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Prevalence and Factors Associated with Excessive Daytime Sleepiness among Long-Distance Bus Drivers: A Cross-Sectional Study in Dar es Salaam, Tanzania

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Abstract

Background: Excessive Daytime Sleepiness (EDS) is a prevalent sleep disorder that is associated with considerable health hazards and an elevated risk of Road Traffic Accidents (RTA). Commercial drivers are especially vulnerable due to their lengthy driving hours and unpredictable sleep patterns. This aimed to determine prevalence of EDS and its factors among long-distance bus drivers at the Ubungo Bus Terminal (UBT) in Dar es Salaam, Tanzania

Methodology: A cross-sectional descriptive study was undertaken at UBT with 250 consenting long-distance bus drivers. Structured questionnaires, the Epworth Sleepiness Scale (ESS), clinical and anthropometric assessments, and random blood glucose monitoring were used to collect information. EDS characterized as an ESS score of ≥9. Data was analyzed using SPSS version 25.0 and $p<0.05$ was considered statistically significant.

Results: The average age of participants was 43.5 ± 8.6 years, with 99% being male. The prevalence of EDS was 46.8% (117/250). Individuals with EDS had similar clinical and anthropometric characteristics as those without EDS, with the exception of neck circumference, which was borderline significant ($p=0.05$). EDS and non-EDS participants shared similar substance use tendencies (alcohol, khat, cannabis, and cigarettes). Drivers with EDS had considerably higher rates of major accidents (0.68 vs. 0.46, $p=0.04$), while rates of minor accidents were comparable.

Conclusion: EDS is extremely common among long-distance bus drivers in Dar es Salaam and is linked to an increased risk of catastrophic road traffic incidents. Screening for EDS is necessary, as is the implementation of preventive methods such as driving laws and health promotion initiatives.

Keywords: Excessive Daytime Sleepiness, Long-Distance Bus Drivers, Road Traffic Accidents, the Epworth Sleepiness Scale, Tanzania

INTRODUCTION

EDS is characterized as a diminished ability to remain awake and alert throughout regular daylight hours, resulting in drowsiness or sleep. EDS significantly reduces the quality of life for affected patients. It is characterized by persistent tiredness and often a general lack of energy, even after seemingly enough or even extensive nighttime sleep. Excessive daytime drowsiness is a major public health issue,

with a community prevalence of up to 18%. Sleepiness is the result of insufficient or poor sleep quality. Among others, many neurological, psychiatric, cardiac, and pulmonary problems may contribute (1).
Worldwide excessive daytime sleeping is a problem affecting both developed and developing countries. Excessive daytime drowsiness is one of the most frequent sleep-related patient symptoms, affecting an estimated 20 percent of the population in the United States despite its well-established infrastructure and high level of science and technology (2). Excessive daytime sleepiness increases the likelihood of motor vehicle and work-related mishaps, as well as poorer health, compared to other individuals. The most prevalent causes of excessive daytime sleepiness include sleep loss, obstructive sleep apnea, and sedative drugs. Certain medical and mental illnesses, as well as sleep disorders like narcolepsy, may also contribute to excessive daytime sleepiness.
Obstructive sleep apnea is a leading cause of excessive daytime sleepiness. Obstructive Sleep Apnea (OSA) is a significant breathing disorder that disrupts sleep. Obstructive sleep apnea causes short pauses in breathing while sleeping. These breathing pauses, known as apneas or apnea episodes, often last 10 to 30 seconds but may last longer. People with obstructive sleep apnea may stop breathing dozens or hundreds of times per night (3). If not treated, sleep apnea can lead to major health problems, accidents, and early death. There are numerous factors that increase the risk of developing obstructive sleep apnea. For example, the prevalence of obstructive sleep apnea rises from 18 to 45 years of age, and then plateaus between 55 and 65 years of age. Approximately 4% of women and 9% of men suffer from obstructive sleep apnea (4).
The occupational dangers associated with OSA and EDS in commercial drivers are particularly noteworthy because the risk extends not only to the drivers themselves, but also to third parties such as passengers and other road users. Pack et al. found that commercial drivers with OSA experienced significant drowsiness and reduced driving performance (5). Simulated driving trials have also showed decreased steering abilities in persons with OSA compared to controls, with patients with OSA wandering more frequently from the road and having delayed responses to distractions (6,7). Because little is known about Excessive Daytime Sleepiness (EDS) in Tanzania, the current study sought to determine the prevalence of EDS and its associated characteristics among long-distance bus drivers at the Ubungo Bus Terminal (UBT) in Dar es Salaam, Tanzania, as well as its relationship to traffic accidents.

