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PREVALENCE AND ASSOCIATED FACTORS FOR LOWER BACK PAIN AMONG PROFESSIONAL BUS DRIVERS

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ABSTRACT

Lower back pain (LBP) is one of the commonest causes of morbidity and has a significant social, economic and health impact. Identifying LBP prevalence and the associated factors is a current global necessity. Studies show that professional drivers are at an increased risk for LBP due to prolonged exposure of whole body vibrations, shocks and jolts, prolonged sitting, and postural factors. This study will help identify the prevalence of LBP in this professional group and the associated factors related. Study followed an analytical cross sectional study design. Data was collected through an interviewer administered questionnaire from 140 participants. Out of which 39.3% (n=55) complained of lower back discomfort, 40.7% (n=57) complained of lower back pain, 27.1% (n=38) suffered from lower back stiffness and 17.9% (n=25) had lower back tenderness during the past 12 months. Medical related absenteeism was also found in drivers suffering from LBP, 15% (n=21) of the drivers were absent from work for between 1-7 days and 2.1% (n=3) for more than 30 days. A statistically significant relationship was found between age (p=0.035) and number of driving hours per day (p=0.010) with the presence of lower back discomfort during the past 12 months. Measures should be taken to initiate awareness programs for the bus drivers to improve their back discipline and back issues arising from poor posture. Making the steering wheels and driving seats adjustable should be taken into consideration as well.

Keywords: Lower back pain, Drivers

INTRODUCTION

Lower back pain is one of the commonest causes of morbidity and has a significant social, economic and health impact on the individuals affected. 60-80% of global adult population experience Lower Back Pain (LBP) at some point of their life. LBP is one of the commonest causes for absenteeism, hospitalizations, medical consultations and surgical interventions among the working population (Ganesan et al., 2017). This number has been on the rise for the past decade and now it is at a stage where it's affecting the productivity and efficiency of the work force.

LBP is one of the commonest causes for absenteeism, hospitalizations, medical consultations and surgical interventions among the working population (Ganesan et al., 2017, Ramadas & Jella., 2018). According to the international classification of impairments, disabilities and handicaps by the World Health Organization, lower back pain is a condition revealing loss or abnormality of the structure of the lumbar spine with psychological, physiological or anatomic etiology or, as a deficiency that causes a disability limiting or preventing full performance of physical activities (World Health Organization, 1980).

This study focus on assessing the prevalence of lower back symptoms

including lower back pain, lower back stiffness and lower back tenderness in professional bus drivers who are at higher risk of developing these symptoms. This study mainly focuses on the lower back pain since it's the commonest lower back symptom found in this professional group. Lower back pain is defined as "pain that occurs posteriorly in the region between the lower rib margin and proximal thighs (Helfenstein et al., 2010). Bovenzi and Betta (1994) defines LBP as "ache or pain in the lower part of the back during life time or within the previous 12 months or 1 month". Lower back stiffness in a mechanical back disorder is defined as "stiffness of short duration lasting less than 1 hour" (Scheeleet al., 2012). Lower back tenderness is defined as "sensitivity to touch or palpation in the region between the lower rib margin and proximal thighs posteriorly" (Nice et al., 1992).

According to previous studies, 40-60% of the working adult population suffer from LBP in the western setting (Dunn, et al., 2013; Froud, et al, 2014). Data of an Asian population on the subject is not very common. In the available studies it's concluded that LBP rates are higher in low income countries than in high income countries. According to available research statistics, LBP prevalence in low income countries is higher among urban populations than among rural populations. (Earnest, 1997.) LBP is one of the disorders that have a high economic impact among the working population across the world. Within the total workforce, several studies have shown that professional drivers are at increased risk of developing lower back pain compared to the rest of the population (Alperovitch-Najenson, et al., 2010; Robb, & Mansfield, 2007). Lower back pain or lumbar pain has long been identified as a major reason for absenteeism and as one of the disorders having a high economic impact globally. Professional drivers are at an increased risk for low back pain and injury due to a range of reasons including whole body vibrations, shocks and jolts, prolonged sitting, and postural factors Prevalence rates of lower back pain have been found to include 81% of bus drivers, 60% of truck drivers and 51% of taxi drivers. (Robb, & Mansfield 2007).

