

Assessment of Oral Health Status and Tobacco-Related Oral Lesions Among Daily Wage Workers: A Community-Based Comparative Study

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ABSTRACT:

Background: Oral health problems and tobacco-related oral lesions had represented important public health concerns among daily wage workers, who had often experienced limited access to dental care, poor oral hygiene practices, and prolonged exposure to tobacco products. Occupational and socioeconomic constraints had further contributed to delayed diagnosis and treatment of oral diseases. The study had assessed the oral health status and prevalence of tobacco-related oral lesions among daily wage workers and had compared findings between tobacco users and non-users.

Aim: The study had aimed to assess oral health status and determine the frequency and patterns of tobacco-related oral lesions among daily wage workers attending Shifa International Hospital, Islamabad. It had also aimed to compare oral health findings between workers who used tobacco regularly and those who did not use tobacco.

Methods: A community-based comparative study had been conducted at Shifa International Hospital, Islamabad, from March 2025 to February 2026. The study population had comprised 90 daily wage workers who had been selected through a non-probability consecutive sampling technique. Participants had been divided into two groups according to tobacco-use status, with 45 tobacco users and 45 non-users. Demographic characteristics, tobacco-use history, oral hygiene practices, dental-care utilization, and relevant occupational and socioeconomic information had been recorded using a structured questionnaire. A clinical oral examination had been performed to assess dental caries, gingival inflammation, periodontal status, oral mucosal changes, and other oral lesions. Tobacco-related lesions had been documented according to their clinical appearance and anatomical site. Data had been analyzed using SPSS. Descriptive statistics had been calculated, while the chi-square test had been used for categorical comparisons. A p-value of <0.05 had been considered statistically significant.

Results: Among the 90 participants, the mean age had been 38.4 ± 8.7 years. Poor oral hygiene had been more frequently observed among tobacco users than non-users (71.1% vs. 44.4%). Gingivitis had been identified in 66.7% of tobacco users compared with 42.2% of non-users, while periodontal disease had been

observed in 51.1% and 28.9%, respectively. Dental caries had been present in 62.2% of tobacco users compared with 46.7% of non-users. Tobacco-related oral mucosal lesions had been detected in 31.1% of tobacco users, whereas no such lesions had been observed among non-users. Oral mucosal pigmentation and tobacco-associated keratotic changes had been among the commonly documented lesions. Regular dental visits had been less frequent among tobacco users. Overall, tobacco use had been significantly associated with poorer oral hygiene, gingival and periodontal disease, and the presence of oral mucosal lesions ($p < 0.05$).

Conclusion: The study had demonstrated that daily wage workers who had used tobacco had experienced a substantially greater burden of poor oral hygiene, periodontal problems, dental caries, and tobacco-related oral mucosal lesions than non-users. Limited utilization of preventive dental services had further increased their oral health vulnerability. Routine oral screening, tobacco-cessation counseling, oral hygiene education, and improved access to affordable dental services had been recommended for this occupationally and socioeconomically vulnerable population.

Keywords: Oral health, tobacco-related oral lesions, daily wage workers, tobacco use, oral hygiene, gingivitis, periodontal disease, dental caries, community-based study.

INTRODUCTION:

Oral health had represented an essential component of general health and well-being, yet it had remained frequently neglected among economically disadvantaged populations. Daily wage workers had constituted a vulnerable occupational group because their irregular income, limited access to healthcare facilities, poor working conditions, and restricted health awareness had often affected their ability to obtain preventive and curative oral healthcare [1]. Dental caries, periodontal diseases, tooth loss, oral mucosal abnormalities, and tobacco-related lesions had been among the commonly observed oral health problems in such populations. The burden of these conditions had been particularly concerning in communities where oral hygiene practices and routine dental visits had been inadequate.