METHODOLOGY

Study area and circumstances.

Ubungo bus station is located in Ubungo ward, Kinondoni district, Dar es Salaam, Tanzania. It is 8 kilometers from the city core. Because of its enormous bus terminal, it is well-known throughout Tanzania as one of the primary transit hubs. It acts as a transportation link for the majority. Tanzanian urban areas include Iringa, Mbeya, Mwanza, Mtwara, Lusaka, Lilongwe, Nairobi, and numerous East African cities. Every day, around 260 buses depart and 150 arrive at the bus terminal.

Study design and population

A cross-sectional descriptive study was conducted to investigate the prevalence of EDS and related variables among long-distance bus drivers. During the study period, all consented long-distance bus drivers at Ubungo bus terminal aged ≥ 18 years were included. Drivers who drove less than 500 km from UBT and those who refused to participate were excluded.

Sample Size and Sampling Procedure

The sample size was determined using a single population proportion formula with finite population adjustment, with a 14% prevalence, 95% confidence level (Z = 1.96), and 4% margin of error. Based on a total population of 600 registered bus drivers, the minimum sample size was 224 people.

A successive sampling procedure was employed to choose eligible drivers from the association registration until the sample size was reached. Prior to participation, participants provided written informed consent. Socio-demographic factors and clinical measures were among the information gathered. After at least five minutes of rest, blood pressure and pulse rate were taken using a calibrated Omron digital monitor, as per usual procedures.

Data collection tools & methods

A standardized questionnaire, a digital blood pressure machine, a digital weighing scale, a height rod, and a non-elastic or flexible measuring tape were all necessary for the study.

Data was collected using a structured questionnaire as well as the validated Epworth Sleepiness Scale questionnaire. The questionnaires were translated into Swahili (East Africa's language), filled out, and then back-translated into English to preserve the intended meaning.

After at least five minutes of rest, the patient's blood pressure and pulse rate were monitored with a commercially accessible, well-calibrated Omron digital blood pressure machine while reclining. Body weight was measured using an Omron digital weighing scale with no shoes and only light clothing. Meter rods were used to measure height, and body mass index (kg/m^2) was determined by dividing weight by height. The neck circumference (NC) was measured at the cricothyroid membrane with a non-elastic or flexible measuring tape. The waist circumference was measured halfway between the lower rib cage margin and the anterior superior iliac spine. Truncal obesity is defined as a waist circumference of more than 102 cm for men and 88 cm for women (8).

No regular laboratory results are useful in confirming excessive daytime sleepiness. Blood was drawn from the tip of the finger, and a random spot blood glucose test was performed using a BETACHEK G5.

Data Processing and Analysis

Pre-coded data were entered into a computer using Microsoft Excel, and statistical analysis was performed using the Statistical Package for Social Sciences software (SPSS) version 25.0 after appropriate consistency and discrepancy checks.

The lead investigator analyzed the cleaned and confirmed data in cooperation with a trained statistician and calculated the appropriate statistics. Continuous data were summarized as mean ± SD or median (range), whereas categorical variables were expressed as proportions (n). For categorical variables, the independent t-test, chi-squared, and Fisher's exact test were used to compare groups. A regression analysis was conducted to identify predictors of excessive daytime sleepiness. A probability of $p < 0.05$ will be considered statistically significant.

RESULTS

Baseline characteristics of study participants

The socio-demographic characteristics of the study participants are shown in Table 1. Overall, males comprised 99% (249/250) of the sample. A majority (44%) of the study participants were in the age range of 37-47 years. We also noted that 71% of study participants had primary-level education and 77% were married.

