



Prevalence and Determinants of Tobacco Use among Public Bus Staff in Banke District, Nepal: A Cross-Sectional Study

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ABSTRACT

Introduction: Tobacco consumption, encompassing both smoked and smokeless forms, is the leading cause of preventable death, responsible for more than 7-8 million deaths each year. It remains a significant public health challenge globally and in Nepal, particularly among high-risk occupational groups such as public transport workers. The study aims to assess the prevalence and determine the determinants of smoked and smokeless tobacco use among public bus drivers and staff in Banke District, Nepal: a cross-sectional study.

Methods: A cross-sectional study was conducted among 195 drivers and support staff selected using systematic random sampling. Data were collected through face-to-face interviews using a semi-structured questionnaire adapted from the Nepal STEPS Survey 2019. Descriptive statistics summarised the prevalence and consumption patterns, while Chi-square tests assessed associations, with significance set at $p < 0.05$.

Results: Among participants, 52.8% were current smokers and 80.5% were current smokeless tobacco users. Dual use was observed in 47.2% of users. The mean age of participants was 33.4 ± 9.4 years, and the mean initiation age for tobacco use was 18.8 ± 3.8 years. Most smokers (61.8%) consumed six or more sticks per day, while the average smokeless tobacco use was 11.9 ± 7.6 packets daily. Smoking was strongly associated with young age (OR=1.881, 95% CI: 1.064-3.325), while smokeless tobacco use was linked to lower education (OR = 2.16, 95%CI: 1.03-4.52) and support staff occupation (OR = 2.245, 95%CI: 1.042-4.838). Religion showed a protective association (OR = 0.79, 95%CI: 0.73-0.85).

Conclusion: Tobacco use is alarmingly high among bus drivers and staff in Banke, with early initiation and high dual use. Peer influence, wakefulness were the driving factors for the usage of tobacco products.

Keywords: Tobacco use, peer pressure, drivers, Nepal, occupational health

INTRODUCTION

Tobacco use is a major contributor to global morbidity and mortality, linked to numerous health conditions, including cancers, cardiovascular diseases, and respiratory disorders (1). Cigarette smoking remains the most common form, affecting nearly every organ in the body. At the same time, smokeless tobacco use is associated with oral, esophageal, and pancreatic cancers, as well as pregnancy complications and nicotine poisoning

in children (2,3). Second-hand smoke exposure also increases the risk of stroke, lung cancer, and heart disease among nonsmokers (4,5).

Tobacco use while driving poses additional public health risks, contributing to motor vehicle crashes due to distraction and reduced concentration (6). In Nepal, dual use of both smoked and smokeless tobacco is common, especially among individuals in physically demanding and high-stress occupations (7)(8). Occupational

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factors significantly influence tobacco use patterns, with the highest smoking rates observed in industries such as mining, construction, and transport (9). Blue-collar workers are consistently found to have higher smoking prevalence than their white-collar counterparts across various global studies (10,11,12).

Behavioral and social determinants such as low education, occupational stress, peer influence, limited awareness, and poor access to cessation resources contribute to continued tobacco use (13–19). In South and Southeast Asia, diverse tobacco products are used, with smoking rates particularly high among men in countries like Indonesia, Bangladesh, and Nepal (13). Within Nepal, long-distance drivers may be especially vulnerable due to the nature of their work, prolonged stress, and irregular routines (7).

Little research has been conducted in Nepal on the tobacco consumption among bus drivers and supporting staff in Nepal. Given the context, the present research examined the prevalence and association of tobacco use (both smoked and smokeless) among public bus drivers and support staff in Banke District, Nepal, in the understudied yet high-risk group.

METHODS

Study design and setting

A cross-sectional survey was done among public passenger vehicles registered under the “KHA” category in Nepal’s Banke district. These vehicles provide inter-city transportation, linking Banke to major provincial capitals and other regions inside and outside Lumbini Province.

