

Prevalence and Predictors of Musculoskeletal Disorders among Bus Drivers Engaged in Long-Distance Transportation in Port Harcourt, Nigeria

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Abstract:-

➤ Background

An increasing number of occupational injuries occur due to work-related musculoskeletal disorders (WRMSDs) in both developing and industrialized countries. These disorders have an impact on workers' health as well as society at large, posing medical, occupational, and economic challenges.

➤ Objectives

This research assessed work-related musculoskeletal disorders and its risk factors among Bus drivers for private long-distance Transport Companies in Port Harcourt, Nigeria.

➤ Materials and Methods

This study employed a cross-sectional study design. The multi-stage sampling technique was used to sample 338 long-distance bus drivers in the city of Port Harcourt. Participants' demographic data and information regarding work related musculoskeletal disorders were collected using a modified version of the Standardized Nordic Musculoskeletal Survey questionnaire. Descriptive statistics determined prevalence and inferential statistics was used to determine associated risk factors of WRMSD. The p-value of the test of statistical significance was set at ≤ 0.05 . The participants were all male.

➤ Result

58.6% of the research sample had WRMSDs, according to the findings. After logistic regression analysis, only marital status (AOR=5.714, 95% CI for AOR=3.046-10.721; $p=0.001$), prolonged sitting of ≥ 8 hours, (AOR=0.350; 95% CI for AOR=0.166-0.741; $p=0.006$) and previous history of pain in a previous occupation (AOR=5.714, 95% CI for AOR=3.046-10.721; $p=0.001$), were significantly associated with the prevalence of WRMSD.

➤ Conclusion

WRMSDs are prevalent in private long-distance bus drivers and are strongly correlated with marital status, prolonged sitting times (more than eight hours), and a history of muscle or joint discomfort in a prior job.

Keywords:- Work-Related Musculoskeletal Disorders, Risk Factors, Long-Distance, Port-Harcourt, Drivers.

I. INTRODUCTION

When work settings and occupational practices play a significant role in the development of musculoskeletal illnesses that impair function and create discomfort in different regions of the body, these conditions are recognized as work-related by the World Health Organization (WHO).¹ The muscles, tendons, ligaments, cartilage, nerves, and bones comprise the musculoskeletal system which shapes, supports, stabilizes, and moves the body.² Musculoskeletal diseases (MSDs) are the most prevalent work-related injuries that affect the human musculoskeletal system, causing discomfort and limiting physical activity. When a person is exposed to a musculoskeletal disorder risk factor, the part of the body that is exposed begins to tire, an imbalance may occur due to exhaustion if sufficient healing is not provided, and if the imbalance persists, a musculoskeletal problem will develop.³ Carpal tunnel syndrome, back pain, tendinitis, hand-arm vibration syndrome, neck tension syndrome are common musculoskeletal disorders.⁴ MSDs can result from a work-related exposure or individual exposure.³

Work-related musculoskeletal disorder (WRMSD) is the term used to describe the impaired functioning of different joints, muscles, tendons, nerves, and bones due to the work environment.⁵ Currently, WRMSDs account for 44% of all work-related illnesses and injuries in Great Britain, making them the most common health concerns among workers in both developed and developing countries.⁶ In addition to being one of the main factors contributing to activity-limiting illnesses in the working class, placing a heavy burden on both the employer and the employee and leading to absenteeism and lost work hours with a big financial impact.⁶⁻⁸ These

illnesses lead to significant morbidities, including physical harm and disability, a decline in life quality, and a significant financial strain on medical services.⁹

Driving more than 300 km in a range or more than three hours in a single trip is referred to be long-distance driving.¹⁰ Because Nigeria is such a densely populated country, people travel throughout its states on a regular basis. Road travel is the major means of public transportation for the average Nigerian due to the expensive cost of air travel. Bus drivers, particularly those who drive long distances, are directly faced with a rise in workload. Long-driving necessitates repetitive activities such as handling, bending, and sitting for long periods of time, all of which can cause undue stress on the body especially along the kinetic chain and have an effect on the driver's personal and social life.¹¹

WRMSDs are a public health issue with psychosocial, medical, occupational and economic consequences that affect not just the worker but the whole community. WRMSDs account for approximately 38.1% of all occupational diseases in Europe and approximately 70% of all paid occupational diseases in Korea.¹²

According to a study done in Tricity, India, the lower back and neck were the most often injured regions in transport workers, followed by the knee, shoulder, and ankle. The study found that the frequency of WRMSD was significant; at almost 53%.¹³ Another Canadian study comparing musculoskeletal pain in short and long-distance truck drivers found that long-distance truck drivers have a higher prevalence of musculoskeletal pain than those who drive short distances.¹⁴

A study of occupational drivers in Ibadan, Nigeria, discovered a high frequency of musculoskeletal pain, particularly in the lower back. According to the survey, the number of years spent driving is also associated to the chance of acquiring musculoskeletal pain. 89.3% of drivers said they had musculoskeletal pain in at least one portion of their body in the previous year.¹⁵

The researcher was inspired to investigate WRMSDs among long distance bus drivers in the Port Harcourt metropolitan after becoming concerned about whether long distance bus drivers in Rivers State will get WRMSD. This was due to the fact that road travel, particularly by bus, is a popular mode of transportation, which puts a strain on drivers, particularly those who travel great distances. Due to the hazardous nature of Nigerian roads and the country's high degree of insecurity, people's personal, social, and social lives are negatively impacted.

