Original Research

Prevalence and associated factors of occupational stress among bus drivers of Sri Lanka Transport Board in Colombo District

DK Illangasinghe^{1*}, MAAP Alagiyawanna¹, DBDL Samaranayake², N Fernando³

¹ Health Promotion Bureau, Ministry of Health, Sri Lanka; ² Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka; ³ General Sir John Kotelawala Defence University, Sri Lanka

*Correspondence: dhananjachami@gmail.com

<https://orcid.org/0000-0002-6162-3856>

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Abstract

Introduction: Occupational stress among bus drivers is on the rise in the world. It is of prime importance to detect the prevalence and to identify the associated factors of job stress for managing it among bus drivers in Sri Lanka.

Objectives: To determine the prevalence of occupational stress and its associated factors among bus drivers of Sri Lanka Transport Board in Colombo District

Methods: A descriptive cross-sectional study with an analytical component was carried out in Sri Lanka Transport Board depots in the district of Colombo among 631 bus drivers. The study population was selected by simple random sampling method and used the Effort Reward Imbalance-Sinhala questionnaire and other self-administered questionnaires as instruments. Associated factors with occupational stress were determined by multivariate analysis using adjusted odds ratio (aOR).

Results: The prevalence of occupational stress was 52.1% (95% CI=50.66, 53.62). The factors associated with occupational stress in multivariate analysis were current use of tobacco (aOR=9.3; 95% CI=5.71, 11.2), good alertness at the end of the day (aOR=13.2; 95% CI=9.48, 15.11), work experience ten years or less (aOR=9.8; 95% CI=8.65, 11.2), working days per week six days or more (aOR=9.72; 95% CI=5.65, 12.16) and working hours per day more than 10 hours (aOR=3.1; 95% CI=2.67, 5.1).

Conclusions & Recommendations: The prevalence of occupational stress was high among bus drivers. There were modifiable and non-modifiable associated factors for job stress. Mental health promotion programs need to be conducted at the recruitment of bus drivers.

Keywords: job stress, SLTB bus drivers, mental health promotion

Introduction

Job stress is the response people may have when presented with work demands, which is not matched to their knowledge and abilities; and challenges their ability to cope. Stress occurs in varying levels of work circumstances cutting across all the hierarchical categories (1), thus has become a key occupational risk factor in the current context (2). According to the WHO Global Burden of Disease Survey estimates, mental health disorders together with stress-related mental health conditions are considered highly predominant, which were second only to cardiac disease in terms of disabilities by year 2020 (3). In concurrence, the International Labour Organization has named occupational stress as the '21st century disease' (4). In addition, occupational stress causes a pronounced economic impact. The Health Service Executive predicted a cost of £530 million due to sickness absence due to stress, depression and anxiety perceived by the workers in 2006 (5). This recognized the salient interrelation between work and mental health (6).

Concerning bus drivers' profession, work stress plays a key role due to the nature of their work. Exposed to "everyday stress" behind the wheel is a unique dimension in a bus driver's life. Bus driving can be regarded as a classic example of high strain occupation, with increases the risks of physiological and psychological issues (7). Operating public transit vehicles is amongst the most stressful and unhealthy occupations in modern times (8). Literature over the last four decades on bus drivers shows that, as compared to workers in other jobs, bus drivers are more likely to experience cardiovascular diseases, gastrointestinal disorders and musculoskeletal disorders, while occupational stress is believed to play a significant role in causing them (9). Bus driving is particularly a stressful job, which has high psychological demands and little decision-making control, in combination with low social support. The main task of bus drivers is to drive safely and maintain a timely schedule, yet two of these tasks are inherently contradictory.