Studies have estimated that 5-10% of people experience LBP resulting in severe morbidity increasing health care costs, sick leaves and individual suffering and it's one of the commonest reasons for seeking medical care (Ganesan et al., 2017, Ramadas & Jella., 2018). Direct and indirect financial costs of LBP are considerable in developed countries. In developing countries, the indirect financial costs are higher than direct costs for medical care due to reduced productivity and lack of interest in seeking medical care (Ramadas & Jella., 2018). So it's important to identify the prevalence of LBP, improving productivity and reducing absenteeism, thereby reducing the direct and indirect costs from LBP.

Sri Lanka as a middle income, developing country uses the public transportation system as its key transportation method, in which long distance bus rides play a main role. The country has a large number of professional bus drivers and Sri Lankan studies are scarce on the prevalence of lower back symptoms among them. So this study plans to assess the prevalence of lower back symptoms, mainly focusing on lower back pain in professional bus drivers. This study also focuses on assessing the associated factors that influence in increasing the prevalence of LBP in the target group. Findings of the study will be beneficial in early diagnosis and prevention of chronicity of the pain and thereby achieving better quality of life.

LITERATURE REVIEW

Lower back pain and Occupational lower back pain

Lower back pain has been identified as one of the commonest causes for medical consultations, hospitalizations and surgical interventions (Helfenstein et al., 2010). So the need to identify the prevalence of lower back pain among the Sri Lankan adult community and looking at this from a social and economic point of view is both important and necessary.

Back pain in working individuals is a common presenting complaint in primary health care settings. Back pain is classified as occupational back pain is when it occurs as a consequence of the individual's occupational activity. Occupational low back pain is the largest single health problem related to work and absenteeism (Robb, & Mansfield, 2007). It's commonly seen among workers aged less than 45 and is responsible for approximately one quarter of all cases of early occupational invalidity (Marras, 2000). Occupational lower back pain is related to work incapacity, reduced productivity, and absenteeism and increased insurance payments. Since it affects the economy of the active part of the population and the country's economy and it should not only be analyzed as a medical issue, but also as a social and economic problem.

According to previously carried out studies lower back pain most commonly affects men above 40 of age and women between 50 and 60 years of age (Marras, 2000). The prevalence of low back pain in the general population has been identified to be between 50 and 80% (Frank et al., 1996)

Driving and Lower Back Pain

Spinal disorders are a prominent health concern among professional drivers. It involves both neck and back pains but shows a higher prevalence of back pain (Anderson, 1992). Studies have found an increased risk of anterior disc bulges among machine drivers, which includes mechanical stress from sitting posture and exposure to vibration. The frequency of discomfort or pain increased with higher annual mileage (Porter, & Gyi, 2002). Drivers with higher driving durations more than 4 hours per day have been identified as more susceptible for LBP (Chen, et al., 2005). According to previous studies proportion of people with orthopedic diseases amounts to 77.1% among transport workers and the lumbar region was found to be most frequently damaged. Study participants of multiple studies had complained for having pain for more than 5 years, 94.6% had acute pain with restricted spinal functions. Neck, back, shoulder, knee and thigh areas had the highest 12-month pain prevalence from 35-60% and 90% of discomfort was related to bus driving (Bagirova & Ignatcheva, 2001; Szeto & Lam, 2007).

Prevalence of Lower Back Pain in Professional Drivers

Epidemiological evidence shows that the back pain prevalence in professional drivers is considerably higher than the normal reference values. Machine drivers, forklift drivers, bus drivers, agriculture tractor drivers and other professional drivers are at a higher risk of LBP and spinal disorders (Chen et al., 2005, Bovenzi, et al., 2006). Out of which bus drivers are at a higher risk of lower back issues. LBP prevalence in bus drivers exceeded the control groups' prevalence in several symptoms such as leg pain, acute lower back pain and lower back pain. These health issues are faced by drivers in both developed and developing countries (Bovenzi & Zadini, 1992).

Professional drivers are at a higher risk for developing LBP, however the exact reasons for this are poorly understood. In an Israeli study done in 2010, 45.4% of the sample reported experiencing LBP in the

