a p-value of 0.02, suggesting that the level of oral hygiene as measured by OHIS is significantly associated with the presence of wasting diseases. Additionally, differences were observed between wasting diseases and adverse oral hygiene habits ($p = 0.04$), highlighting that harmful habits are linked to higher rates of these diseases. Lastly, there was a significant association between wasting diseases and the methods used for dental cleaning ($p = 0.02$), underscoring the impact of different dental care practices on the occurrence of wasting diseases.

CONCLUSION

The findings from the study conclude that due to lack of knowledge and exposure towards the importance of oral hygiene practices the prevalence of wasting diseases are more commonly seen in construction workers. Awareness and education has to be given regarding oral hygiene and maintenance to reduce the prevalence of wasting diseases among construction workers.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

OHIS: Oral Hygiene Index Simplified; **DMFT:** Decayed, Missing, and Filled Teeth; **WHO:** World Health Organization; **SPSS:** Statistical Package for the Social Sciences.

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