Job factors that contribute to developing stress in bus drivers are work shift schedules, irregular mealtimes

and poor nutrition, traffic congestion, prolonged driving, constant visual and mental alertness and driving during night hours in bad weather conditions (10). Report by the International Transport Workers Federation in 2013 pointed out that according to the San Francisco Bus drivers' Study which was done using both objective and subjective measurements, less than 50-year-old bus drivers were having job stress (11). In Asian culture, injurious nature of occupational stress among bus drivers has been stressed. This, in turn increases the risk of physical as well as psycho-social ailments. According to a comprehensive review of 50-year research on bus drivers' wellbeing, it revealed predisposition to poor health. Moreover, growing traffic, aggressive passengers and increasingly tight running schedules due to market competition are continuously growing threats to drivers' wellbeing (12).

Bus drivers' working conditions were studied extensively by researchers and the public transport industry due to the inherent nature of the job's unpopularity on the market, high labour turnover and early retirement caused by health problems. A review study on bus drivers' health has been carried out by compiling related literature in 50 years by Kompier and reported that more than 50% of the drivers considered their job to be very demanding, stressful and rushed; 55% and 53% of respondents named peak running times and public enquiring, respectively as the main stressors. Furthermore, 25% of bus drivers reported that schedules were so tight that safety was compromised daily. Consequently, driving a bus is considered an occupation with potential danger for health and overall wellbeing; bus drivers have higher levels of absenteeism and disabilities than other occupational groups. They more often experience psychological problems; a strong feeling of fatigue, tension, and mental overload, sleeping problems in addition to physical risks such as muscular-skeletal disorders (9). Numerous studies have shown that bus drivers worldwide suffer from various cardiovascular problems (9). However, there is a lack of evidence-based research on improving bus drivers' quality of life to mitigate their occupational stress and its potential implications. It is shown that longitudinal studies are needed with appropriate control groups,

to test the impact of reducing physical and psychological stressors on driving workforce rather than additional investigations to describe stressors (13). They also strongly recommended that bus operators would need to work together with researchers, trade unions, policymakers and co-workers to make amendments, coping with stress and strains.

There are nearly 10,000 bus drivers employed by the Sri Lanka Transport Board (SLTB) and the highest allocation was maintained in Colombo District (14). Moreover, Colombo being the commercial capital city of Sri Lanka, the urban driving environment itself causes multiple stressors to the bus drivers. Identification of the area-specific associated factors for occupational stress was elaborated in the current study, enabling future establishments of good mental wellbeing. Health-based occupational stress contributes to an increasing proportion of worker compensation claims, health care, disability, absenteeism and productivity losses (15). Additionally, acute non-infectious diseases caused by road traffic accidents were increased gradually. In 2012, total road traffic accidents of 42,145 occurred, of which 2444 people untimely died (16). For both chronic and acute NCDs, the perceived stress and lack of alertness among drivers due to occupational stress became a predominant risk factor. Therefore, it is important to focus on the prevalence of work stress and factors associated with it among Sri Lankan bus drivers, which would ultimately help to manage their stress levels.

Methods

A descriptive cross-sectional study was performed among 631 SLTB bus drivers in the Colombo district covering 12 depots from January to March 2019. Professional full-time bus drivers attached to SLTB in the preceding six months were recruited. Bus drivers who were engaged in temporary or emergency services and in luxury fleets and those who had been already diagnosed as suffering from mental illness were excluded. The sample size was calculated using the formula for the total sample size required for a cross-sectional analytical study and the

sample size required per group was calculated by comparing dichotomous variable proportions (17) based on previous prevalence of job stress (34.1%), two-sided α of 0.05 and a power of 80%. Total sample size calculated was 631 after an allowance of 10% for non-respondents. A simple random sampling method was used to select the sample from sampling frame comprising the name register of 1271 drivers with their salary number available for each of the 12 depots. These compiled names were listed according to the alphabetical order to minimise selection bias, from which random numbers were drawn from a table of random numbers.