past 12 months (Najenson et al., 2010). A study conducted in California concluded that 80.5% of the drivers and 50.7% of non-drivers suffered from neck and back pain. Out of the 80.5% of the drivers suffering from spinal pain 53.9% complained of mild pain while 10.2% had severe pain. In Taiwan the prevalence of LBP in professional drivers were found to be 51% (Chen et al., 2005). Studies have found a high prevalence of 60.4% of LBP among Malaysian commercial vehicle drivers (Chen et al., 2005). Studies conducted on truck drivers in 2000 found that 50.3% of the sample suffered from LBP (Miyamoto et al., 2000). Other studies have found that forklift operators have a higher prevalence of LBP than non-drivers. Professional car drivers who drive for more than 4 hours per day are at a higher risk of LBP and car driving has been reported to be one of the risk factors for lumbar disc prolapse (Hoy et al., 2005). Car drivers who drive as a part of their job complain more of LBP than those who primarily sit and stand for work and drive cars during commute (Porter & Gyi, 2002). A study conducted among Chinese truck drivers, showed a LBP prevalence of 86.1% (Yu et al.,2002) and several studies conducted in India showed a 94.6% prevalence of acute LBP and restricted spinal function among automobile drivers (Bagirova & Ignatcheva, 2001; Gangopadhyay & Dev, 2012). Studies found a 64.6% of back pain prevalence in commercial motor drivers out of which 59.3% had lower back pain.

Out of these different driving groups, bus drivers are at a higher risk of LBP symptoms (Gangopadhyay & Dev, 2012), prevalence of LBP is 57% among bus drivers and 40% among the group of other vehicle drivers. Also they found a significant rise in lumbar disc herniation in bus drivers compared to the study group. A study conducted in Senegal found chronic LBP among bus drivers and out of the sample of 69 cases, 54% complained of chronic LBP and 31.64% showed X-ray abnormalities (Mbaye et al., 2002). A study conducted in India shows a 70.8% of LBP prevalence among public transport bus drivers, compared to the 51.6% prevalence of non-drivers (Jadhav, 2016).

Health condition of public transport drivers is one of the major factors in assuring the safety of passengers. These health issues, especially musculoskeletal issues, directly affect their reaction time and reaction speed, putting passengers at risk (Gangopadhyay & Dev, 2012). In order to prevent this and get optimal functions their MSK issues especially spinal and lower back issues should be identified and addressed early.

Risk factors for Lower back pain among professional drivers

A large number of studies on LBP among professional drivers have found a range of risk factors that might be leading to symptoms. These risk factors can be sociodemographic, work related or health related risk factors.

Sociodemographic factors

Proportions of spinal injuries increase with age. Majority of the sample having lower back issues were at the age between 30-50 years, with service duration of more than 10 years (Hakim & Mohsen, 2017; Bagirova & Ignatcheva, 2001).

Work related factors

Studies have found that frequent bending and twisting while driving can lead to LBP, as well as constrained forward flexed and twisted postures (Chen et al., 2005). Irregular duty time, short resting time, and long driving time in a day are significantly related to high prevalence of lower back pain (Miyamoto, et al., 2000). Studies have found long hours of driving, a regular shift of over 12 hours per day has a significant contribution toward increasing LBP prevalence (Albert, et al., 2014). According to further studies even a driving shift of 8 hours per day can lead to LBP (Hakim & Mohsen, 2017). Most of

the studies have also found that drivers worked for 9-10 hours per day on an average, 5 days per week, putting them at an increased risk for lower back issues.

Studies found that occupational factors of prolonged sitting in constrained posture (Szeto & Lam, 2007; Jadhav, 2016), prolonged exposure to whole body vibration (Bovenzi, et al., 2006; Tamrin et al., 2007), vibration dose, vibration magnitude, duration of exposure/years of service (Bovenzi, et al., 2006), work related injuries (vehicle collisions) (Hakim & Mohsen, 2017; Chen, at al., 2005) were most related to musculoskeletal discomfort. Prolonged sitting behind the wheel causes significant postural strain on the back muscles and lumbar spine, and physical over strain is accounted for high prevalence of LBP in professional drivers (Bagirova & Ignatcheva, 2001; Bovenzi, et al., 2006). Also work-related factors such as length of employment has a direct connection was high LBP prevalence (Tamrin, et al.,2007).

Health related factors

Studies have found smoking to be associated with higher prevalence of LBP (Bagirova & Ignatcheva, 2001). According to previous studies smoking is a weak indicator of LBP According to Alkherayf et al., (2010) the prevalence of LBP was higher in daily smokers but was less obvious in occasional smokers and the association between LBP and smoking was stronger in young adults. Also the risk of LBP was higher with a higher smoking dose and with number of cigarettes smoked and years of smoking. A relationship was found between past and current smoking with the prevalence of non-specific LBP (Goldburg. Et al., 2000). Former smokers have a higher prevalence of low back pain compared with non-smokers, but a lower prevalence of low back pain than current smokers, both current and former smokers have a higher prevalence and incidence of low back pain than non-smokers (Shiri, et al., 2010).