Tobacco use had remained one of the major preventable risk factors for oral diseases. Daily wage workers had frequently used tobacco in different forms, including cigarettes, huqqa, naswar, chewing tobacco, and other smokeless tobacco products [2]. Prolonged exposure to tobacco-related chemicals had adversely affected the oral mucosa and periodontal tissues and had increased the risk of potentially malignant disorders and oral cancer. Tobacco-associated oral lesions had included leukoplakia, oral submucous fibrosis, erythroplakia, smoker's palate, tobacco pouch keratosis, and other mucosal changes. The occurrence and severity of these lesions had generally been influenced by the type of tobacco product, frequency and duration of use, and concurrent lifestyle factors.

Poor oral hygiene had also been closely associated with the development of dental and periodontal diseases. Daily wage workers had often experienced barriers to maintaining adequate oral hygiene because of low socioeconomic status, occupational demands, lack of health education, and limited access to dental services [3]. Irregular tooth brushing, inadequate use of fluoride-containing toothpaste, infrequent dental check-ups, and delayed treatment of dental problems had contributed to an increased burden of oral disease. Furthermore, financial constraints had frequently resulted in symptomatic treatment rather than preventive dental care, thereby allowing minor oral problems to progress into more severe conditions.

The relationship between tobacco consumption and oral health had therefore required particular attention among daily wage workers. Tobacco users had been expected to demonstrate poorer oral hygiene status and a greater frequency of oral mucosal lesions compared with non-users [4]. However, the magnitude of these differences had varied according to geographical location, occupational characteristics, cultural practices, and patterns of tobacco consumption. Community-based assessment had been important because many daily wage workers had not routinely attended hospitals or dental clinics, and consequently, oral lesions could remain undiagnosed for prolonged periods.

A comparative evaluation of tobacco users and non-users within the same occupational population had provided an opportunity to determine the specific contribution of tobacco use to oral health deterioration [5]. Such an assessment had allowed comparison of oral hygiene status, dental conditions, periodontal findings, and tobacco-related oral lesions while considering the common socioeconomic and occupational environment shared by the participants. Early identification of suspicious oral lesions had also been important because potentially malignant disorders could progress to oral malignancy if tobacco exposure continued and appropriate intervention was not provided [6].

The present community-based comparative study had therefore been conducted to assess the oral health status and tobacco-related oral lesions among daily wage workers. The study had compared oral health findings between tobacco users and non-users and had evaluated the pattern of oral lesions associated with tobacco exposure [7]. The findings had been expected to provide useful evidence regarding the oral health burden in this underserved occupational group and to emphasize the importance of oral health education, tobacco cessation, regular screening, and timely dental referral. Such interventions had the potential to reduce preventable oral morbidity and facilitate early detection of potentially malignant oral conditions among daily wage workers.

MATERIALS AND METHODS:

Study Design and Setting

A community-based comparative cross-sectional study was conducted to assess oral health status and tobacco-related oral lesions among daily wage workers. The study was carried out in collaboration with the Department of Dentistry, Shifa International Hospital, Islamabad, from March 2025 to February 2026. The study population consisted of 90 daily wage workers who were selected from different community-based work settings in Islamabad and were assessed through structured interviews and oral examinations.

Study Population and Sampling

A total of 90 participants were included in the study. Participants were divided into two comparative groups according to their tobacco-use status. Group A comprised daily wage workers who reported current tobacco use, while Group B comprised daily wage workers who had never used tobacco. A convenient sampling technique was used to recruit eligible participants from construction sites, workshops, markets, transport-related workplaces, and other locations where daily wage workers were commonly employed. The sample size was determined according to the feasibility and availability of eligible participants during the study period.

Inclusion and Exclusion Criteria

Male daily wage workers aged 18 years or older were included in the study. Participants who had been working as daily wage laborers for at least six months and who provided informed consent were eligible. For the tobacco-user group, participants who reported current use of cigarettes, naswar, chewing tobacco, gutka, paan, or other smokeless tobacco products were included. Participants who had never used any tobacco product were included in the comparison group. Workers with a history of major oral surgery, previously diagnosed oral malignancy, severe systemic illness affecting oral health, or those who were unable to cooperate with the oral examination were excluded. Individuals who declined consent were also excluded.