The Effort-Reward Imbalance questionnaire was administered to detect the prevalence of occupational stress (18). It showed good psychometric properties and assessed the stress levels in terms of high efforts, high over-commitment and low rewards. Since this tool has been validated for the local context (19) for administrative officers, only judgmental validity was performed to assess its suitability to the driver community in this study. The prevalence of occupational stress was assessed using the imbalance of Effort-Reward Ratio. Value of more than 1 was considered as positive for job strain. Another self-administered questionnaire (SAQ) was developed and judgmentally validated to assess the socio-demographic and associated factors for work stress, such as family related (e.g., number of children, time spent with family), economic related (e.g., monthly income, loan repayments), health and life style related (e.g., tobacco and alcohol consumption, chronic non communicable diseases), work life related (e.g., work experience, working hours per day) factors and perception on driving performance, and environment related factors (e.g., difficulties faced inside and outside the bus). Both questionnaires were self-administered in Sinhala version simultaneously.

Data collection was done by the principal investigator with the assistance of three pre-intern medical graduates who were recruited as field assistants. With the permission of all relevant officials, appointments were obtained to conduct the data collection. According to the pre-listed sampling

frame, bus drivers were selected for the study on the first visit to the depots.

Data analysis

Data entry and statistical analysis were carried out using Software Package for Social Sciences (SPSS) version 24.0. Socio-demographic characteristics of the bus drivers were described using frequency distributions and percentages. Associated factors for occupational stress were evaluated by bivariate and multivariable analysis. Multivariable analysis was performed to identify adjusted odds ratio (aOR). P value of less than 0.05 was considered as the level statistically significant. The dependent variable was the presence/absence of occupational stress. Independent variables were those showing statistical significance at $p < 0.05$ in the bivariate analysis. Model fit was depicted by insignificant Hosmer-Lemeshow Test ($p > 0.05$) and significant Omnibus test ($p < 0.05$).

Results

The overall response rate was 99.8% ($n=630$). All the drivers were males. Majority were in the 41-50-year age group ($n=273$; 43.3%) followed by 31-40-year age group ($n=224$; 35.6%). A large majority of the drivers were Sinhalese ($n=589$; 93.5%) and were current users of tobacco ($n=361$; 99.8%). Out of this, 57 (9%) drivers used only smokeless tobacco (e.g., betel chewing with tobacco leaves). At the end of the day, only 21 (3.3%) had good concentration (perceived alertness by the driver himself). Approximately one-third of the drivers ($n=209$, 33.7%) worked as professional bus drivers (as a bus driver on permanent basis at SLTB) for more than 10 years. Almost half of the drivers worked six days per week ($n=345$; 54.9%). A proportion of 83.3% ($n=525$) of the drivers worked for 11-14 hours per day (Tables 1 and 2).

The prevalence of occupational stress among drivers was 52.1% (95% CI=50.66, 53.62). In univariate analysis, work factors such as working overtime, shift patterns and running hours were associated with job stress. Working six days or more per week

($p < 0.001$), frequent driving hours after 5am-5pm ($p < 0.001$), working 10 hours or more per day ($p < 0.001$) and having shift duty ($p < 0.001$) showed statistically significant factors for occupational stress. Many among these factors were found to be significant in multivariate analysis.

In the multivariate analysis, five factors were statistically significant after adjusting for confounding factors, namely current tobacco use (aOR=9.3; 95% CI=5.71, 11.2; $p=0.02$), good concentration and alertness at the end of the day (aOR=13.2; 95% CI=9.48, 15.11; $p=0.015$), work experience for 10 years and less (aOR=9.8; 95% CI=8.65, 11.2; $p=0.011$), working for 6 days and more per week (aOR=9.72; 95% CI=5.65, 12.16; $p=0.012$) and working for more than 10 hours per day (aOR=3.1; 95% CI=2.67, 5.1; $p=0.027$) (Table 3).

Discussion

The prevalence of overall occupational stress among SLTB bus drivers in Colombo District was considerably high (52.1%; 95% CI=50.66, 53.62). It indicates the need for the attention of public transport authorities for preventive interventions. Hence, real advocacy needs to be advocated on prompt implementation of preventive strategies urgently. In comparison, the estimated prevalence of occupational stress among bus drivers was 34% at Maharagama Municipal Council Area, which is part of the district of Colombo (20). However, in this study, the assessment of job stress was done using JCQ (Job Content Questionnaire), which can lead to differences in the prevalence. Occupational stress among bus drivers has been studied comprehensively in other countries, though only a few are meaningfully comparable to the current study, given that they have used the same tool, ERI, to assess occupational stress. Despite this, the main obstacle of comparison was that many studies on bus drivers' psychology belonged to Western countries rather than in Asian culture.