Studies on the effect of alcohol consumption on LBP are not common. A systemic review conducted by Leboeuf-Yde (1999) have found no positive link between alcohol consumption and LBP.

Studies have found that bus drivers are at a higher risk of suffering from non-communicable disorders including diabetes, hypertension, hypercholesterolemia (Jadhav, et al., 2017; Odeyinka, et al., 2017).

How to address the issue of LBP among Professional Drivers?

Ergonomic and occupational risk factors leading to LBP can be modified by proper organizational strategies and health plans. Ergonomic changes in the driving cabins like making the seats and back rests adjustable and more comfortable and the steering wheels and the dash boards more adjustable will help to reduce the risk of LBP as well as scheduling changes of the duty shifts to address the psychological risk factors leading to LBP.

An improvement in working conditions reduce the incidence of LBP to some extent (Miyamoto, et al., 2000). Drivers with more adjustable seats had fewer reported musculoskeletal issues (Porter, & Gyi, 2002). Undamaged roads, ergonomic design of bus seats, medical screening during placement and regular medical examinations will help reduce the prevalence of LBP (Mbaye, et al., 2002). Bus drivers should be covered by especially designed preventive programs, turning attention to health promotion at and outside of work as well.

METHODOLOGY

This study followed a descriptive cross sectional study design, with the participation of 140 professional bus drivers. There were around 1500 employees in the selected study

population. A sample size of 200 was calculated with 95% confidence interval and 5% margin of error.

Kesbewa and Maharagama central bus dispensaries and the National Transport Medical Institute, Nugegoda were used as the study setting. Data was collected from 140 participants, selected using convenient sampling. All the bus drivers were informed of the study and data was collected from all the bus drivers who were willing to participate and met the inclusion criteria. The inclusion criteria were participants who have more than one-year experience as a professional bus driver, and drivers who did not have acute or chronic back injury, back surgery or history of traumatic accidents.

Data was collected through two interviewer administered questionnaires. One questionnaire collected participants' socio-demographic data on their age, marital status, education level, medical history (hypertension, diabetes, heart disease), driving distance, driving duration, smoking and alcohol consumption. Data on presence of lower back pain, its duration and other symptoms was also collected. The questionnaires were designed based on validated questioners of the topic and the findings of previous studies on similar topics. The questionnaires were designed in English and were translated to Sinhala and back translated to increase their validity. The questionnaires were finalized after expert feedback.

The collected data was analyzed using SPSS version 21. Descriptive analytical methods, and chi square were used to analyze the data.

RESULTS

Sociodemographic factors

Age, marital status and education level of the participants

The sample included 140 male bus drivers between the ages of 23 and 58 years. The mean and standard deviation of the age of the participants was 39±7.85 years. Majority of the participants (51.4%) were between the ages of 36-45 years.

The majority in the study population were married (n= 120, 85.7%) and had completed the GCE.O/L examination (n=97,69.3%).

Table 1: Age and Education Level distribution of the participants

Age groups (years)	Frequency		Education Category	Frequency
20-25	6 (4.3%)		<Grade 5	3 (2.1%)
26-35	38 (27.2%)		Grades 5-9	19 (13.6%)
36-45	72 (51.4%)		G.C.E O/L	97 (69.3%)
46-55	17 (12.1%)		G.C.E A/L	18 (12.9%)
>55	7 (5%)			
Total	140		Total	138

*Information on education level of two participants was missing

Work related factors

Driving Distance of the participants

The highest driving distance in the group was 405 km and the lowest driving distance was 6 km, with a median distance of 116 km. The sample can be divided into drivers who drive more than 100 km drivers (long distance drivers) and who drive less than 100 km (short distance drivers).

Majority of the drivers (n=77, 55%) were long distance drivers, driving a distance of 130-299 km (213.71±34.90). A considerable number of drivers (n=63, 45%) also drove a shorter distances of 10-59 km with a mean and standard deviation of (28.24±15.51). (The driving distances obtained are the distances driven continuously without a minimum rest period of an hour).

The long distance group included drivers from Colombo to Jaffna (n=3, 3.9%), Anuradhapura (n=25, 32.5%), Ampara (n=2, 2.6%), Badulla (n=2, 2.6%), Embilipitiya (n=1, 1.3%), Galle (n=3, 3.9%), Kandy (n=8, 10.4%), Kurunegala (n=1, 1.3%), Matara (n=7, 9.1%), Pollonnaruwa (n=1, 1.3%), Tangalle (n=1, 1.3%), Tricomalee (n=1, 1.3%), Walapane (n=3, 3.9%) and Vavuniya (n=19, 24.7%).

