PREVALENCE OF EXCESSIVE DAYTIME SLEEPINESS AND ITS ASSOCIATED FACTORS AMONG LONG DISTANCE BUS DRIVERS IN DAR-ES-SALAAM, TANZANIA

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By

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A dissertation Submitted in (partial) Fulfillment of the Requirements for the Degree of Master of Medicine in Internal Medicine of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that they have read and hereby recommend for acceptance by `Muhimbili University of Health and Allied Health Sciences a dissertation entitled: ***Prevalence of Excessive Daytime Sleepiness and its Associated Factors Among long Distance Bus Drivers in Dar-es-salaam,*** in (partial) fulfillment of the requirements for award of the degree of Master of Medicine in Internal Medicine of the Muhimbili University of Health and Allied Health Sciences (MUHAS).

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Prof. Stephen M. Humphrey

Date_____

_____

Dr. Pascal Rugajjo

Date_____

DECLARATION AND COPYRIGHT

I, **Dr. Faith Melchiory Kundy**, declare that this **dissertation** proposal is my own original work and that, it has not been presented, and will not be presented, to any other university for a similar or any other degree award, and is not previously or currently under copyright.

Signature…… **Date**……

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DEDICATION

This dissertation is dedicated to my beloved parents, Dr& Mrs. Melchiory Kundy for their love, guidance and for laying an excellent foundation which made the person I am today and to my precious daughter, Gwantwa Evelyn Meshack Mwakyambiki, you are my life air.

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ABSTRACT

Background: There has been a steady rise in the prevalence of disordered sleep in the developing world. This has far reaching consequences like elevated cardiovascular and cerebrovascular mortality. However, the associated day time hypersomnolence may have a more direct impact upon mission dedicated workers like pilots and occupational drivers (e.g. public transport and long distance drivers). The prevalence of disordered sleeping among bus drivers in Tanzania remains unknown and needs to be researched.

Aim: To assess the prevalence of excessive daytime sleepiness (EDS) and its associated factors among long distance bus drivers in Dar-es-salaam

Material and Methods:

This was a descriptive cross sectional study whereby 250 eligible study subjects were recruited consecutively using a simple random sampling. Study population includes all long bus drivers who were willing to participate in the study and were interviewed at Ubungo bus terminal in Dar es Salaam .The EPWORTH SLEEPINESS SCALE was be used to asses daytime sleepiness.

R**esults**: Overall, 99% (249/250) of the drivers were male. 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. The prevalence of excessive day time sleepiness among long distance bus driver at Ubungo Bus Terminal was 46.8% (117/250), 43.2% (108/250) of the bus drivers had an average sleep**,** and 10% (25/250)of drivers had enough sleep. There was no statistical difference between those with and without excessive day time sleepiness in terms of age ranges, education level or marital status. There was no relationship between excessive day time sleepiness and clinical measurements namely pulse rate, blood pressure, blood sugar (all were in normal range). Neck circumferences however were found to be statistically significantly associated with excessive day time sleepiness. The use of psychoactive substances including cigarettes, khat, cannabis, and alcohol was not significantly different between drivers with EDS and those who were EDS-free. 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.

In conclusion: This study shows that the prevalence of daytime sleepiness is substantially high (46.8%) among the long distance bus drivers in Dar es Salaam Tanzania. Overall psychoactive substance use, especially cannabis and cigarettes, was rampant among long distance bus drivers, however it was stimulant (khat) and depressant(alcohol) use which was found to associate with excessive day time sleepiness. We also found that major accidents (injury to driver/passengers and substantial damage to the vehicle) correlated with EDS.

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LIST OF ABBREVIATIONS AND ACRONYMS

BMI	Body mass index.
CRP	C reactive protein
CPAP	Continuous positive airway pressure
EDS	Excessive day time sleepiness.
INH	Intermittent nocturnal hypoxemia
MTA	Motor Traffic Accident
NREM	Non Rapid Eye Movement.
OSA	Obstructive sleep apnea
OSAH/	Hypoapnea Obstructive sleep.
PLMD	*Periodic Limb Movement Disorder (PLMD)*
RTA	*Road Traffic Accident*.
REM	Rapid eye movement.
RLS	Restless Legs Syndrome
SBD	Sleep breathing disorder.
UBT	Ubungo Bus Terminal.

OPERATIONAL DEFINITION OF KEY TERMS

Excessive day sleepiness is defined in the international classification of sleep disorders (ICSD) based on behavior of unintentionally falling sleep or difficulty maintaining alertness or wakefulness.

Obstructive sleep apnea syndrome is a clinical disorder marked by frequent pauses in breathing during sleep usually accompanied by loud snoring.

Apnea is defined as the cessation of airflow for at least 10 seconds.

Hypopnea is defined as a recognizable transient reduction (but not complete cessation) of breathing for 10 seconds or longer, a decrease of greater than 50% in the amplitude of a validated measure of breathing, or a reduction in amplitude of less than 50% associated with oxygen desaturation of 4% or more.

Long distance bus driver is an operator who drives least 500km from the driver's operating base to his destination (as per this study).

History of past RTA: involvement in RTA(major or minor) within the past one year from the time of initial interview.

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1.0 INTRODUCTION AND LITERATURE REVIEW

Excessive daytime sleepiness is one of the most common sleep-related patient symptoms, and it affects an estimated 20 percent of the population in USA (1). Persons with excessive daytime sleepiness are at risk of motor vehicle and work-related incidents, and have poorer health than comparable adults. The most common causes of excessive daytime sleepiness are sleep deprivation, obstructive sleep apnea, and sedating medications. Other potential causes of excessive daytime sleepiness include certain medical and psychiatric conditions and sleep disorders, such as narcolepsy. Obstructive sleep apnea is a particularly significant cause of excessive daytime sleepiness. Obstructive sleep apnea is a serious breathing problem that interrupts sleep. Obstructive sleep apnea means production of short pauses in breathing during sleep. These breathing pauses – called apneas or apnea events – last for 10 to 30 seconds, maybe longer. People with obstructive sleep apnea can stop breathing dozens or hundreds of times each night (2). If not treated, sleep apnea can lead to major health problems, accidents, and early death.

1.2. Definition of Excessive Day Time Sleepiness

EDS is defined as the reduced ability to stay awake and alert during normal daytime hours, resulting in periods of sleepiness or sleep. EDS seriously decreases quality of life for affected patients.Itis characterized by persistent sleepiness and often a general lack of energy, even after apparently adequate or even prolonged night time sleep. EDS can be considered as a broad condition encompassing several sleep disorders where increased sleepiness is a symptom, or as a symptom of another underlying disorder like narcolepsy, sleep apnoea or a circadian rhythm disorder.

1.3 Epidemiology of EDS

Excessive daytime sleepiness is a significant public health problem, with prevalence in the community estimated to be as high as 18%. Sleepiness is caused by abnormal sleep quantity or sleep quality. Amongst others, multiple neurological, psychological, cardiac and pulmonary

disorders may contribute (3).Several population-based studies across various geographical regions and ethnic groups have established a high prevalence of OSA.

The prevalence of obstructive sleep apnoea in the general population is approximately 20% if defined as an apnoea hypopnea index (AHI) > 5 events per hour.

Factors that predispose to the occurrence of obstructive sleep apnoea are plenty. For instance, with regard to age, the prevalence of obstructive sleep apnoea increases from 18 to 45 years of age, with a plateau occurring at 55 to 65 years of age (a). With gender, about 4% of women and 9% of men have obstructive sleep apnoea(4).

In a study conducted in Australia about 50% of over 3000 drivers assessed using a questionnaire had a high risk of OSA, while 45% of drivers in a Malaysian study had OSA based on an apnea/hypopnea index (AHI) greater than 5 on polysomnography (5,6).

The AHI index is the number of episodes of apnea or hypopnea occurring per hour of sleep during a polysomnography test. Apnea is the complete cessation of airflow or greater than 50% reduction in airflow lasting at least 10 seconds, while hypopnea is <50% reduction in airflow lasting longer than 10 seconds that is accompanied by ≥4% oxygen desaturation or by arousal from sleep.