Study population and sampling procedure

The sample size was determined using the prevalence of tobacco consumption among bus drivers and supporting staff at the main bus departure sites in the downtown Banke region. Based on the records from registered vehicles in the transportation management office operating from the samities registered in Banke district, there were 650 registered vehicles. The Sample size was determined using the formula, $n = z^2pq/d^2$, where z = standard normal variate, with value 1.96 at 95% confidence Interval, $p = 0.78$ (20), and allowable error, taken as 5%. Assuming a 10% non-response rate, the sample size was 208.

A systematic selection technique was used, with the first respondent selected at random and subsequent respondents selected using the formula $k = N/n$, guaranteeing that every third bus was sampled. Each respondent was chosen at random, with one representing the bus from the selected vehicles, either a driver or other staff member of the vehicle, based on their availability

during the survey. A total of 195 samples were obtained from the study location, resulting in a 6% non-response rate.

Inclusion Criteria:

The respondents, comprising both drivers and support staffs of public passenger vehicles designated as “Category KHA,” had been employed in the public transportation sector for at least the previous six months.

Exclusion Criteria:

Staff who refused to provide the required information or declined to participate were excluded from the study. Vehicles not classified as “Category KHA” were also excluded.

Data collection tool

To assess the prevalence of tobacco consumption among drivers and support staff, trained data collectors conducted semi-structured interviews using a standard questionnaire adapted from the Nepal STEPS Survey 2019 and refined through an extensive literature review.

Data collection procedure

Qualified data collectors conducted semi-structured interviews to investigate the prevalence of tobacco consumption among drivers and support staff. Qualified data collectors conducted semi-structured interviews at bus departure points and garages in the Banke district. Public health graduates were trained for 2–3 days. Face-to-face interviews were conducted during morning and afternoon shifts. One person from each selected bus was interviewed. Before collecting any data, informed consent was required. Individuals who were initially unavailable had follow-up visits. The participants were told that their responses would be de-identified and kept anonymous.

Data management and analysis

Data completeness was verified immediately after collection. Data entry and analysis were performed using IBM SPSS Statistics 20 software, with frequencies and percentages calculated for summary values. A Chi-square test was used to assess tobacco consumption, with significance determined at a p -value of <0.05 and a 95% confidence interval.

Ethical Consideration

Ethical approval was taken from the Ethical Review Board at Nepal Health Research Council (Registration No. 292/2022P). Approval for the study was obtained from the transportation management office, Banke. Informed written consent was also obtained from every participant before data collection.

RESULTS

Sociodemographic characteristics

Table 1 shows that 49.7% of participants were aged 18-32, and 50.3% were aged 33-52. Regarding education, 49.2% were educated up to the primary level (1-8), while 50.8% had completed high school or higher. Regarding ethnicity, 56.9% identified as belonging to the upper caste group, and 92.3% were Hindu, with 65.1% married, 44.1% working as drivers, and 50.8% working 12 or more hours.

Table 1. Sociodemographic characteristics among the participants

Characteristics	Frequency	Percent
Age in years		
18-32	97	49.7
33-52	98	50.3
Education		
Educated up to the primary level (1-8)	96	49.2
High School Completed (9-12, intermediate)	99	50.8
Ethnicity		
Upper caste Group	111	56.9
Other caste Group	84	43.1
Religion		
Hindu	180	92.3
Other religion	15	7.7
Marital Status		
Unmarried	68	34.9
Married	127	65.1
Occupation		
Driver	86	44.1
Support Staff	109	55.9
Working Hours		
< 12 hrs	96	49.2
≥ 12 hrs	99	50.8

Among the 195 respondents, 52.8% were aged between 18–33 years and 47.2% between 34–58 years, with a mean age of 33.36 ± 9.37 years (range: 18–58). Among tobacco users ($n=103$), the average age of initiation was 18.84 ± 3.82 years (range: 10–28), with 57.3% starting before 18 years of age. Regarding tobacco consumption, 61.8% of smokers used six or more sticks per day, averaging 7.41 ± 4.11 sticks daily (range: 1–30; median: 6; mode: 5). For smokeless tobacco users ($n=157$), the average daily use was 11.93 ± 7.6 packets (range: 1–40), with 61.1% consuming fewer than 12 packets per day (Table 2).