The short distance drivers' driving routes included Angoda, Awissawella, Bandaragama, Battaramulla, Eheliyagoda, Homagama, Ingiriya, Kadawatha, Panadura, Kalutara, Katunayake, Kottawa, Kadawatha, Malabe, Maharagama, Kegalle, Kiribathgoda, Mathugama, Ragama and Kesbewa from Colombo.

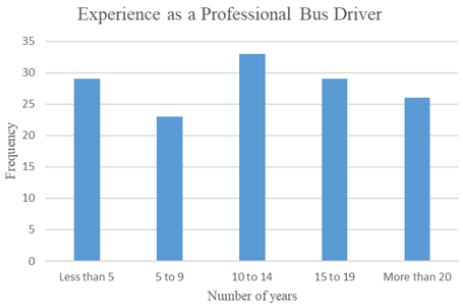
Table 2: Driving Distance to the Destination

Driving Distance (km)	Frequency	(%)
>300	5	3.6
201-299	27	19.3
130-200	33	23.6
100-129	12	8.6
60-99	4	2.8
30-59	20	14.3
11-29	35	25
< 10	4	2.8
Total	140	100

Employment Duration of the Participants

Data was collected from bus drivers who worked as professional drivers for more than one year. Within the study population, the mean number of years working as a professional driver was 12±10.26 years. The longest service duration as a professional driver within the study population was 35 years.

Figure 1: Years of Experience as professional bus drivers



Number of Driving Hours per Week

The study found 82.9% (n=116) of the drivers in the study sample had a driving shift of more than 8 hours per day on an average working day. Majority of the study population (n=91, 65%) had a driving time between 50-100 hours per week. Only 7.1% (n=10) had driving time less than 30 hours per week and 1.4% (n=2) had more than 100 hours of driving time during an average working week.

Health related factors

Non communicable Disease

Data regarding non-communicable diseases (NCDs) among the participants revealed that the prevalence of diagnosed NCDs among them was at a considerably low level. Data regarding the participants who are currently on medication for hypertension, diabetes, asthma and heart disease was collected. Only 6.4% (n=9) suffered from diabetes, 3% (n=4) of the participants suffered from hypertension and 0.7% (n=1) was on medication for some form of heart disease.

Smoking and Alcohol Consumption

Data regarding smoking habits of the participants revealed that the majority of 45.2% (n=62) of the drivers in the sample were current smokers, 31.4%, (n=43) were non-smokers, 23.4% (n=32) was ex-smokers.

Majority of the current and previous smokers (51%, n=48) have been smoking for between 1-9 years and 34% (n=32) has been smoking for between 10-19 years, 5.3% (n=5) had been smoking for between 20-29 years and only 1.0% (n=1) for over 30 years, 7.9% (n=11) has been smoking for less than a year. A considerable majority of 74.4% (n=70) of current and previous smokers has smoked between 1-19 cigarettes or cigars per day and 3.1% (n=3) of the sample were heavy smokers smoking between 20-29 cigarettes or cigars per day and 22.3% (n=21) has been smoking one or less cigarette or cigar per day.

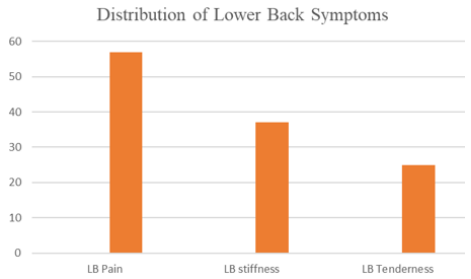
A considerable 82.9%, (n=112) of the participants were found to be current and former alcohol users. Majority of the current or former alcohol users (52.6%, n=59) have been using alcohol for between 1-9 years, 31.25% (n=35) has been consuming alcohol for between 10-19 years, 4.4% (n=5) had been using alcohol for between 20-29 years and 2.6% (n=3) for over 30 years, 8.9% (n=10) has been using for less than a year.

However, only 1.7% (n=2) were very frequent alcohol users, using alcohol on a daily basis and 8.9% (n=10) used alcohol more than 4 days per week, 31.25% (n=35) were using alcohol at a frequency of less than 4 days per week. While the majority of 35.7% (n=40) was using alcohol far lesser frequently i.e. about for once a month with 22.3% (n=25) using alcohol even less frequently than once a month.