The prevalence of excessive daytime sleepiness in Nigerian study overall (14%) was also similar to that in Edinburgh where 20% of the drivers had excessive daytime sleepiness using the ESS (7)**.** The occupational hazards attributable to OSA and EDS in commercial drivers are particularly significant because the risk extends, not just to the individuals themselves, but also to third parties including passengers and other road users. Pack *et al*. demonstrated that commercial drivers with OSA had marked sleepiness and impaired driving performance (7).

Simulated driving experiments have also demonstrated impaired steering ability in those with OSA compared to controls, with patients with OSA wandering more often from the road and having delayed response to distractions (8,9) Two meta-analyses have clearly shown that there

is an increased risk of RTA among patients with OSA and this risk is actually more profound in those patients with very severe OSA (AHI ≥30)(10,11).

The effects of OSA goes beyond increasing the risk of RTA, as the impaired neuro-cognitive functioning due to OSA also results in reduced productivity, mood disorders including depression, irritability, poor libido and overall negative impact on the quality of life (12,13)There is a strong association of OSA in the etiology and adverse outcomes in several cardiovascular conditions such as hypertension, stroke, coronary artery disease, diabetes mellitus and cardiac arrhythmias(14–16)**.**

1.4 Risk Factors for Excessive Day Time Sleepiness

Risk factors for excessive sleepiness include obesity, depression, extremes of age and insufficient sleep. In the clinical setting, two of the most commonly encountered causes are obstructive sleep apnoea and periodic limb movement disorder.

The most commonly encountered causes of EDS in a clinical setting are obstructive sleep apnoea (OSA) and periodic limb movement disorder. Sleep apnoea results from total or partial occlusion of the upper airway during sleep, causing apnoeas and hypopnoeas that lead to intermittent hypoxia, arousal from sleep with resulting sleep fragmentation and disturbed sleep architecture.

OSA can be reliably diagnosed by using overnight polysomnography studies to assess the number of apnoeas-hypopnoeas per hour of sleep: the apnoea-hypopnoea index (AHI). According to the American Academy of Sleep Medicine criteria, an AHI of 5-15 events per hour represents mild OSA, an AHI of 15-30 as moderate OSA and an AHI>30 as severe. However, this criteria also considers the degree of EDS, which may not correlate with the severity as measured by the AHI. OSA is common worldwide, with the proportion of 30-60 year old adults in the USA with an AHI ≥5 estimated at 24% of men and 9% of women (17).

In Europe, estimates of 26% of men and 28% of women with an AHI ≥5 have been reported (18), whilst 9% of Hong Kong males were found to have an AHI ≥5 (19). The percentage of participants with OSA associated with EDS was lower in both the USA study (4% of men and 2% of women) and the Hong Kong study (4% of participants), suggesting that OSA is highly prevalent but often asymptomatic. In the USA, it is estimated that 75-80% of those with symptomatic OSA are undiagnosed, representing a significant population who could benefit from treatment(20).

Patients are rarely aware of night-time disturbance other than snoring, but may complain of excessive sleepiness during the daytime or involuntarily falling asleep. Well recognised risk factors for this condition include an increased BMI, neck circumference, increased age, alcohol use, male gender and anatomical variations which narrow the upper airway.

A hypothesized mechanism for sleep disruption in obesity is that excess tissue around the pharynx narrows the airway, impacting on the critical occlusion pressure of the upper airway (21) and disrupting breathing during sleep. However, this theory has been criticised by a number of authors, who argue that the physical effects of increased fat cannot account for the degree of disruption to breathing.

The factors determining EDS in OSA are not well understood; the severity of OSA measured by AHI does not correlate well with the presence or degree of daytime sleepiness. Early studies found no link with sleep fragmentation and inconsistent results regarding the significance of intermittent nocturnal hypoxaemia (INH) (22,23). However, nasal continuous positive airway pressure (CPAP) to correct INH in OSA, has proved to be an effective treatment for EDS, especially for those with a high AHI or severe sleepiness (24,28). Colt *et al.* suggested that this may be due to the correction of sleep fragmentation, rather than the elimination of INH. They studied OSA patients with nasal continuous positive airway pressure (CPAP) treatment to avoid apnoeas and hypopnoeas and correct sleep fragmentation, with or without the induction of INH. INH was induced by the intermittent addition of 100% nitrogen to the air delivered via CPAP. After 2 nights of treatment, there was no significant difference

in the change of mean sleep latency in the MSLT observed in each group, leading the authors to suggest that nocturnal hypoxemia was not relevant to the pathogenesis of EDS. However, this study involved only 2 nights of INH and in this short-term design EDS may not significantly change; it is therefore unlikely to be a valid model of the pathological mechanism in OSA. OSA patients experience nocturnal hypoxemia over many years, a chronic process which is thought to cause daytime cognitive dysfunction and damage wake-promoting networks (25)and experience shows that sleep apnoea patients, even when controlled with CPAP therapy, may require weeks or even months of treatment to experience significant changes in their level of sleepiness.

1.4.1 Periodic Limb Movement Disorder (PLMD) and Restless Legs Syndrome (RLS)

Periodic limb movement disorder (PLMD) is another commonly-encountered sleep disorder and potentially a cause of daytime sleepiness. It was initially identified in patients with RLS, with approximately 80% of RLS patients undergoing polysomnography found to have PLMD (26) (30). However, PLMD is recognised as a separate condition from RLS (27). PLMD patients experience involuntary, but non-epileptic, stereotypical movements of their limbs, especially during non-rapid eye movement (NREM) sleep and during the 1st half of the night. Up to 25% of those presenting with other sleep disorders, such as OSA, rapid eye movement (REM) sleep behaviour disorder or narcolepsy may also suffer from PLMD(28) which, in part, explains the difficulties in understanding the effects of isolated PLMD. PLMD is commonly thought to be under-diagnosed, with prevalence in the community estimated at 3.9% (29). Several studies have suggested a role for dysregulation of dopaminergic transmission in the pathogenesis of PLMD, supported by the observation that dopamine agonists can be an effective treatment(30).

Recent work to establish the cause of EDS in PLMD has focused on the presence of autonomic arousals seen in this disorder. It is not obvious whether PLMs cause the arousals or are a reflection of altered autonomic function, although the periodic nature of movements in PLMD has led to comparisons with the “cyclic alternating pattern” (CAP) sometimes visible on the EEG and used as a marker of arousal instability during sleep (31). This pattern consists

of the background EEG pattern (phase B) interspersed with bursts of delta wave activity (phase A). In 1996, Parrino*et al.* demonstrated that PLMs are mostly present during periods of CAP, and that there are increased limb movements during phase A activity. Ferrillo has suggested that this signifies that cortical arousals in PLMD are synchronised with a brainstem network regulating cardiovascular and respiratory changes, an arrangement which also underlies the CAP (32).

More recently, polysomnographic data from PLMD patients was used to examine the temporal relationship between changes in the EEG, heart rate and limb movements in both REM and NREM sleep. A number of studies have detected autonomic activation several seconds before either limb movement or EEG changes, suggesting that sympathetic activation leads to sub-cortical activation and facilitation of both cortical arousal and PLM (33). This, similarly to patients with sleep-disordered breathing, implies that sympathetic over-activity and not the PLMs may be the cause of sleep disruption, resulting in EDS.

1.4.2 EDS in the general population

Outside of the clinical setting, EDS is a widespread problem in the community, with estimated prevalence as high as 18% (34). A number of factors contribute to EDS and this may range from chronic insufficient sleep to poor sleep hygiene, use of modern media in bed and female gender. However, it can be difficult to identify significant risk factors. Interviews with 1997 16-93 year olds in the UK, carried out by Groeger*et al.*, found that 18% of subjects reported insufficient sleep on most nights; 58% of participants had suffered sleep problems on at least one night during the previous week, which was similar to the US sleep survey findings (35). However, only 5% of respondents reported sleeping less than 5 hours a night, with little gender difference in self-reported sleep duration (34).

The importance of long-term sleep insufficiency is unclear. Bonnet and Arand have argued that even small reductions of sleep time may have significant effects on the mean sleep latency and that reduced awareness due to sleepiness should be a serious public health concern (36). A study showed that loss of two hours of sleep can cause a 32% reduction in MSL (37).