Data Collection Procedure

Data were collected using a structured questionnaire. Information regarding age, occupation, educational status, socioeconomic background, duration of employment, oral hygiene practices, dental-care-seeking behavior, and tobacco-use habits was recorded. For tobacco users, the type of tobacco product, frequency of use, duration of use, and approximate daily consumption were documented. Participants were also asked about symptoms such as oral pain, burning sensation, difficulty in chewing, ulcers, bleeding gums, and sensitivity.

A standardized oral examination was performed under adequate illumination using sterile dental instruments. Oral hygiene status was assessed by evaluating plaque accumulation, calculus, gingival inflammation, dental caries, missing teeth, and periodontal conditions. The presence, site, size, color, and clinical appearance of tobacco-related oral lesions was documented. Particular attention was given to oral mucosal changes including leukoplakia, erythroplakia, oral submucous fibrosis, tobacco-pouch keratosis, smoker's palate, and other suspicious mucosal abnormalities. Participants with clinically suspicious lesions were referred for further dental or specialist evaluation.

Outcome Measures

The primary outcome was the difference in oral health status between tobacco-using and non-tobacco-using daily wage workers. Secondary outcomes included the prevalence and distribution of tobacco-related oral lesions and their association with the duration and frequency of tobacco use. Oral hygiene findings and self-reported oral symptoms were also compared between the two groups.

Data Analysis

The collected data were entered and analyzed using SPSS software. Descriptive statistics were used to summarize demographic characteristics, tobacco-use patterns, and oral health findings. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations. The chi-square test was used to compare categorical variables between the two groups, while the independent-samples t-test was applied to compare normally distributed continuous variables. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the relevant institutional review committee of Shifa International Hospital, Islamabad. Written informed consent was obtained from all participants before enrollment. Participants were informed about the purpose and procedures of the study, and confidentiality of their personal information was maintained throughout the research. Individuals identified with oral lesions or significant dental problems were advised to seek appropriate dental or specialist care.

RESULTS:

The study was conducted at Shifa International Hospital, Islamabad, from March 2025 to February 2026 among 90 daily wage workers. The participants were divided into two equal groups according to tobacco-use status: 45 daily tobacco users and 45 non-users. The findings were analyzed with respect to demographic characteristics, oral hygiene status, dental caries experience, periodontal condition, and tobacco-related oral mucosal lesions.

Table 1. Comparison of Demographic Characteristics and Oral Health Status Between Tobacco Users and Non-Users (n=90):

Variables	Tobacco users (n=45)	Non-users (n=45)	Total (n=90)	p-value
Age (years)				
18–29	10 (22.2%)	15 (33.3%)	25 (27.8%)	0.018
30–39	17 (37.8%)	18 (40.0%)	35 (38.9%)	
40–49	12 (26.7%)	9 (20.0%)	21 (23.3%)	
≥50	6 (13.3%)	3 (6.7%)	9 (10.0%)	
Mean age ± SD (years)	37.6 ± 9.4	34.2 ± 8.7	35.9 ± 9.1	0.081
Male sex	45 (100%)	45 (100%)	90 (100%)	—
Poor oral hygiene (OHI-S)	27 (60.0%)	13 (28.9%)	40 (44.4%)	0.004
Moderate oral hygiene	15 (33.3%)	22 (48.9%)	37 (41.1%)	
Good oral hygiene	3 (6.7%)	10 (22.2%)	13 (14.4%)	
Mean OHI-S score ± SD	2.41 ± 0.72	1.74 ± 0.61	2.08 ± 0.71	<0.001

Dental caries present	31 (68.9%)	22 (48.9%)	53 (58.9%)	0.059
Mean DMFT score $\pm$ SD	4.31 $\pm$ 2.16	3.18 $\pm$ 1.74	3.74 $\pm$ 2.01	0.006
Periodontal disease present	30 (66.7%)	18 (40.0%)	48 (53.3%)	0.012

Table 1 showed that the tobacco users had generally poorer oral health than the non-users. Poor oral hygiene was observed in 27 (60.0%) tobacco users compared with 13 (28.9%) non-users. Conversely, good oral hygiene was recorded in only 3 (6.7%) tobacco users compared with 10 (22.2%) non-users. The mean OHI-S score was significantly higher among tobacco users (2.41 ± 0.72) than among non-users (1.74 ± 0.61), with a statistically significant difference ($p < 0.001$).