Prevalence of LBP among Professional Drivers

Out of the total study population (n=140), 40.7% (n=57) complained of lower back pain, 27.1% (n=38) suffered from lower back stiffness and 17.9% (n=25) had lower back tenderness during the past 12 months.

Figure 2: Distribution of Lower Back Symptoms



Out of the 40.7% (n=57) of the study population who suffered from lower back pain, 64.9% (n=37) had pain episodes lasting for less than 30 minutes, 14% (n=8) had pain lasting between 30-90 minutes and a significant 21% (n=12) had pain lasting for more 120 minutes.

Out of the study population who suffered from LBP, 36.8% (n=21) suffered from acute LBP with pain for less than 6 weeks, 17.5% (n=10) had sub-acute LBP having pain for 6-12 weeks, 45.6% (n=26) suffered from chronic LBP with pain persisting longer than 12 weeks. The study found that LBP directly affects productivity and efficiency of the drivers, 7.9% (n=11) of the drivers who suffered from LBP had to change their duties due to their condition and 12.9% (n=18) had to change their professional, personal and leisure activities due to back pain. Medical related absenteeism was also found in drivers suffering from LBP, 15% (n=21) of the drivers were absent from work for between 1-7 days of work due to LBP and 2.1% (n=3) were absent from work for more than 30 days of work during the course of their lower back pain. Only 18.6% (n=26) of the drivers who suffered from LBP had sought medical care for their LBP, out of which 2.9% (n=4) had to be hospitalized for treatment for LBP. Within the group of drivers who sought medical care the majority (12.1%, n=17) got treatment from a medical doctor and 3.6% (n=5) sought auyrvedic treatments.

The association between sociodemographic factors, work related factors and health related factors with low back pain among professional bus drivers

Sociodemographic Factors

The association of LBP and symptoms with driver's age

Pearson's chi square test was performed for the different age categories and presence of lower back pain, stiffness and lower back tenderness for the last 12 months. The analysis found a statistical significant relationship between age groups and lower back pain during the past 12 months (p=0.035).

No relationship was found between age and lower back stiffness (p=0.086) or lower back tenderness (p=0.666).

Work related factors

The Occurrence of LBP and symptoms with driving distance

The study focused on identifying the relationship between driving distance of professional bus drivers and the presence of pain, stiffness or tenderness in the lower back.

A statistically significant relationship was found between driving distance and pain in lower back (p=0.031) in professional bus drivers in the Western province. Further there was a statistically significant relationship between driving distance and stiffness in lower back in professional bus drivers (p=0.035). Presence of tenderness in the lower back showed a statistically significant relationship with driving distance (p=0.049).

Occurrence of LBP and symptoms with the number of driving hours

Pearson's chi square test was conducted on the number of driving hours per day and presence of lower back pain, stiffness and lower back tenderness for the last 12 months to identify a relationship between them within the study sample. The analysis found a statistically significant relationship with the number of driving hours per day and the presence of lower back pain during the past 12 months (p=0.010). No statistically significant relationship was found number of driving hours per day and lower back stiffness (p=0.347) or lower back tenderness (p=0.365).

Occurrence LBP and symptoms with duration of employment

The study focused on identifying the relationship between driving distance of professional bus drivers and the presence of pain, stiffness or tenderness in the lower back. A statistically significant association was found between the presence of lower back stiffness with employment duration (P=0.022) among professional bus drivers. No statistically significant relationship was found between employment duration and the presence of tenderness in lower back (p=0.555) or the presence of pain in lower back among professional bus drivers (p=0.265)

Health related factors

The occurrence LBP and symptoms with presence of NCDs

Data regarding the non-communicable diseases (NCDs) were collected from the participants who were currently on medication for hypertension, diabetes, asthma and heart disease. The study tried to assess the relationship between these NCDs and the presence of LB pain, stiffness and tenderness during past 12 months. The study assessed the association of hypertension with lower back pain, stiffness and tenderness. No statistically significant relationship was found between hypertension presence of lower back pain (p=0.405), stiffness (p=0.885) or lower back tenderness (p=0.808).

The association of diabetes with lower back pain, stiffness and tenderness was assessed. No statistically significant relationship was found between presence of diabetes and lower back pain (P=0.190), stiffness (p=0.119) or lower back tenderness (p=0.414).

The study assessed the association of heart disease with lower back pain, stiffness and tenderness. No statistically significant relationship was found between presence of heart disease and lower back pain (p=0.498), stiffness (p=0.685) or lower back tenderness (p=0.802).