Table 1: Social demographic characteristics of 250 long distance bus drivers working at Ubungo Bus Terminal.(N=250)

Character	Frequency (n)	Percent (%)
***Age (years)**		
26 to 36	60	24
37 to 47	110	44
48 to 58	68	27.2
More than 58	12	4.8
Sex		
Male	249	99.6
Female	1	0.4
Education level		
No formal education	7	2.8
Primary education level	177	70.8
Secondary education level	51	20.4
Vocation training	11	4.4
University	4	1.6
Marital status		
Single	15	6
Married	193	77.2
Cohabiting	31	12.4
Divorced	6	2.4
Widowed	5	2

*The mean age was found to be 43.5 (SD=8.6), Minimum of 29 years and Maximum of 69years.

Prevalence of excessive daytime sleepiness among long-distance bus drivers at Ubungo Bus Terminal.

The overall excessive daytime sleepiness prevalence among long-distance bus drivers working at Ubungo bus terminal was 46.8% (117/250); 108 (43.2%) bus drivers had an average sleep**,** and 25 (10.0%) bus drivers had enough sleep, as shown in Figure 1 below.

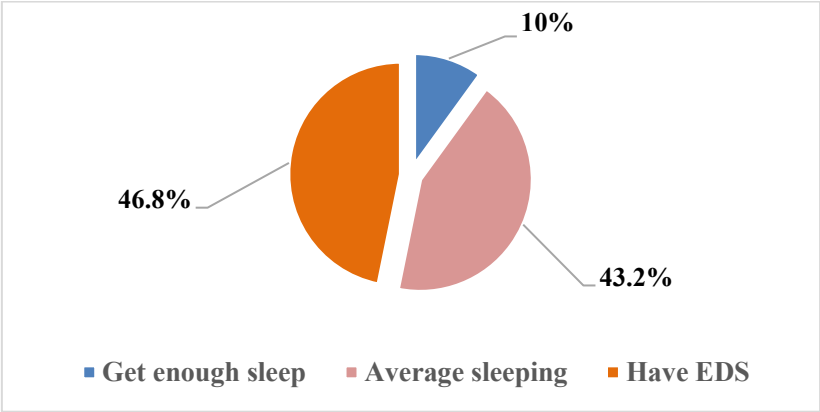

Figure 1: Pie chart showing distribution of Excessive day sleepiness (n=250)

The relationship between Excessive Daytime Sleepiness and Socio-demographic characteristics

There was no significant relationship between excessive daytime sleepiness and socio-demographic characteristics; Married and cohabiting drivers had relative more Excessive Daytime sleepiness as compared to single drivers. As shown in table 2

Table 2: Participants with EDS displayed similar socio-demographic characteristics to those without EDS,

Character	No EDS	Have EDS	*p-value*
Age (years)			
26 to 36	26 (43.3)	34 (56.7)	
37 to 47	64 (58.2)	46 (41.8)	***0.312***
48 to 58	36 (52.9)	32 (47.1)	
More than 58	7 (58.3)	5 (41.7)	
Education level			
No formal education	3 (50)	3 (50)	
Primary education level	96 (53.9)	82 (46.1)	
Secondary education level	27 (52.9)	24 (47.1)	***0.853***
Vocation training	6(54.5)	5 (45.5)	
University	1 (25)	3 (75)	
Marital status			
Single	11(73.3)	4 (26.7)	
Married	101(52.3)	92 (47.7)	
Cohabiting	16 (51.6)	15 (48.4)	***0.574***
Divorced	3 (50)	3 (50)	
Widowed	2 (40)	3 (60)	

Distribution of excessive daytime sleepiness with clinical and anthropometric measurements.

Participants with EDS had similar clinical and anthropometric measurements, including pulse rate, blood pressure, waist circumference, and overall obesity status, compared to their counterparts without EDS. Neck circumference, however, produced borderline results, i.e., p=0.05, as shown in Table 3.

Table 3: Distribution of EDS with Clinical and Anthropometric measurements

Character	No EDS	Have EDS	*p-value*
Pulse rate			
Normal	115 (53.7)	99 (46.3)	
Raised pulse rate (>100b/min)	18(50)	18 (50)	***0.68***
Blood pressure			
Normal	63 (58.3)	45 (41.7)	
Raised (>140/90mmHg)	70 (49.3)	72 (50.7)	***0.156***
Waist circumference (cm)			
Normal	87 (56.1)	68 (43.9)	
Trunk obesity (>102cm)	46 (48.4)	49 (51.6)	***0.236***

Neck circumference (cm)			
Normal	126 (55.0)	103 (45.0)	
Raised values (>43cm)	7 (33.3)	14 (66.7)	***0.05***
Obese status			
Normal	77 (53.1)	68 (46.9)	
Obese (BMI>30kg/m2)	56 (53.3)	49 (46.7)	***0.971***

Note: All the blood sugar values were in the normal range

Excessive Daytime Sleepiness with history of substance use

Regarding the use of psychoactive substances, including cigarettes, khat, cannabis, and alcohol, the EDS and EDS-free participants displayed a similar pattern, as shown in Table 4.