Current tobacco users showed almost 10 (adjusted OR=9.6) times higher occupational stress than non-smokers in this study. Similarly, Bangladesh, Dhaka

Table 1: Distribution of the bus drivers by socio-demographic characteristics (N=630)

Socio-demographic characteristic	No.	%
Age in completed years		
20-30	17	2.7
31-40	224	35.6
41-50	273	43.3
51-60	116	18.4
Ethnicity		
Sinhala	589	93.5
Tamil	18	2.9
Muslim	21	3.3
Burger	2	0.3
Religion		
Buddhist	545	86.5
Hindu	18	2.9
Islam	21	3.3
Roman Catholic	1	0.2
Christian	45	7.1
Highest level of education		
Grade 1-11	104	16.5
Passed GCE Ordinary Level	456	72.4
Passed GCE Advanced Level	70	11.1
Household living status while working		
At own house with family	520	82.5
At a rented house with family	5	0.8
At a relative's place without family	5	0.8
At a boarding house without family	92	14.6
At another place without family	8	1.3

GCE = General Certificate of Education

City bus drivers had an overall prevalence of 93% of tobacco smoking (21) and nicotine dependence on tobacco and smokeless tobacco with job stress among Bangalore cities, India, and public transit workers elicited a significant association ($p=0.035$).

Work-related factors such as working overtime, working shifts, tight running times, running late, time pressure, shift patterns were found to be associated stress factors experienced in bus drivers globally (13, 22-25) in concurrence with the findings of present study. Different results were shown among Brazilian company bus drivers. (26) revealed that working experience of more than 10 years had a significant association with job stress ($OR=6.11$; $95\% CI=2.43, 15.38$; $p<0.01$). This different finding may be due to

the company's monotonous work environment causing stress among older groups. This study elaborated that the drivers who maintained good alertness till the end of the day experienced more stress (52.1%) than those who did not. This fact was supported by the results of another study on stress, fatigue, health and risk of road traffic accidents among professional drivers, in which drivers having good alertness and free of fatigue were found to be stressed (27).

Strengths and limitations of the study

The ERI has been used in many studies worldwide to assess work stress among various occupational

Table 2: Distribution of the bus drivers by factors related to work-life (N=630)

Characteristic	No.	%
Distance to the depot		
Less than 1 km	132	20.9
1-5 km	38	6.03
6-10 km	73	11.6
11-20 km	387	61.4
Frequency of home visits (n=105)		
Weekly	10	9.5
Fortnightly	98	93.3
Monthly	6	5.7
Work experience		
Less than a year	60	9.5
1-3 years	234	37.1
4-6 years	71	11.3
7-10 years	56	8.9
More than 10 years	209	33.2
Shift duty		
Yes	354	56.2
No	276	43.8
Night shifts (n=354)		
No	184	51.9
Yes	170	48.1
Weekly night shifts (n=170)		
Once	60	35.3
2-3 times	100	58.8
4-6 times	10	5.9
Working days per week		
1-3 days	85	13.4
4-5 days	100	15.9
6 days	345	54.8
7 days	100	15.9
Working hours per day		
Less than 8 hours	40	6.3
8-10 hours	65	10.3
11-12 hours	142	22.5
13-14 hours	285	45.2
More than 14 hours	98	15.6
Frequent driving hours		
After 5 am till 12 noon	317	50.3
After 12 noon till 5 pm	37	5.9
After 5 pm till 12 midnight	171	27.1
After 12 midnight till 5 am	105	16.7

Table 3: Summary of the associated factors of occupational stress in the logistic regression model