However, there is conflicting evidence, including animal studies, indicating that sleep times extend beyond those required if there are few incentives to stay awake, and this may have serious implications considering the social background of subjects and potential associations with underlying depression. Additionally, normal subjects will sleep for longer than usual in the right environment, even when EDS is not detected in the MSLT (38), suggesting that sleep times alone are of little use in estimating the severity of sleep disorders in the community.

1.4.3 Obesity and EDS

Obesity is a factor consistently linked to daytime sleepiness (39), with obese subjects twice as likely to report EDS as non-obese individuals (40). Whilst the increased prevalence of OSA in obese subjects may account for some of this difference, obesity is associated with hypersomnolence even in the absence of sleep-disordered breathing(40,41). The reasons for this are not fully understood, although a number of factors have been shown to be predictive of EDS in obese patients, suggesting that the underlying mechanism is multifactorial.

Perhaps unexpectedly, a study of obese patients presenting for bariatric surgery found that AHI is not predictive of daytime sleepiness (42) suggesting that other factors may be more important than the presence of OSA. A recent cross-sectional study of OSA patients also found that obesity and depressive symptoms, but not AHI, were predictive of EDS (43). Even snoring has been found to be a predictor of sleepiness independently of AHI and other sleep parameters (44). The importance of factors other than sleep disordered breathing could also explain why CPAP therapy sometimes fails to correct EDS, especially in those with mild OSA.

1.4.4 Depression and EDS

In both obese and non-obese subjects, depression is strongly associated with sleepiness. However, 70% of those with depressive disorders complain of difficulty initiating and maintaining sleep and, thus, insomnia and fatigue rather than daytime sleepiness are often regarded as the most important problems, with a number of studies confirming the importance of insomnia as an independent predictor of suicidal ideation and behaviour(45,46). Most

clinical rating scales for depression enquire about fatigue and tiredness rather than EDS specifically, so the significance of sleepiness in depression may be underestimated (47). Daytime sleepiness has been shown to correlate with increased depression tendency scores in the general public (48) and, in addition, patients with OSA have high rates of depressive disorders (15-56% of patients vs. 6-7% of the healthy population)(49,50).

1.4.5 Age and EDS

The prevalence of EDS also changes with age, with a number of studies finding increased EDS in the very young and very old. Prevalence of EDS decreases in those over 35 years old, and increases again in the over 75 years old range (51). EDS in the young is most likely due to insufficient sleep, whilst sleepiness in the old is more commonly associated with health problems such as diabetes and cardiovascular disease. Additionally, both sleep efficiency and sleepiness become less common in middle age, suggesting that EDS in older people is not solely due to less efficient sleep, but may also hint at changes in the everyday routines that working life demands. Another suggested mechanism is that hormonal sleep homeostasis is disrupted in older people. This is supported by the observation that administration of an arousal-promoting hormone, such as corticotrophin-releasing hormone, at the beginning of sleep causes more sleep disturbance in older subjects than younger (52).

1.4.6 Other risk factors for EDS

Cross-sectional studies have proved useful in identifying other risk factors for EDS in the general population, including shift-work, poor sleep hygiene (e.g., using mobile phones before bedtime) and loneliness (53,54) Shift work sleep syndrome, a type of circadian rhythm disorder in which patients have difficulty falling asleep and waking up, is a well recognized cause of EDS(55) estimated to affect about 10% of those who work irregular hours (56). Working outside of daylight hours disrupts the circadian sleep-wake cycle and decreases both the duration and efficiency of sleep(57). A recent study of over 3,000 people found that night workers were 2.7 times more likely than day workers to feel moderately to severely sleepy at work (58). Additionally, sleepiness is a commonly encountered symptom in serious systemic

disease. Examples include cardiac failure, respiratory illness (e.g., COPD), malignancy and a range of neurological conditions (59–63)

1.5 Excessive Day Time Sleepiness and Road Traffic Accidents

Road traffic crashes are major cause of disability and death worldwide, with large number occurring in developing countries (64–66).The problem is increasing rapidly due to motorization and other factors(3).

Tanzania, a developing country in Africa, has witnessed at least a fivefold rise in recorded traffic-related fatalities during the last decade. This in part is due to the proliferation of roads, which are often in poor states and also, a phenomenal increase in the number of motor vehicles, many of which are old, and not road-worthy.

In Sub-Saharan Africa including Tanzania, with increasing vehicular traffic, RTA has become an immense health problem and constitutes a burden on under-funded and oversubscribed health services (67,68)**(75,76)**. The reasons for the high burden of road traffic crashes in developing countries are: growth in the numbers of motor vehicles; higher number of people killed or injured per crash in low-income countries, poor enforcement of traffic safety regulations; inadequacy of health infrastructure, and poor access to health care (65,67) .

1.6 Clinical Features of Excessive Day Time Sleepiness

Snoring and daytime sleepiness are the most common presenting complaints of obstructive sleep apnoea syndrome. Most patients with obstructive sleep apnoea syndrome first come to the attention of a clinician because the patient complains of daytime sleepiness, or the bed partner reports loud snoring, gasping, snorting, or interruptions in breathing while sleeping. Additional symptoms and signs include poor concentration, nocturnal angina, and awakening with a sensation of choking, gasping, or smothering.

Features of obstructive sleep apnoea syndrome may be identified by medical history, physical examination, or evaluation of special laboratory test results.

1.6.1 History

Daytime sleepiness is a common feature of obstructive sleep apnoea syndrome. However, it may go unnoticed or its significance may be underestimated because of its insidious onset and chronicity. The patient may not describe the symptom as sleepiness, but may use other terms, such as fatigue, tiredness, and low energy

Features and conditions related to obstructive sleep apnoea syndrome include but are not limited to daytime sleepiness, witnessed apnoe as by a spouse or bed or room partner, awakening with choking, nocturnal restlessness, insomnia with frequent awakenings, lack of concentration, cognitive deficits, changes in mood, morning headaches, vivid or strange or threatening dreams, gastroesophageal reflux, obesity, large neck circumference, systemic hypertension, hypercapnia, cardiovascular disease, cerebrovascular disease, cardiac dysrhythmias, narrow airway and pulmonary hypertension.

Careful questioning of the patient typically reveals a pattern of feeling sleepy or falling asleep in boring, passive, or monotonous situations. As an example, the patient may admit to consistently falling asleep while reading, watching television, or even while operating a motor vehicle. In addition, embarrassing or inappropriate episodes of sleep, e.g. at religious services, or while driving, may be reported.

Reviewing patient behavior away from the workplace is essential because daytime sleepiness can be masked by activity. Patients should always be asked about behaviors that may mask sleepiness, such as caffeine consumption.

Sleepiness is the inability to remain fully awake or alert during the wakefulness portion of the sleep-wake cycle, while fatigue is a subjective lack of physical or mental energy that is perceived by the individual or caregiver to interfere with usual and desired activities. It is often unclear whether a patient's complaint of daytime sleepiness represents true sleepiness or fatigue.

Snoring is the other major feature of obstructive sleep apnoea syndrome. It is usually helpful to have the patient's bed partner or a family member present during the interview because they may have greater insight than the patient into the frequency and severity of the snoring, as

well as associated events, such as resuscitative gasping or snorting, witnessed apneic periods, periods of silence followed by loud snoring, restless or fitful sleep, since these things occur during sleep.

1.6.2 Physical Examination

Physical examination is frequently normal, except for overweight and obesity and a crowded oropharyngeal airway.

Additional physical findings that are common among patients with obstructive sleep apnoea syndrome include the following:

- Narrow airway – Numerous conditions can narrow the upper airway. These include retrognathia, micrognathia, lateral peritonsillar narrowing, macroglossia, tonsillar hypertrophy, an elongated or enlarged uvula, a high arched or narrow palate, nasal septal deviation, and nasal polyps.
- Large neck and/or waist circumference – obstructive sleep apnoea syndrome is more strongly correlated with an increased neck size or waist circumference than general obesity (69). obstructive sleep apnoea syndrome is particularly prominent among men who have a collar size greater than 17 inches and women who have a collar size greater than 16 inches (70).