Table 4: Distribution of EDS with history of substance use (n=250)

Item	No Have EDS	Have EDS	*p-value*
Cigarette use			
*Never	46 (58.2)	33 (41.8)	
Yes, but quit	34 (50)	34 (50)	***0.32*** ***0.37***
Yes, still smoking	53 (51.5)	50 (48.5)	
Khat use			
*Never	86 (56.2)	67(43.8)	
Yes, but quit	40 (47.6)	44 (52.4)	***0.20*** ***0.87***
Yes, still using	7 (53.8)	6 (46.2)	
Cannabis use			
*Never	38 (57.6)	28(42.4)	
Yes, but quit	30 (57.7)	22 (42.3)	***0.99*** ***0.27***
Yes, still using	65(49.2)	67(50.7)	
Alcohol use			
*Never	84 (56.4)	65 (43.6)	
Yes, but quit	45 (50.0)	45 (36.4)	***0.34*** ***0.20***
Yes, still using	4 (36.4)	7 (63.6)	

*Represent reference group

Rates of accidents among drivers with EDS and without

While participants had similar rates of minor accidents regardless of their EDS status, those with EDS had significantly higher rates of major accidents compared to their counterparts without EDS, p=0.04, as shown in table 5.

Table 5: Comparisons of rate of accidents among EDS drivers and drivers without EDS

	Mean rate of minor accident	Mean rate of major accident
Have EDS	0.74	0.68
Don't have EDS	0.62	0.46
***p*-Value**	0.507	**0.04**

DISCUSSION

In the current study, the prevalence of EDS was 46.8%. Similarly a study conducted in Brazil on Excessive Daytime Sleepiness and its associated factors among male driver had prevalence of 39.9% which is relative bit lower compared to the current study, and EDS was influenced by being aged between 41 to 60 years, anxiety and long working hours (9). Unlike another study conducted in Peru on factors associated with Excessive Daytime Sleepiness to the informal bus drivers of high altitude road found relative low prevalence of EDS (27.8%) which were influenced by overweight, obesity and having more than ten years working experience (10).

The current study found no significant relationship between the socio-demographic characteristics with Excessive Daytime Sleepiness. Unlike another study on Excessive Daytime Sleepiness found that; break time, driving fatigue, depressive symptom, subjective sleep quality, physical, and mental health and driving risks to have an association with Excessive Daytime Sleepiness (11).

In terms of anthropometric measurements, the current study indicated that EDS rates were identical regardless of waist circumference, neck circumference, or overall obesity status. In previous study found that the EDS was influenced by anthropometric measurement such as Obesity, overweight, and other factors such as hypertension, co-morbidity, and being old (12).

Present study found that EDS with Clinical and Anthropometric measurements had no significant relationship except for the neck circumference showed that drivers with raised value of neck circumference >43cm had Excessive Daytime Sleepiness. Unlike a study conducted in Brazil on Daytime Sleepiness and attention in city drivers found small neck circumference and there was correlation in Daytime Sleepiness with the Body Mass Index and the Age (13).

Current study found that there were no significant relationship between drivers who were using substance abuse and the Excessive Daytime Sleepiness. A previous study on sleeping quality and associated factors found that alcohol consumption, working night shift, being married and not exercising were linkage to poor sleeping quality (14). Despite having similar rates of small accidents, drivers with EDS had much higher rates of severe accidents (accidents in which a passenger is injured or killed and the vehicle is damaged) than those without EDS.

Strength and Limitation

The study's strength was a high response rate, but its limitation was that it was descriptive, so no causal relationships can be made, and it was conducted at one center, so it can't be generalized to all Tanzanian bus drivers.