Table 2. Tobacco consumption patterns of participants

Characteristics	Frequency (N= 195)	Percent (%)
Age Group		
18 -33	103	52.8
34 - 58	92	47.2
Mean \pm SD= 33.36 ± 9.37 1802 years		
Initiation age (n=103)		
< 18	59	57.3
≥18	44	42.7
Mean \pm SD= 18.84 ± 3.819 years		
Number of Sticks per day (n=103)		
Up to 5 Sticks	39	38.2
6 or more Sticks	63	61.8
Mean \pm SD= 7.4118 ± 4.108 sticks/day		
Number of Smokeless tobacco products per day (n=157)		
<12	96	61.1
≥12	61	38.9
Mean \pm SD= 11.93 ± 7.6 packet/day		

Table 3 shows that the 195 participants, 65.6% ($n=128$) had ever smoked tobacco products, while 52.8% ($n=103$) were current tobacco smokers. Regarding smokeless tobacco use, 79.5% ($n=155$) reported ever using such products, and 80.5% ($n=157$) were current users. Among current tobacco users ($n=103$), 47.2% ($n=92$) consumed both smoked and smokeless tobacco products daily, while 5.6% ($n=11$) used only one type of tobacco product.

Table 3. Prevalence of smoked and smokeless tobacco use among participants

Characteristics	Frequency (N=195)	Per cent (%)	
Ever smoked tobacco products	Yes	128	65.6
	No	67	34.4
Current tobacco smokers	Yes	103	52.8
	No	92	47.2
Ever used smokeless tobacco products	Yes	155	79.5
	No	40	20.5
Current smokeless tobacco users	Yes	157	80.5
	No	38	19.5
Tobacco product consumption - Daily (N=103)	Both of the products	92	47.2
	Either only one of the products	11	5.6

Table 4. Factors influencing smoking and smokeless tobacco use among bus drivers and staff

Causes of Tobacco Use	Frequency	Percent (%)
Smoking tobacco (n=103)		
Peer Pressure	87	85.3
Curiosity	44	43.1
Media and movies	21	20.6
Stress	10	9.8
Chewing tobacco/ smokeless tobacco (n=157)		
Improves alertness/Wakefulness	101	64.3
Peer pressure	52	33.1
Curiosity	46	29.3
Influence from family/community	29	18.5
Masticatory habit	21	13.4

Among smokers, the leading cause of tobacco use was peer pressure, reported by 85.3% of cases, followed by curiosity (43.1%), media and movies (20.6%), and stress (9.8%). For chewing tobacco or smokeless tobacco users (n=157), the most common reason was to improve alertness or wakefulness (64.3%), with peer pressure

(33.1%) and curiosity (29.3%) also significant factors. Additionally, influence from family or community (18.5%) and masticatory habit (13.4%) contributed to smokeless tobacco use, as shown in Table 4.

Among the participants, a significant association was found between age and smoking Cigarette use, with those aged 18–33 years having significantly higher odds of smoking compared to those aged 34–58 years (OR=1.881, 95% CI: 1.064-3.325; $p < 0.029$), indicating a strong and statistically significant association. Use of smokeless tobacco was significantly associated with education level, where individuals with primary education or below had higher odds compared with secondary education (OR = 2.16, 95%CI: 1.03-4.52; $p < 0.039$), indicating a strong and statistically significant association. Additionally, occupation showed a significant association with smokeless tobacco use; support staff had significant odds of smoking compared to drivers (OR = 2.245, 95%CI: 1.042-4.838; $p < 0.036$), indicating that support staff had 2.245 times higher odds compared to drivers. While Hindu religion was negatively associated with smokeless tobacco use (OR = 0.79, 95%CI: 0.73-0.85; $p < 0.047$), as represented in Table 5.