Routine laboratory data are not helpful in confirming or excluding the diagnosis of obstructive sleep apnoea syndrome.

Indication for diagnostic testing

Objective diagnostic testing is necessary because the clinical features of obstructive sleep apnoea syndrome are nonspecific and the diagnostic accuracy of clinical impression alone is poor (71). It is recommend that diagnostic testing for obstructive sleep apnoea syndrome be performed on any patient who snores and has excessive daytime sleepiness. In the absence of

excessive daytime sleepiness, diagnostic testing is recommended if the patient snores and either works in a mission-critical profession e.g. airline pilots, bus drivers, and truck drivers. Polysomnography (PSG) is the diagnostic test of choice in adults. During PSG, the patient sleeps while connected to a variety of monitoring devices that record physiologic variables. The most common indications for PSG include diagnostic evaluation of suspected obstructive sleep apnoea syndrome, titration of positive airway pressure, and assessment of the adequacy of therapy that is already being used.

1.6.5 Clinical tool for assessment ofexcessive day time sleepiness

The Epworth Sleepiness Scale (ESS) is a scale intended to measure daytime sleepinessby the use of a very short questionnaire. This can be helpful in diagnosing sleep disorders. It was introduced in 1991 by Dr Murray Johns of the Epworth Hospitalin Melbourne, Australia.

The questionnaire asks the subject to rate his or her probability of falling asleep on a scale of increasing probability from 0 to 3 for eight different situations that most people engage in during their daily lives, though not necessarily every day (72).

The scores for the eight questions are added together to obtain a single number. A number in the 0–9 range is considered to be normal while a number in the 10–24 range indicates that expert medical advice should be sought (72). For instance, scores of 11-15 are shown to indicate the possibility of mild to moderate sleep apnea, where a score of 16 and above indicates the possibility of severe sleep apnea or narcolepsy(72).Certain questions in the scale were shown to be better predictors of specific sleep disorders, though further tests may be required to provide an accurate diagnosis (72).

The questionnaire was originally created with the intent to preserve the exact wording of the questionnaire to provide a standardized test and to preserve its validity. The ESS has a sensitivity and specificity of 100% and 93.5% respectively (72).

1.7 Psychoactive Drugs and Accident Risk on Road Traffic

Use of any psychoactive (mind-altering) drug makes it highly unsafe to drive a car and is illegal—just like driving after drinking alcohol. Drugged driving puts at risk not only the driver but also passengers and others who share the road.

In the DRUID (Driving under the influence of drugs, alcohol and medicines) study, the risk of injury and death was calculated for different psychoactive substances on the basis of samples collected from drivers in road traffic and in various accident situations. The number of persons having used alcohol or drugs with negative effects on the ability to drive was lower in Finland than in Europe on the average. Aggravated drunk drivers and mixed substance abusers pose an accident risk that can be several hundredfold higher compared with sober drivers. More attention should be focused on traffic risks due to mixed use of drugs and alcohol (73).

After alcohol, THC (delta-9-tetrahydrocannabinol), the active ingredient in marijuana, is the substance most commonly found in the blood of impaired drivers, fatally injured drivers, and motor vehicle crash victims.

Many prescription drugs including opioid pain relievers and benzodiazepines prescribed for anxiety or sleep disorders come with warnings against the operation of machinery—including motor vehicles—for a specified period of time after use. When prescription drugs are abused (taken without medical supervision), impaired driving and other harmful reactions become much more likely.

2.0 PROBLEM STATEMENT

The potential impact of excessive day time sleepiness on the performance of commercial drivers in relation to driving safety is of major public health importance.

The burden of excessive daytime sleepiness among long distance bus drivers is increasing in sub Saharan countries.

Approximately 20% of driving accidents are attributable to inadequate sleep such as occurs in persons with OSA (74).

The burden of excessive day sleepiness in long bus drivers in Dar es salaam, Tanzania, has not been studied.

3.0 RATIONALE

- In Tanzania there is no published data on prevalence of excessive daytime sleepiness among long distance bus drivers.
- This study will reveal the prevalence of excessive daytime sleepiness among long distance bus drivers and considerably contribute to sensitize the respective authority working in transport industry on the current picture of sleeping disease and the recommendation hope to decrease MTA in Tanzania.

3.1 Hypothesis

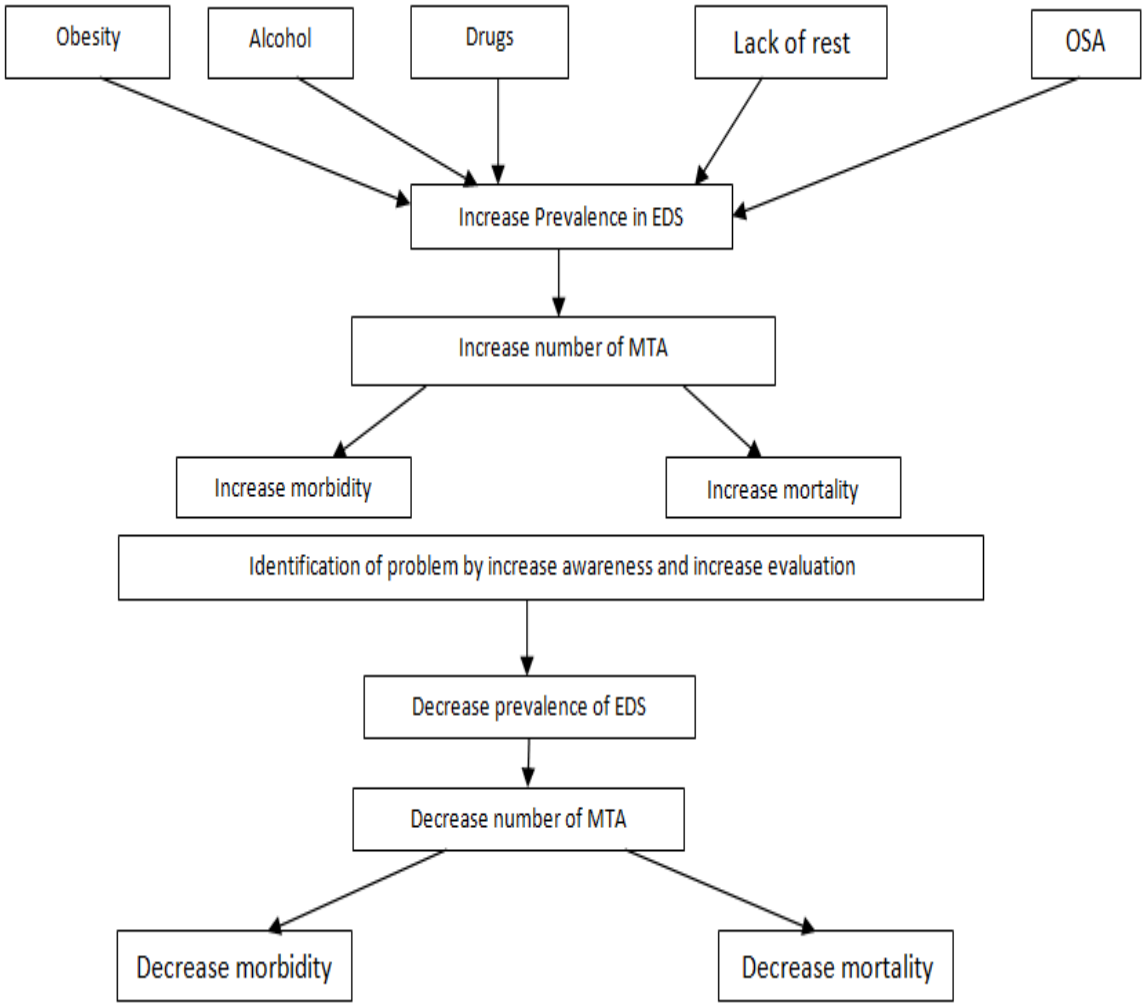
A significant proportion of long distance bus drivers have sleeping disorders and thus are at risk of MTA endangering their lives and that of their passengers

3.2 Broad objective

To determine the prevalence of EDS and its associated factors amongst long distance bus drivers.