Conclusion and Recommendations

This study discovered that long-distance bus drivers in Dar es Salaam, Tanzania, had a significant prevalence of excessive daytime sleepiness (EDS) (46.8%). Psychoactive substance use trends were comparable across drivers with and without EDS. However, EDS was significantly connected with

serious road traffic incidents, including injuries and vehicle damage, indicating that it is an important and changeable risk factor.

Commercial drivers should be routinely screened for sleep issues using simple techniques such as the Epworth Sleepiness Scale (ESS). Policymakers should tighten and implement road safety standards, including screening for sleep problems and psychoactive substance usage. More research is required to better understand the influence of sleep disorders on road safety in Tanzania and other countries.

Abbreviations

EDS Excessive Daytime Sleepiness, **ESS** Epworth Sleepiness Scale, **NC** Neck Circumference, **OSA** Obstructive Sleep Apnea, and **UBT** Ubungo Bus Terminal

Ethical consideration and consent

The researcher sought ethical clearance and permission from MUHAS's ethics committee. Permission to conduct the study was sought from Kinondoni municipality, Ubungo administrative council, Tanzania Bus and Truck, and International Drivers Association. Prior to being included in the study, all study participants provided verbal and written agreement to participate in the interviews, clinical, and anthropometric testing. The results of the participants were relayed to the lead investigator, and those who had concerns were treated appropriately. The confidentiality of all information obtained from respondents was protected by properly and securely archiving the questionnaires. Participants who were determined to have risk factors for OSA, hypertension, or diabetes were advised and directed to appropriate healthcare facilities. They were instructed appropriately regarding treatment.

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References

1. Jacobs G, Astrop A. Estimating global road fatalities. Vol. 445, Methods. TRL Limited; 1999.
2. Colten H, Altevogt BBM, Colten. H. Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem. Colten HR, Altevogt BM, editors. Committee on Sleep Medicine and Research. The National Academies Press; 2006.
3. Morgenthaler TI, Kagramanov V, Hanak V, Decker PA. Complex sleep apnea syndrome: is it a unique clinical syndrome? Sleep. 2006;29(9):1203–9.
4. Young T, Skatrud J, Peppard PE. Risk factors for obstructive sleep apnea in adults. JAMA. 2004;291(16):2013–6.
5. Pack AI, Maislin G, Staley B, Pack FM, Rogers WC, George CFP, et al. Impaired performance in commercial drivers: role of sleep apnea and short sleep duration. Am J Respir Crit Care Med. 2006;174(4):446–54.

6. George CF, Boudreau AC, Smiley A. Simulated driving performance in patients with obstructive sleep apnea. Am J Respir Crit Care Med. 1996;154(1):175–81.
7. Juniper M, Hack M a, George CF, Davies RJ, Stradling JR. Steering simulation performance in patients with obstructive sleep apnoea and matched control subjects. Eur Respir J. 2000;15(3):590–5.
8. Ohayon MM, Roth T. Prevalence of restless legs syndrome and periodic limb movement disorder in the general population. J Psychosom Res. 2002;53(1):547–54.
9. Canevari R, Maria S, Campos F, André A, Duarte F. Excessive Daytime Sleepiness and Its Associated Factors Among Male Road Transport Workers in Brazil. 2025;1–9.
10. Julio R, Olarte H. Factors associated with excessive daytime sleepiness in informal drivers of buses on a high-altitude road. 2022;15(Special 1):143–8.
11. Ahn YH, Lee S, Kim SR, Lim J, Park SJ, Kwon S, et al. Factors associated with different levels of daytime sleepiness among Korean construction drivers : a cross-sectional study. 2021;1–12.
12. Perales, Ria Sophia B. and Herman Melvin P. Sirilan. Obstructive Sleep Apnea and Excessive Daytime Sleepiness Among Long-Distance Bus Drivers in Iloilo Province : A Cross Sectional Study. 2025;40(2):8–13.
13. D.BrasilSantosa,∗, L.Gonc¸alvesBittencourtb, C.A.deAssisViegasb,♦ EG. Daytime sleepiness and attention in city bus drivers of two capitals of Brazil ☪. 2013;19(4):152–6.
14. Chaiard J, Deeluea J, Suksatit B, Songkham W. Factors associated with sleep quality of Thai intercity bus drivers. 2019;596–603.