Occurrence of LBP and symptoms with Smoking, Smoking duration and Alcohol usage, Duration of Alcohol usage

The study focused on assessing the relationship between smoking and

smoking duration with lower back pain, stiffness and tenderness in the sample.

No statistically significant relationship was found between lower back pain (p=0.238), lower back stiffness (p=0.422) and lower back tenderness (p=0.744) with smoking.

Table No. 3: Association of Lower Back Pain and symptoms with Smoking duration

Smoking Duration	Presence of LBP		Total	Presence of LB Stiffness		Total	Presence of LB Tenderness		Total
	Yes	NO		Yes	No		Yes	No	
< 1 year	1	10	11	0	11	11	0	11	11
1-9 years	22	26	48	12	36	48	5	43	48
10-19 years	18	14	32	13	19	32	9	23	32
20-29 years	2	3	5	0	5	5	1	4	5
> 30 years	1	0	1	1	0	1	0	1	1
Total	44	53	97	26	71	97	15	82	97

The study found a statistically significant association between duration of smoking and presence of lower back pain (p=0.039). There was a statistically significant association between duration of smoking and presence of lower back stiffness (p=0.039). The study found no statistically significant association between duration of smoking and presence of lower back tenderness (p=0.180).

No statistically significant relationship was found between lower back pain (p=0.437), lower back stiffness (p=0.364) and lower back tenderness (p=0.152) with alcohol usage.

No statistically significant relationship was found between lower back pain (p=0.061), lower back stiffness (p=0.375) and lower back tenderness (p=0.752) with duration of alcohol usage.

In summary, the current study has identified several factors having a significant relationship with lower back pain, stiffness or tenderness.

Table No. 4: Associated Factors of Lower Back Symptoms

Lower back Pain		Lower back Stiffness		Lower back Tenderness	
Associated Factor	*P value*	*Associated Factor*	*P value*	*Associated Factor*	*P value*
Age	0.035	Driving Distance	0.035	Driving Distance	0.049
Driving Distance	0.031	Employment duration	0.022		

Driving hours per day	0.01	Duration of smoking	0.039		
Duration of smoking	0.039				

DISCUSSION

Previous studies have identified that LBP is common in adult populations globally and the prevalence is higher in low to middle income countries ((Hoy et al., 2003; Jin et al., 2004; Earnest, 1997). This high prevalence is identified to be higher in in certain occupational groups (Earnest, 1997).

Prevalence of Lower Back Pain

This study found a 40.71% (n=57) prevalence of LBP among the bus drivers. These findings are in line with existing literature which has found that drivers are more susceptible to postural pain in any part of spine, furthermore professional drivers are at a higher risk for developing LBP. (Anderson, 1992; Najenson et al., 2010; Chen et al., 2005; Tamrin et al., 2007; Miyamoto et al., 2000). A study conducted in India shows a 70.8% of LBP prevalence among public transport bus drivers, compared to the 51.6% prevalence of non-drivers (Jadhav, 2016). The prevalence identified in this study is lower than the prevalence found in several international studies; it's in line with a Sri Lankan study which found different occupational groups can have different LBP prevalence ranging from 12-30% depending on their profession (Warnakulasuriya et al, 2012). Existing data suggested that LBP was more prevalent among long distance bus drivers (Miyamoto, et al., 2000), this may be due to the fact that the long distance drivers face more traffic congestion, irregular working shifts and shorter break periods which have been identifies as risk factors for high prevalence of LBP (Miyamoto, et al., 2000). This study also found a statistically significant relationship between LBP and the driving distance.

Sociodemographic, work related and health related risk factors of LBP and other symptoms

Sociodemographic factors

According to the current literature spinal injuries and LBP prevalence increase with age. Few previous studies have found that the most at risk age group for LBP in men is above 40 years (Marras, 2000). While others have determined it to be between 30-50 years of age (Hakim & Mohsen, 2017; Bagirova & Ignatcheva, 2001). This study found the similar results, out of the group of bus drivers (n=57) who complained of LBP, 52% were above 40 years of age. Also this study found a statistical significant relationship between age groups and LBP during the past 12 months (p=0.035). These findings are in line with the previous study findings. These findings might be due to the physical changes in the body with age which makes the lower back more prone to over use and degenerative injuries leading to lower back pain and discomfort.