3.3 Specific objectives

- To determine the prevalence of EDS among long distance bus drivers
- To determine socio demographic characteristics associated with excessive daytime in long distance bus drivers.
- To document clinical and anthropometric characteristics of long distance bus drivers with excessive day time sleepiness.
- To assess the relationship between excessive day sleepiness and the history of past RTA.


Obesity
Alcohol
Drugs
Lack of rest
OSA
Increase Prevalence in EDS
Increase number of MTA
Increase morbidity
Increase mortality
Identification of problem by increase awareness and increase evaluation
Decrease prevalence of EDS
Decrease number of MTA
Decrease morbidity
Decrease mortality

4.0 METHODOLOGY

4.1. Study area and settings

Ubungo bus terminal is located in Ubungo ward, which is located in Kinondoni district, in the city of **Dares salaam**, Tanzania. It is 8Km from a city center. It is known throughout much of Tanzania as one of central hubs of transportation because of its massive bus terminal.

It serves as a transportation link to most Tanzanian urban areas such as Iringa, Mbeya, Mwanza, Mtwara, Lusaka, Lilongwe,, Nairobi and several east African cities. About 260 buses depart from and about 150 buses arrive at the bus terminal every day**.**

4.2 Study design

A cross sectional descriptive study to determine the prevalence of EDS and its associated factors amongst long distance bus drivers.

4.3. Study duration

Six months, from June 2014 to November 2014

4.4. Study population

All long distance bus drivers at Ubungo bus terminal during the study period.

4.5. Inclusion criteria

Consenting long distance bus drivers aged ≥ 18 years at Ubungo bus terminal.

4.5.1 Exclusion criteria.

Bus drivers who drive to less than 500 km from UBT

Drivers who failed to give consent to participate in the study

4.6 Study variables

4.6.1 Dependent Variables

i. Excessive day time sleepiness.

4.6.2 Independent Variables

i. **Socio-demographic features**: age, sex, marital status, occupation.
ii. **Clinical parameters:** pulse rate, systolic blood pressure, diastolic pressure, mean arterial pressure, duration of hypertension.
iii. **Anthropometric measures:** weight, height, body mass index, neck circumference, waist circumference.
iv. **Other investigation:** random blood glucose

4.7 Sample size for finite population

$$\underline{n = N z^2 pq}$$
$$e^2(N-1) + Z^2pq$$

- where: n = sample size
- z = Standard normal Deviate (1.96)
- p = Prevalence of (p = 14%) *** (75)**
- e = Bound of error (e = 0.04)
- **q=** $\underline{(1-p)}$
- Minimum sample size is 224

4.8 Sampling method and recruitment:

Consecutive sampling technique was used: a list of bus drivers was obtained from a chairperson of Tanzania bus and truck international drivers association. There is a total of 600 registered bus drivers at UBT. Participants who met the inclusion criteria were included in the study. The participant was contacted to arrange for a meeting with the principal investigator. The meetings were done on a daily basis, information regarding the study was provided, and

then participant was requested to sign an informed consent form for the participation in the study per protocol.

Data from consented long distance bus drivers included social demographic details such as age, gender, marital status, level of education. They were also evaluated with reference to their clinical and anthropometric measurements including measurement of blood pressure and pulse rate, using an Omron digital pulse and blood pressure machine with the patient is in recumbent position after at least five minutes of rest.

4.9 Data collection tools

The required study tools were questionnaires, digital blood pressure machine, digital weighing scale, height rod and non-elastic or flexible measuring tape.

4.9.1 Data collection methods

4.9.2. Clinical and anthropometric measurements

Structured questionnaire and the validated Epworth Sleepiness Scale questionnaire were used for data collection. All the questionnaires was translated into Swahili which is the language in East Africa and filled in and then back translated again into English with the aim of preserving the meaning intended.

Blood pressure and pulse rate were measured using a commercially available well calibrated Omron digital blood pressure machine with the patient is in recumbent position after at least five minutes of rest. Body weight was recorded by using Omron digital weighing scale without shoes and only wearing light clothing. Height was measured using meter rods and body mass index was calculated as body weight/height^2 (kg/m^2). Neck circumference (NC) was measured at the level of crico-thyroid membrane using a non-elastic or flexible measuring tape. Waist circumference was measured midway between the lower rib cage margin and the anterior superior iliac spine. Truncal obesity will be defined either a waist circumference greater than 102 cm for men, 88 for female (29).

4.9.3 Laboratory

No routine laboratory data are helpful in confirming excessive day time sleepiness. Blood from the tip of the finger was taken and spot random blood glucose tested using a BETACHEK G5 glucometers to look for hyperglycemia.

4.10. Research assistants

Two (2) nurses were recruited as research assistants. Special preference was given to those who were on their annual leave. These research assistants were given appropriate training on how to collect data and do the measurements. However, the recruitment of bus drivers was done by the principal investigator and chairperson of Tanzania Bus and Truck and International Drivers Association. After participant was identified research assistants proceeded to seek consent and perform data collection.

4.11. Data Processing and Analysis

Pre-coded data were entered into a computer using Microsoft Excel and statistical analysis was done using the Statistical Package for Social Sciences software (SPSS) version20.0 after checking for consistency and discrepancy accordingly.

The cleaned and validated data were analyzed by the principal investigator in consultation with a competent statistician and the relevant statistics done. Continuous variables were summarized as mean ± SD or median (range) and categorical variables as proportions, n (%).Comparison between groups were done by independent Student's t-test and Chi-square and Fisher's exact test for categorical variables. A regression analysis was performed to determine predictors of excessive day time sleepiness. A probability of $p< 0.05$ will be taken as statistically significant.

4.12. Dissemination of the Results

- The findings were complied into this dissertation to be submitted in partial fulfilment for award degree of Masters of Medicine in Internal Medicine of Muhimbili University of Health and Allied Sciences.
- Copies of the dissertation will be available to the department of internal medicine of MUHAS and MUHAS Library, Kinondoni municipality, Ubungo administrative council and Tanzania Bus and Truck and International Drivers Association.
- These data will also be available for publication.

4.13. Ethical Consideration and Consent

- The researcher requested ethical clearance for the research and approval from the ethics committee of MUHAS.
- Permission to conduct the study was also sought at Kinondoni municipality, Ubungo administrative council and Tanzania Bus and Truck and International Drivers Association.

A verbal and written consent to do the study was sought from all study participants prior to inclusion in the study for interviewing, doing clinical and anthropometrics test. Results of participants were communicated to principal investigator and those with problems were treated accordingly. Confidentiality of all information obtain from respondent was ensured by safely and securely storing the questioners. Participants who were found to have risk factors for OSA, hypertension, diabetes, were counseled and channeled to the proper health facilities. They were advised accordingly regarding treatment options available. Most importantly participants with risk of OSA were advised to attend Respiratory clinic, at Muhimbili for detailed and proper evaluation and management.