Characteristic	Unadjusted OR (95% CI)	p value
Age ≤40 years	1.29 (1.16, 2.23)	0.004
Living with family	3.27 (2.08, 5.18)	<0.001
Other marital status	2.68 (1.89, 6.27)	<0.001
Earning spouse	2.74 (1.31, 3.8)	0.002
≤SLR 40,000*	1.89 (1.36, 2.63)	<0.001
Obtained financial aid	2.90 (1.91, 4.41)	<0.001
Presence of NCDs**	2.26 (1.45, 3.51)	<0.001
Current users of tobacco	11.19 (7.56, 16.07)	<0.001
Current users of alcohol	2.2 (1.6, 3.03)	<0.001
Inadequate sleep	2.17 (1.57, 2.99)	<0.001
Distance to the depot >10 km	2.10 (1.52, 2.92)	<0.001
Work experience ≤10 years	7.19 (4.89, 10.57)	<0.001
Having shift duty	2.11 (1.54, 2.91)	<0.001
Working days per week ≥6 days	11.6 (7.41, 18.16)	<0.001
Working hours per day >10 hrs	3.28 (2.08, 5.18)	<0.001
Frequent driving hours after 5 am till 5 pm	2.11 (1.54, 2.91)	<0.001
Good alertness at the end of the day	15.5 (7.09, 30.42)	<0.001

* Sri Lankan rupees; ** Non communicable diseases

groups including among bus drivers. Many countries have their validated versions. As it is also validated in Sri Lanka, it could be considered a valid indicator among drivers. Also, SAQs were created according to both qualitative and quantitative methods, thus, external validity is retained. All possible biases including confounding bias were identified and measures were taken to address them in the study design and analysis. The non-response rate was very low, and this along with representative sampling enabled generalizing the results to all SLTB bus drivers.

The present study was carried out among SLTB bus drivers who belonged to the government sector. Hence, the findings cannot be generalized to private bus drivers. Also, validation of the cut-off values of ERI score has not been decided through a criterion validity process due to the absence of gold standard clinical diagnostic criteria for occupational stress according to either ICD-10 or ICD-11 classifications. Hence, a degree of misclassification may have resulted. The present study identified factors associated with occupational stress through a cross-

sectional analytical study design, thus temporal relationships of the associated factors could not be determined.

Conclusions & Recommendations

The study revealed that the prevalence of occupational stress was 52.1% (95% CI=50.66, 53.62) measured through ER Ratio among SLTB bus drivers in Colombo District. The study identified several factors associated with occupational stress among them when controlled for confounding effects. Of the modifiable factors, person-related factors associated with occupational stress were tobacco usage, while the work-life-related factors were working more than 10 hours per day and working more than six days per week. Work experience less than 10 years was a non-modifiable factor for job stress. Being alert at the end of the day with good concentration was also a significant factor for work stress.

The observed high prevalence of occupational stress warrants accessible and confidential mental health

services to be established to provide psychosocial support for the SLTB bus drivers. The present study results should be used to advocate such mental well-being programs as a capacity building session when recruiting drivers by the Ministry of Transport and SLTB. A routine health screening system for primordial prevention of non-communicable diseases among bus drivers is highlighted in the current findings. It is of prime importance to have an annual health check-up at the institutional level, which would be in line with healthy lifestyle centres. In organizational level (depot wise), healthy suitable working rosters can be maintained to avoid irreversible burnout from work stress, such as to manage overburdened working days, hours and running time.

Public Health Implications

- Unaddressed job strain can end up with burnout, a “syndrome” that result from “chronic workplace stress which has not been successfully managed, (ICD-11). Occupational diseases are also emerging as a public health concern in the country.
- Associated factors for job strain such as tobacco use and alcohol consumption which directly or indirectly cause non-communicable diseases and road traffic accidents, emerged as the triple burden of diseases leading to even more high morbidity, mortality and disability rates in Sri Lanka. This finding implies room to consider the importance of mental well-being in this professional group.

Authors Declarations

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