Table 5. Prevalence of tobacco use and associated factors

Variables	Smoking Cigarette		χ^2	p	OR (95% CI)
	Yes	No			
Age					
18 -33	62 (60.2%)	41 (39.8%)	4.76	0.03	1.88 (1.06, 3.33)
34 - 58	41 (44.6%)	51 (55.4%)			
Marital Status					
Unmarried	23 (62.2%)	14 (37.8%)	1.59	0.21	
Married	80 (50.6%)	78 (49.4%)			
Education					
Primary School and below (can read and write, 1-8)	56 (58.3%)	40 (41.7%)	2.31	0.13	
Secondary School (9-12)	47 (47.5%)	52 (52.5%)			
Religion					
Hindus	95 (52.8%)	85 (47.2%)	0.001	0.97	
Non-Hindus	8 (53.3%)	7 (46.7%)			
Occupation					
Driver	48 (55.8%)	38 (44.2%)	0.55	0.46	
Supporting Staff	55 (50.5%)	54(49.5%)			
Working Hours					
≤12 hrs	49 (52.7%)	44 (47.3%)	1.08	0.29	
> 12 hrs	54 (52.9%)	48 (47.1%)			
Castes					
Other Caste	71 (84.5%)	13 (15.5%)	1.51	0.22	
Upper Caste	86 (77.5%)	25 (22.5%)			
Smokeless tobacco products					
Age					
18 -33	84 (81.6%)	19 (18.4%)	0.150	0.69	

Variables	Smoking Cigarette		χ^2	p	OR (95% CI)
	Yes	No			
34 - 58	73 (79.3%)	19 (20.7%)			
Marital Status					
Unmarried	29 (78.4%)	8 (21.6%)	0.132	0.72	
Married	128 (81.0%)	30 (19.0%)			
Religion					
Hindu	142 (78.9%)	38 (21.1%)	3.931	0.047	0.79 (0.73 - 0.85)
Non-Hindus	15 (100.0%)	0 (0.0%)			
Education					
Primary School and below (can read and write, 1-8)	83 (86.5%)	13 (13.5%)	4.260	0.039	2.16(1.029 - 4.520)
Secondary School (9-12)	74 (74.7%)	25 (25.3%)			
Occupation					
Driver	75 (87.2%)	11 (12.8%)	4.39	0.035	2.245 (1.042 - 4.838)
Support staffs	82 (75.2%)	27 (24.8%)			
Working Hours					
≤12 hrs	72 (77.4%)	21 (22.6%)	1.084	0.298	
> 12hrs	85 (83.3%)	17 (16.7%)			

DISCUSSION

This study assessed the prevalence and patterns of tobacco use among public passenger vehicle drivers and staff in the Banke district of Nepal. The findings revealed alarmingly high levels of both smoked and smokeless tobacco consumption in this occupational group.

More than half of the respondents (52.8%) were current smokers, while 80.5% reported current use of smokeless tobacco. These rates are considerably higher than the national averages reported in the Nepal STEPS Survey 2019, which found the prevalence of current tobacco smoking among males to be 28% and smokeless tobacco use at 33.3% (8). The prevalence of smoking among drivers varies across different regions. This finding was quite consistent with the research done in Western Maharashtra, India (59%) (21). Nonetheless, the outcome was considerably lower than the previous research carried out in Dharan, Eastern Nepal (96.3%), and Dhaka, Bangladesh (93%) (7,22). Despite the lack of international research on this demographic, studies conducted in France (51.8%), the US (46.2%), Brazil (21.1%), Nigeria (18.9%), and South Africa (11%) have reported significant rates of tobacco usage (23–26). Drivers had a substantially greater rate of tobacco use, both smoking and smokeless, than the overall population. Although the South Asia Biobank discovered that tobacco use, both smoking and smokeless, is common among South Asian adults, Bangladesh had the highest rates (27). The elevated prevalence in this study population could be attributed to occupation-related stress, long working hours, and limited access to cessation support.