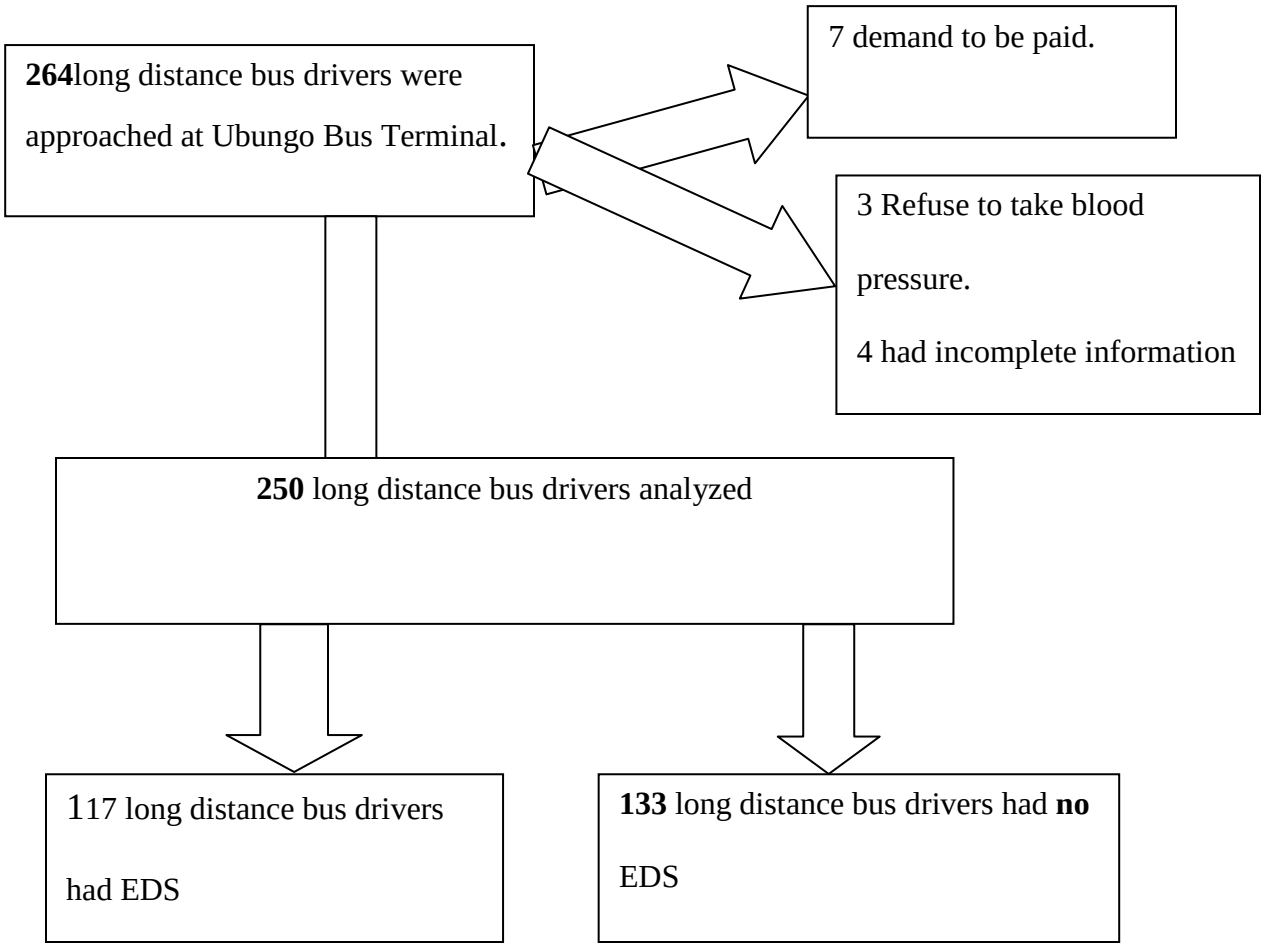
Anonymity and confidentiality of the subjects was maintained by using serial numbers instead of names.

4.14. Study limitations& Mitigations

- **Desirability bias:** The tendency of respondents to answer questions in a manner that will be viewed favorably by others. It can take the form of over-reporting "good behavior" or under-reporting "bad," or undesirable behavior. The way of overcoming this was by using anonymous questioner.
- **Recall Bias:** This is systematic error caused by differences in the accuracy or completeness of the recollections retrieved ("recalled") by study participants regarding events or experiences from the past. The way of overcoming this is by using anonymous questioner.

5.0 RESULTS

Fig 2: Study flow chart



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 day time sleepiness among long distance bus driver at Ubungo Bus Terminal.

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

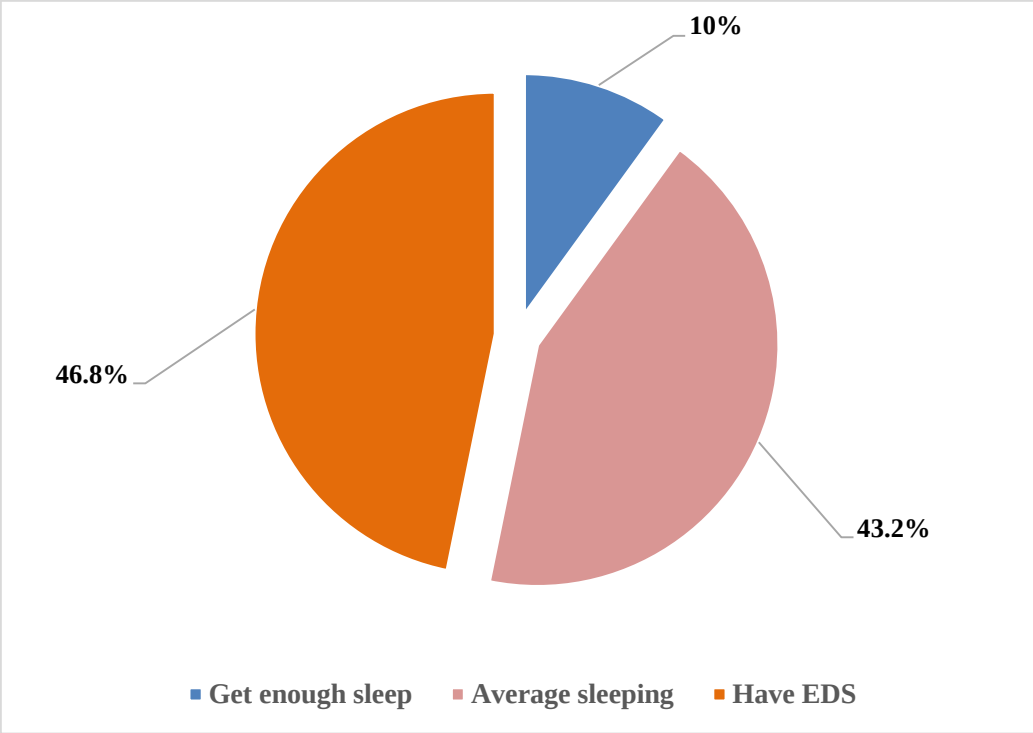


Figure 1: Pie chart showing distribution of Excessive day sleepiness (n=250)

Enough sleep: ESS score 1-6 scores

Average sleep:ESS score 7-8 scores

EDS: ESS score 9 and above

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(73.7)	4 (26.7)	
Married	101(52.3)	9247.7)	
Cohabiting	16 (51.6)	15 (48.4)	***0.574***
Divorced	3 (50)	3 (50)	
Widowed	2 (40)	3 (60)	

Distribution of excessive day time 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	TOTAL	*p-value*
Pulse rate				
Normal	115 (53.7)	99 (46.3)	214 (100)	
Raised pulse rate (>100b/min)	18(50)	18 (50)	36 (14.4)	***0.68***
Blood pressure				
Normal	63 (58.3)	45 (41.7)	108	
Raised (>140/90mmHg)	70 (49.3)	72 (50.7)	142 (56.8)	***0.156***
Waist circumference (cm)				
Normal	87 (56.1)	68 (43.9)	155(100)	
Trunk obesity (>102cm)	46 (48.4)	49 (51.6)	95 (100)	***0.236***
Neck circumference (cm)				
Normal	126 (55.0)	103 (45.0)	229 (100)	
Raised values (>43cm)	7 (33.3)	14 (66.7)	21 (100)	***0.05***
Obese status				
Normal	77 (53.1)	68 (46.9)	145 (100)	
Obese (BMI>30kg/m2)	56 (53.3)	49 (46.7)	105 (42)	***0.971***

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

Regarding the use of psychoactive substances including cigarette, 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

Item	TOTAL	No Have EDS	Have EDS	*p-value*
Cigarette use				
*Never	79 (100)	46 (58.2)	33 (41.8)	
Yes, but quit	68 (100)	34 (50)	34 (50)	***0.32***
				0.37
Yes, still smoking	103 (100)	53 (51.5)	50 (48.5)	
Khat use				
*Never	153(100)	86 (56.2)	67(43.8)	
Yes, but quit	84 (100)	40 (47.6)	44 (52.4)	***0.20***
				0.87
Yes, still using	13(100)	7 (53.8)	6 (46.2)	
Cannabis use				
*Never	66 (100)	38 (57.6)	28(42.4)	
Yes, but quit	52 (100)	30 (57.7)	22 (42.3)	***0.99***
				0.27
Yes, still using	132(100)	65(49.2)	67(50.7)	
Alcohol use				
*Never	149(100)	84 (56.4)	65 (43.6)	
Yes, but quit	90 (100.)	45 (50.0)	45 (36.4)	***0.34***
				0.20
Yes, still using	11 (100)	4 (36.4)	7 (63.6)	

*Represent reference group

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: Table 5: Display a history of road accident by EDS status.