Work related factors

Studies have found that high prevalence of LBP had a relationship with service duration more than 10 years (Hakim & Mohsen, 2017; Bagirova & Ignatcheva, 2001). Majority (23.6%) of the study population have been working as drivers for between 10-14 years. This study found a statistically significant relationship between employment duration and lower back stiffness, These findings are in line with previous study findings which have found prolonged exposure to whole body vibration was casing LBP and other lower

back related symptoms (Bovenzi, et al., 2006; Tamrin et al., 2007), and the symptoms were related to vibration dose, vibration magnitude, duration of exposure/years of service (Bovenzi & Zadini, 1992; Bovenzi, et al., 2006), drivers who had longer service durations will be exposed to more dosage of whole body vibrations and might lead to the symptoms, however this study found no relationship between service duration and presence of LBP or presence of tenderness in the lower back

Studies have found that high prevalence of LBP had a relationship with long hours of driving more than 8 hours (Hakim & Mohsen, 2017) to 12 hours (Albert, et al., 2014) per day (Miyamoto, et al., 2000). This study found the similar result that there is a relationship between the increased number of driving hours and presence of LBP, this might be due to the fact that during long driving hours, drivers are in the same flexed and constrained posture leading to more spinal pain and discomfort. Prolonged sitting, flexed, twisted and constrained postures have been identified as risk factors for LBP by several previous studies as well (Chen et al., 2005; (Szeto & Lam, 2007; Jadhav, 2016; Bovenzi & Zadini, 1992), however no relationship was found between the presence of lower back stiffness and tenderness and number of driving hours.

Health related factors

Previous studies have found that the prevalence of non-communicable diseases in Sri Lanka to be at a high level (World Health Organization, 2015). The prevalence of diabetes mellitus was found to be 14.2% in 2005 (Wijewardene, 2005) and 10.3% in 2008 (Katulanda et al., 2008). Prevalence of hypertension was 18.8% (Wijewardene, 2005), and for coronary diseases it was found to be 16.1% (Mendis, 1994). This study found the prevalence of non-communicable diseases to be at a considerably low level. It found the prevalence of diabetes to be 6.4%, hypertension to be 3% and coronary diseases showed a prevalence of 0.7%. Data was collected only from the participants who were already diagnosed with the selected NCDs. The low prevalence found might be due to the fact that the participants are currently undiagnosed. In the interviews it was found that the participants didn't participate in regular medical checkups for identifying non-communicable diseases and they might be unaware of the fact that they are suffering from any medical condition. Previous studies have also found that majority of the participants suffering from diabetes were previously undiagnosed (Katulanda et al., 2008). The study found no statistically significant relationship between hypertension, diabetes, heart disease or asthma with lower back pain, stiffness or tenderness.

Studies have found smoking to be associated with prevalence of LBP (Bagirova & Ignatcheva, 2001). Also the risk of LBP was higher with a higher smoking dose and with number of cigarettes smoked and years of smoking. A relationship was found between past and current smoking with the prevalence of non-specific LBP (Goldburg. et al., 2000). In line with these findings, this study found a statistically significant relationship between duration of smoking with presence of lower back stiffness ($p=0.039$). However, this study found no statistically significant association between smoking and LBP, lower back stiffness or lower back tenderness. This might be due to the fact that the sample of former and current smokers was not adequate.

Studies on the effect of alcohol consumption on LBP are not common. A systemic review conducted by Leboeuf-Yde (1999) have found no positive link between alcohol consumption and LBP. In line with these findings the study found no statistically significant relationship

between lower back pain, stiffness or tenderness with usage of alcohol, duration or frequency of alcohol usage.

CONCLUSION

The study found that professional bus drivers have a 40.7% prevalence for LBP and it's affected by age, driving distance and number of driving hours per day.

Based on the findings, measures should be taken to initiate awareness programs for the bus drivers to improve their back discipline and back issues arising from poor posture. Making the steering wheels and driving seats adjustable should be taken into consideration. Adding a screening test to identify LBP during the mandatory medical examinations and making relevant referrals for treatment and awareness programs on proper preventive measures Eg: suitable exercise programs and necessary posture correction is also recommended. The findings of this study will be beneficial in identifying the social and economic impact of occupation related lower back pain and take necessary steps to prevent and minimize them.

However, no objective measurements of the pain were taken during the study. Objective physical assessment including measuring the strength and flexibility of core muscles and lower limb muscles will provide a better overall picture of the nature and the cause of pain. This study targeted a study population of 200 professional bus drivers and 140 drivers responded at a response rate of 70%. A larger sample size would give a better understanding of the population and the prevalence of LBP.

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