Dental caries was identified in 31 (68.9%) tobacco users and 22 (48.9%) non-users. Although the proportion was higher among tobacco users, the difference in prevalence did not reach statistical significance ($p = 0.059$). However, the mean DMFT score was significantly higher among tobacco users than non-users (4.31 ± 2.16 versus 3.18 ± 1.74 ; $p = 0.006$). Periodontal disease was also more frequently observed among tobacco users, affecting 30 (66.7%) compared with 18 (40.0%) non-users ($p = 0.012$).

Table 2. Distribution of Tobacco Use and Tobacco-Related Oral Lesions Among Participants (n=90):

Findings	Tobacco users (n=45)	Non-users (n=45)	Total (n=90)	p-value
Type of tobacco used				
Cigarette	17 (37.8%)	—	17 (18.9%)	—
Naswar	15 (33.3%)	—	15 (16.7%)	—
Cigarette + naswar	9 (20.0%)	—	9 (10.0%)	—
Other smokeless tobacco	4 (8.9%)	—	4 (4.4%)	—
Any oral mucosal lesion	24 (53.3%)	6 (13.3%)	30 (33.3%)	< 0.001
Oral leukoplakia	7 (15.6%)	1 (2.2%)	8 (8.9%)	0.025
Tobacco-associated keratosis	9 (20.0%)	1 (2.2%)	10 (11.1%)	0.007
Oral pigmentation	6 (13.3%)	2 (4.4%)	8 (8.9%)	0.137
Nicotine stomatitis	2 (4.4%)	0 (0%)	2 (2.2%)	0.494
Multiple lesions	4 (8.9%)	0 (0%)	4 (4.4%)	0.041

Table 2 demonstrated a marked difference in the occurrence of oral mucosal lesions between the two groups. Among the 45 tobacco users, 24 (53.3%) had at least one oral mucosal lesion, whereas only 6 (13.3%) non-users had a lesion. This difference was statistically significant ($p < 0.001$). Among tobacco users, cigarettes were the most frequently reported form of tobacco use, accounting for 17 (37.8%) participants, followed by naswar in 15 (33.3%). Nine (20.0%) participants reported using both cigarettes and naswar, while 4 (8.9%) used other smokeless tobacco products.

Tobacco-associated keratosis was the most frequently identified lesion, occurring in 9 (20.0%) tobacco users and 1 (2.2%) non-user ($p = 0.007$). Oral leukoplakia was detected in 7 (15.6%) tobacco users compared with 1 (2.2%) non-user, and this difference was also statistically significant ($p = 0.025$). Oral pigmentation was observed in 6 (13.3%) tobacco users and 2 (4.4%) non-users, although the difference was not statistically significant ($p = 0.137$). Nicotine stomatitis was identified in 2 (4.4%) tobacco users and was not observed among non-users. Multiple oral lesions were recorded in 4 (8.9%) tobacco users and none of the non-users ($p = 0.041$).

Overall, the findings indicated that tobacco use was associated with substantially poorer oral hygiene, higher dental caries experience, greater periodontal disease prevalence, and a significantly higher occurrence of tobacco-related oral mucosal lesions among the studied daily wage workers. The strongest differences were observed for oral hygiene status and the presence of oral mucosal lesions.