	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**

6.0 DISCUSSION

Prevalence of excessive day time sleepiness

In this current study we found the prevalence of EDS to be 46.8%. In comparison to one Nigerian study by Obianuju (2013) which involved interstate bus drivers they found a significantly lower prevalence of 14 %.(76). This difference could probably be a result of differences in daily mileage amongst interstate and our long distant bus drivers. However two Australian studies by Howard and Sharwood and one Nigerian study by Obaseki which involved long distant bus drivers like in this study found a prevalence of 24%, 12% and 22% respectively(77,78,79), these rates are significantly lower to the rates we found. Potential explanations to this observed variability include differences in the ESS cut-off points used to diagnose EDS and different rates of psychoactive substance use reported by the respective studies.

Regarding anthropometric measurements, this current study found similar rates of EDS regardless of differences in waist circumference, neck circumference or overall obese status. Neck circumference results however, produced some borderline results. Other studies including Obianuju(76) and Obaseki(79) have displayed results contrary to ours. For example Obianuju found higher rates of EDS amongst drivers with increased abdominal adiposity while Obaseki found an association between increased hip circumference and EDS. A hypothesized mechanism for sleep disruption in obesity is that excess tissue around the pharynx narrows the airway, impacting on the critical occlusion pressure of the upper airway (21) and disrupting breathing during sleep

In our assessment of clinical parameters (BP &PR), our cohort displayed similar rates of EDS regardless of BP and PR differences. Again this finding is not in keeping with results from previous published studies, for example Obaseki study found that hypertensive patients had an almost 5 times EDS rates compared to those free from hypertension. The similar rates of raise BP amongst EDS and EDS-free participants could probably be explained by the small sample size we had, otherwise the connection between EDS and hypertension is undisputed.

Surprisingly, we also found similar rates of EDS amongst users and non users of different psychoactive substances including cannabis, alcohol, cigarette and khat. A study by Obianuju (76) found an increased rate of EDS amongst alcohol and cannabis users. We believe the pattern we observed can as well be explained by the small sample size in this study.

EDS with road accident

Despite EDS participants displaying similar rates of minor accidents, drivers with EDS had significantly higher rates of major accidents (accidents where passanger injured/ dead & vehicle is destroyed) compared to those without EDS. Obianuju study found similar rates of RTA in those with EDS compared to those EDS free. On the other hand, Howard study(77) found that drivers with EDS had an OR of 1.19, p=0.02 of having RTA compared to those without EDS, while Obaseki study(79) found a 4 times increased risk of RTA amongst EDS drivers. All these studies however didn't classify accidents into minor and major. Findley et all (80)reported that patients with sleep-disordered breathing cause seven times more accidents than normal subjects. A study done in Turkey by AclanOzder et al reveal, Five hundred and thirty five (86.60 %) of the study participants had a traffic-accident history. Of these 543 drivers, 365 (59.1 %) believed that excessive day time sleepiness contributed to the accident, 137 (22.2 %) stated that occurred RTAs might have been caused because of EDS. (*)

A study done by Carlos Alberto de Viegas shows in the population studied, they found that a significant proportion (42%) of the drivers had been involved in at least one traffic accident. In addition, although only 7.6% reported having been involved in accidents caused by sleepiness 47.7% reported sleepiness while driving .They found a close proximity between the percentage of drivers who had been involved in accidents (42%) and the percentage who reported drowsiness while driving (47.7%).

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LIMITATIONS OF STUDY

Our study was a descriptive study so no casual effect relationships can be made and as it was conducted at one center it cannot be generalized to all bus drivers in Tanzania.

Anthropometric parameters like blood pressure were taken at one sitting and it is possible that some hypertensive patients were not discovered.

Bias was among the limitations we encountered:

Information bias: our study was conducted at Ubungo bus terminal and the fact that drivers were on company premises when taking the test may have led to under-reporting of symptoms. Therefore, the actual number of drivers experiencing excessive daytime sleepiness may be higher than that found herein

Recall Bias: This is systematic error caused by differences in the accuracy or completeness of the recollections retrieved ("recalled") by study participants regarding events or experiences from the past.

Survival bias as victims of serious accidents leading to death of the driver would not have been included in this study.

Notwithstanding, this study has some strength. The high response rate achieved through a face-to-face interview is an important strength of this study.

In conclusion, this study shows that the prevalence of daytime sleepiness is substantially high (46.8%), among the long distance bus drivers in Dar es Salaam, Tanzania. Regarding the use of psychoactive substances including cigarette, khat, cannabis, and alcohol the EDS and EDS-free participants displayed a similar pattern. We also found that major accidents (injury to driver/passengers and damage to the vehicle) were associated with EDS as defined by the ESS.

RECOMMENDATIONS

- Though the factors responsible

- In addition, the for accidents are multidimensional and multifactorial, daytime sleepiness and obstructive sleep apnea are amenable risk factors that can readily be detected through the use of simple screening tools like the ESS.

- Policy makers should institute and enforce strict driving principles and regulations for commercial drivers, Screening for psychoactive substance use among long distance bus drivers should be done.

- Contribution of sleep disorders to road accidents and loss of lives in highways in developing countries like Tanzania is a poorly understood subject. This study hopes to improve upon and, possibly, stimulate more research.

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APPENDICES

Appendix I: Questionnaire/Data Collection Sheet

Date of interview _____, S/N. _____

PART I: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Year of birth_____
2. Gender _____
3. Level of education____[0=Noeducation,1=Primary,2=Secondary,3=vocational, 4=university]
4. Marital status_____ [0=single, 1=Married, 2=Cohabiting, 3=Divorced, 4=Widowed]

PART II: MEDICAL HISTORY:

5 Do you have any health problem currently?

6. Have you ever smoked cigarette? [0=never, 1=yes but quitted, 2= Yes, till now]

7. Have you ever chew cat? [0=never, 1=yes but quitted, 2= Yes, till now]

8. Have you ever smoked weed? [0=never, 1=yes but quitted, 2= Yes, till now]

9. Do you drink alcohol? _____ [0=never, 1=yes but quitted, 2= Yes, till now]

PART III: CLINICAL AND ANTHROPOMETRIC MEASUREMENTS

10. Systolic BP _____mmHg

11. Diastolic BP _____mmHg

12. PR _____beats/min

13 .Weight _____kg

14. Height _____cm

15. Neck circumference _____cm

16. Waist circumference _____cm

17. Random blood glucose _____(mmol/L)

PART IV: WORKING EXPERIENCE

18. Working experience as a driver [0=No experience,1=,<1, 2=<3,3=<5,4=>10 years

19. Working experience as a bus driver [0=No experience, 1=<1,2=<3,3=<5,4=>10years

20. In past one year how many accidents have you encountered: major…….

Minor……..

Major accident: The one where passengers are injured/death &vehicle is destroyed.

Minor accident: The one where only vehicle is destroyed but passengers are safe

VALIDATED EPIWORTH SLEEPINESS SCALE

Use this scale to choose the most appropriate number for each situation

0 = would never doze 2 = moderate chance of dozing

1 = slight chance of dozing 3 = high chance of dozing

It is important that you circle a number (0 to 3) for EACH situation

SITUATION	**CHANCE OF DOZING**
1. Sitting and reading	0 1 2 3
2. Watching television	0 1 2 3
3. Sitting inactive in a public place (theater/meeting)	0 1 2 3
4. As a passenger in a car for an hour without a break	0 1 2 3
5. Lying down to rest in the afternoon	0 1 2 3
6. Sitting and talking to someone	0 1 2 3
7. Sitting quietly after lunch (with no alcohol)	0 1 2 3
8. In a car, while stopped in traffic	0 1 2 3

Total score……..