The average age of smoking initiation was 18.84 years, with over half (57.3%) initiating tobacco use before the age of 18. Other studies also show that the most significant proportion of adolescent smokers initiated between ages 12–13, with 22.8% starting at ≤9 years, 18.8% at 10–11 years, 36.8% at 12–13 years, and 21.6% at 14–15 years (28). More than half of adult smokers worldwide began between the ages of 12 and 16 (28). Early initiation not only increases the risk of long-term addiction but also points to gaps in tobacco control measures, particularly among youth and transport workers.

Peer pressure was identified as the dominant driver of tobacco smoking (85.3%), followed by curiosity and media influence. For smokeless tobacco use, staying alert during long work shifts was cited as the leading factor (64.3%), suggesting a functional reliance on tobacco for maintaining attention and wakefulness during extended driving hours. Different research provides evidence that supports the influence of peer pressure, curiosity, media and movies, and stress on drivers and other staff's smoking (7,9,15,21,29,30). These findings highlight the role of occupational demands in shaping health-risk behaviours among transport workers.

The study found statistically significant associations between age and cigarette smoking ($p=0.029$) and between educational level and smokeless tobacco use ($p=0.039$). Younger respondents (aged 18–33) were more likely to smoke, while those with lower educational attainment were more likely to use smokeless tobacco. Most educational differences in smoking behaviour emerge before age 16, with lower educational attainment linked to earlier smoking initiation and higher smoking

prevalence later in life (31,32,33). Occupation plays a key role in continued smoking and smokeless tobacco (SLT) use, with higher rates observed among manual labourers, drivers, and workers in physically demanding jobs due to occupational stress, social environment, and low education levels (34,35). Even after adjusting for socio-demographic factors, occupation remains a strong predictor of tobacco use, particularly among adults aged 25–44 years (36). These associations emphasise the importance of tailored interventions targeting younger and less-educated transport workers.

Another critical finding was that 47.2% of current users consumed both smoked and smokeless tobacco products daily, reflecting dual-use behaviour that potentially increases the health risks even further. Dual use in other manual occupations, such as construction, power-loom, and industrial work, ranges from 10–22%, while a study of male industrial workers reported 9.7% dual use (23.4% smoked only, 27.3% smokeless only), and national data from India showed dual-use prevalence falling from 9.3% in 2009–10 to 6.3% in 2016–17 (37,38). This pattern of consumption calls for comprehensive tobacco cessation programs that address both forms of tobacco use concurrently.

Current study signifies odds of using tobacco were significant among younger adults, whereas the [OR: 2(1.76-2.77)] of India were slightly higher than that of Nepal [(OR:1.88 (1.06, 3.33)] (39). The study also indicates odds of a lower level of education are directly associated with the odds of smokeless tobacco consumption, which are more prevalent in South Asia (40). The study indicated the prevalence of smokeless tobacco product consumption, and its odds were significantly higher among the occupational groups in South Asian countries (27).

This study was limited to the Banke district and focused exclusively on public passenger buses classified under the 'Kha' category; therefore, the findings may not be generalizable to the entire public transportation workforce. Future research should encompass diverse modes of public transportation and broader geographic regions across the country. To more accurately assess the burden of tobacco use among drivers and support staff personnel in the transport sector, multi-centre studies with larger sample sizes and the incorporation of biomarkers for tobacco exposure are recommended.

CONCLUSION

This study found that both cigarette smoking and the use of smokeless tobacco products were prevalent among bus drivers and support staff, with approximately three-eighths initiating tobacco use before the age of 18. More than half of the drivers and support staff in the Banke district were current users of smoked or smokeless tobacco, underscoring the significance of tobacco use

as a public health concern in this occupational group. Peer pressure, curiosity, exposure to media and movies, and occupational stress were identified as key factors contributing to tobacco use. High levels of job-related stress among drivers and support staff may predispose them to adopt harmful behaviors, including the use of tobacco in various forms. Policymakers and health organizations can provide additional opportunities to influence and eventually reduce hazardous tobacco use behaviors by targeting this population in national tobacco control initiatives and utilizing measures such as routine health screenings.

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Conflict of interest

The authors declare no conflict of interest.

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