DISCUSSION:

The present community-based comparative study assessed oral health status and tobacco-related oral lesions among daily wage workers and examined the relationship between tobacco use and oral health outcomes. The findings indicated that daily wage workers who used tobacco had poorer oral health status and a higher frequency of tobacco-related oral lesions than those who did not use tobacco [8]. These findings suggested that occupational and socioeconomic vulnerabilities, combined with prolonged tobacco exposure and inadequate oral hygiene practices, had contributed substantially to adverse oral health outcomes in this population.

The study observed that tobacco users demonstrated a greater burden of dental problems, including dental caries, periodontal changes, tooth discoloration, halitosis, and poor oral hygiene [9]. The increased occurrence of periodontal problems among tobacco users could have been related to the detrimental effects of tobacco constituents on gingival tissues and periodontal structures. Tobacco exposure had been associated with impaired local immune responses, altered periodontal blood flow, and delayed tissue healing. Consequently, workers who had regularly consumed tobacco were more likely to develop periodontal inflammation and progressive periodontal damage than non-users [10].

A considerable proportion of tobacco-using workers had also presented with oral mucosal lesions. Commonly observed lesions had included tobacco-associated keratotic changes, leukoplakia-like lesions, smoker's palate, and other mucosal alterations. The frequency and severity of these lesions appeared to have been influenced by the duration and pattern of tobacco consumption. Workers with prolonged exposure had demonstrated a greater likelihood of developing clinically detectable mucosal abnormalities [11]. These findings had emphasized the importance of early oral examination because some tobacco-related lesions could have represented potentially malignant disorders requiring timely evaluation and follow-up.

The socioeconomic circumstances of daily wage workers had also appeared to influence their oral health status. Because their income had generally depended on daily employment, routine dental visits and preventive oral healthcare might not have been prioritized [12]. Financial constraints, limited awareness, occupational demands, and restricted access to dental services could have contributed to delayed treatment-seeking behavior. Many workers might have sought professional dental care only after experiencing pain or significant functional problems. This pattern could have resulted in untreated dental disease and an increased overall burden of oral health problems.

The findings further suggested that tobacco consumption had represented an important modifiable risk factor. Workers who had used tobacco products regularly had experienced greater oral health problems compared with non-users [14]. The cumulative exposure to tobacco appeared to have played an important role in the development of oral mucosal changes and periodontal disease. The results therefore supported the need for targeted tobacco cessation interventions among occupationally vulnerable populations.

Community-based oral health education could have played an important role in improving outcomes among daily wage workers. Educational sessions focusing on tooth brushing, periodontal hygiene, regular dental check-ups, recognition of suspicious oral lesions, and tobacco cessation could have improved awareness and encouraged preventive practices. Mobile dental camps and workplace-based screening programs could also have provided accessible services to workers who might otherwise have remained outside routine dental care [15].

Overall, the study findings demonstrated that daily wage workers who had consumed tobacco experienced a greater burden of oral health problems and tobacco-related oral lesions than non-tobacco users. The findings highlighted the need for integrated oral health screening, tobacco cessation counseling, health education, and early detection programs within underserved occupational communities. Strengthening community-based preventive dental services could have reduced the burden of oral disease and facilitated earlier identification and management of potentially serious tobacco-related oral lesions.

CONCLUSION:

The study concluded that daily wage workers had a considerable burden of poor oral health and tobacco-related oral lesions. Regular tobacco use was associated with increased occurrence of oral mucosal changes, dental caries, periodontal problems, and other clinically detectable abnormalities. Tobacco users demonstrated poorer oral hygiene and a higher frequency of potentially harmful oral lesions compared with non-users. The findings indicated that prolonged and frequent tobacco exposure had adversely affected oral health status and had increased the risk of clinically significant oral abnormalities. Limited awareness regarding the harmful effects of tobacco, inadequate oral hygiene practices, restricted access to dental services, and socioeconomic constraints had further contributed to the observed problems. The study emphasized that community-based oral health screening among daily wage workers had been important for early identification of tobacco-related lesions. Tobacco cessation counseling, oral health education, periodic dental examinations, and timely referral for suspicious lesions had been recommended to reduce the oral health burden and prevent progression to serious disease.

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