Appendix II: Dodoso – Kiswahili

Tarehe ya usaili_____S/N_____

SEHEMU I: TAARIFA YA KIJAMII

1. Mwaka wa kuzaliwa (miaka) _____

2. Jinsia _____

3. Kiwango cha Elimu_____ [0=sijasoma, 1=msingi 2=Sekondari, 3=ufundi, 4=chuokikuu]

4. Hali ya ndoa_____ [0=sijaoa, 1=nimeoa, 2=naishi na mwanamke, 3=tumetalikiana, 4=mjane]

SEHEMU II: HISTORIA YA KIAFYA

5. Je unatatizololote la kiafyakwasasa?

.....

6. Je, umeshawai kuvuta sigara? _____ [0=hapana, 1=ndio, lakini nimeacha, 2= ndio, vado naendelea]

7. Je,umeshawai kutafuna mirungi? _____ [0=hapana, 1=ndio, lakini nimeacha, 2= ndio, vado naendelea]

8. Jeumeshawaikuvutabangi? _____ [0=hapana, 1=ndio, lakini nimeacha, 2= ndio, vado naendelea]

9. Je umeshawai kunywa pombe? _____ [0=hapana, 1=ndio, lakini nimeacha, 2= ndio, vado naendelea]

SEHEMU YA III: UCHUNGUZI NA UPIMAJI WA MWILI

10. Shinikizo la damu Systolia _____mmHg

11. Shinikizo la damu Systolia Diastolia _____mmHg

12. Kasi ya mapigo ya moyo _____mapigo/dakika

13. Uzito _____kg

14. Urefu _____sm15.Mzingo washingo _____sm

16.Mzingo wa kiuno_____sm

17.Kiwango cha glukosi kwenye damu _____ (mmol/L)

SEHEMU YA V: UJUZI WAKAZI

(swali la 18-19 zungushia jibu lililosahihi)

18. Je unaujuziwa muda gani katika kazi ya udereva?

0=sinaujuzi,

1 ujuzi chini ya mwaka mmoja,

2=ujuzi chini ya miaka mitatu

3=ujuzi chini ya miaka mitano

4=ujuzizaidi ya miakakumi.

19. Je unaujuziwa muda gani kama dereva wa basi linalosafiri umbali mrefu?

0=sinaujuzi**,**

1=ujuzichini ya mwaka mmoja,

2=ujuzichini ya miaka mitatu

3=ujuzi chini ya miaka mitano

4=ujuzi zaidi ya miaka kumi.

20...Je katika kipindi cha mwaka mmoja umepata ajali ngapi

Kubwa……..

Ndogo……

NB: Ajali kubwa ni ileiliyoumiza chombo chausafiri pamoja na abiria na ndogoni ile iliyoumiza chombo chausafiri pekee na abiria kubaki salama

SEHEMU YA IV: DODOSO LA EPIWORTH SLEEPINESS SCALE:

Chagua namba sahihi kati ya **0, 1,2,3** kujibu maswali yaliyoainishwa hapa chini

0=Huwa sipati usingizi

1=nasinzia kwa kiwango kidogo mno

2=Nasinzia kwa kiwango cha kawaida

3=Nasinzia kwa kiwango kikubwa

Ni vizuri ukazungushia jibu kati ya 0-3 katika maswali yafuatayo

MATUKIO **HALI YA USINGIZI**

Ukiwa umekaaa ama unasoma 0 1 2 3

Ukiwa unaangalia luninga 0 1 2 3

Unapokuwa umekaa bila shughuli yoyote eneo la waz i(mkutanoni/ kwenye ukumbi wa sinema 0 1 2 3

Ukiwa kama abiria unayesafiri kwenye gari linalosafiri mwendo wa saa bila kusimam

0 1 2 3

Ukiwa umepumzika mchana 0 1 2 3

Ukiwa unaongea na mtu 0 1 2 3

Ukiwa umekaa kimya baada ya kumaliza kula mlo wamcha na (bila kilevi cha aina yoyote)

0 1 2 3

Ukiwa ndani ya gari wakati umesimamishwa na askari wa usalama barabarani

0 1 2 3

Jumla ya alama……..

Appendix III: Information Sheet

Greetings Sir/Madam

My name is _____ I am collecting data for the study on prevalence of excessive daytime sleepiness (EDS) and its associated factor among long distance bus drivers in Dar-es-salaam Tanzania.

What is the aim of this research?

The aim of this study is to determine the magnitude of prevalence of excessive daytime sleepiness (EDS) and its associated factor among long distance bus drivers in Dar-es-salaam Tanzania.

What does Participation Involves?

It involves answering questions from a structured questionnaire and taking important measurement namely body weight, height, and neck and waist circumference.

Confidentiality

All information obtained from you during the conduct of this research will remain confidential, and will only be shared to you. However, note that data collected will be analysed and shared scholarly among other people.

Are there and risks and benefits if I participate in this study?

Generally there are no risks involved in your participation in this research. There is no any direct individualized benefit if you participate in the study and equally there are is no harm if you decline to participate in the study.

Do I have a right to participate or withdraw from the study?

You are free to decide whether or not to participate in this study, and you may decide to withdraw at any time after you have consented.

Whom to Contact in case of any query?

If you have any questions about this study, please contact, Dr Faith Melchiory Kundy Department of Internal Medicine, Muhimbili University of Health and Allied Sciences (MUHAS), P.O.Box 65001, Dar-es-Salaam. Mobile: 0657926892/0687958392

If you have any questions about your rights as a participant in this study,

Please contact **The Chairman of the Research and Publications Committee, Prof. Moshi MUHAS, P.O.Box 65001, Dar-es-Salaam. Tel: 022 2152489.**

I declare that I have read (or read for) and understood all the information above, and I hereby willingly and without coercion agree to participate in this study.

Signature _____Date _____

Appendix IV: Fomu ya Maelezo

Salaam!

Jina langu ni _____. Ninashiriki kukusanya data kwa ajili ya utafiti unaofanywa juu ya ukubwa wa tatizo la kupumua kwa shida wakati wa kulala na sababu zinazo ambatana nazo. Utafiti huu unafanyika hapa Dar es Salaam, Tanzania.

Je, lengo la utafiti huu ni nini?

Lengo la utafiti huu ni kujua ukubwa watatizo la shida ya kupumua wakati wa kulala na sababu zake.

Je, ushiriki wangu utafanyika nini?

Kushiriki kwako ni pamoja na kujibu maswali ya dodoso utakayo ulizwana pia kufanya upimaji wa uzito wa mwili, urefu, shinikizo la damu, upana wa kiuno na upana washingo

Usiri

Taarifa zote tutakazokusanya zitakuwa siri na hazitatumiwa namtu au taasisi nyingine yeyote zaidi ya mtafiti. Hata hivyo data hizi zitatumika kwa minajili ya kisomi

Je zipo faida au hatari zozote nikiamua kushiriki kwenye huu utafiti?

Hakuna faida au hasara ya moja kwa moja ya wewe kuamua kushiriki katika utafiti huu.

Je, nina haki ya kushirki au kujitoa kwenye utafiti muda wowote?

Una uhuru wa kuamua kukubali au kukataa kushiriki utafiti huu. Pia unaweza kujitoa wakati wowote.

Je, nikiwa na swali lolote juu ya utafiti huu niwasiliane na nani?

Ukiwa na maswali yeyote kuhusu utafiti huu tafadhali wasiliana na Dk. Faith Melchiory Kundy, Idara ya Tiba, Chuo Kikuu chaTiba na Sayansi za Afya Muhimbili, S.L.P 65001, Dar-es-Salaam, Simu ya Mkononi: 0657926892/0687958392.

Ukiwa na swali lolote kuhusu haki zako kama mshiriki wa utafiti huu tafadhali wasiliana na Mwenyekitiwa Kamati ya Utafiti na Uchapishaji, chuo kikuucha Tiba na Sayansiza Afya Muhimbili, S.L.P 65001, Dar-es-Salaam. Simu ya ofisini: 022 2152489.

Fomu ya Idhini

Nakiri kwamba nimesoma (kusomewa) maelezo yote yanayohusiana na utafiti huu na nimeelewa lengo lake na nakubali kushiriki kwenye utafti huu kwa hiari yangu mwenyewe bila kushurutishwa

Sahihi _____Tarehe _____