II. MATERIALS AND METHODS

➤ *Study Design*

A descriptive cross-sectional study design was used for this study.

➤ *Study Area*

The study was carried out at Port Harcourt, one of the primary hubs for Nigerian economic activity, which is situated in Rivers State between latitudes 4°45'N and 4°55'N and longitudes 6°55'E and 7°05'E.¹⁶ The city, which encompasses Port Harcourt City and the Obio/Akpor Local Government Area, is home to an estimated 1.85 million people as of 2016.¹⁷ Port Harcourt City serves as the terminus for the majority of buses entering the state. The study, which was limited to long-distance bus drivers, focused on motor parks around Oil Mill Junction, Waterlines, Rumuokoro, and the Aba road axis.

➤ *Study Population*

The study population is made up of male bus drivers for private transportation companies who have driven long distances—at least 300 km per trip, three times a week—for at least two years. Bus drivers who agreed to participate were enrolled in the study, but those who were ill or on leave at the time were excluded.

➤ *Sample Size*

The Cochran's formula was used to get the sample size (n).¹⁸

$$n = z^2pq/d^2$$

After adding a 10% non-response, the derived sample size was 329, making the total sample size 362.

➤ *Sampling Technique*

The drivers for the study were chosen through a multi-stage selection procedure that included the following simple random sample and cluster sampling methods:

➤ *Data Collection:*

The participants' sociodemographic details, medical history from the past and present, history of musculoskeletal disorders in the current occupation, and occupational history were all collected. The Nordic Musculoskeletal Questionnaire, which is used to assess musculoskeletal problems, was modified to be answered in a structured interview format.

➤ *Methods of Data Analysis:*

Microsoft Excel was used to enter the data, which was subsequently transferred and analyzed using the Statistical Package for Social Sciences (SPSS) version 24 program. The data were analyzed and presented in tables using exploratory descriptive statistics (frequency and percentages). Chi-square significant at $p=0.05$ and a 95% confidence interval were used for inferential statistics.

➤ *Ethical Considerations:*

Prior to the start of the study, permission was requested and obtained from the managers of the chosen transport

companies. The University of Port Harcourt's Research Ethics Committee granted ethical approval for this study under the reference number UPH/CEREMAD/REC/MM72/063. Prior to their inclusion in the trial, each driver provided their informed consent.

III. RESULTS

➤ *Research and Analysis*

A total of 362 questionnaires were distributed and collected; of those, only 338 were accurately completed for analysis, resulting in a 93% response rate.

Table 1: Socio-Demographic Characteristics of the Long-Distance Bus Drivers

Variable	Frequency (n=338)	Percentage (100%)
Age		
18-24 years	6	1.8
25-31 years	41	12.1
32-38 years	72	21.3
≥39 years	219	64.8
Level of education		
Primary	68	20.1
Secondary	238	70.4
Tertiary	32	9.5
Marital status		
Single	53	15.7
Married	285	84.3
Religion		
Christian	285	84.3
Islam	51	15.1
Others	2	0.6

The sociodemographic details of the private long-distance bus drivers are displayed in Table 1. All of the respondents were men, and the majority of them were Christians (n=285, 84.3%), married (n=285, 84.3%), had a secondary education (n=238, 70.4%), and were 39 years of age or older (n=219, 64.8%). The majority of drivers (n=267, 79.0%) have been in the industry for more than eight years, and 103 drivers (30.5%) had previously experienced joint or muscle pain in their line of work.

Table 2: The long-Distance Bus Drivers' Occupations and Past Medical Histories

Variable	Frequency (n=338)	Percent
How long have you been working as driver?		
2-4 years	13	3.8
>4-6 years	19	5.6
>6-8 years	39	11.5
>8 years	267	79.0
In your previous job, have you ever received a diagnosis or treatment for any joint or muscle pain?		
Yes	103	30.5
No	235	69.5
Which bodily part did the preceding job cause you to experience joint or muscle pain? (n=103)		
Shoulder	21	20.4
Lower back	18	17.5
One or both hips/thigh/buttocks	17	16.5
One or both knees	11	10.7
Elbow	9	8.7
Neck	9	8.7
Wrist/hand	8	7.8
Upper back	7	6.8
One or both ankles/feet	3	2.9

With 198 responders, the prevalence of WRMSDs was 58.6%. The most frequently affected body regions were the low back (n = 44, 22.2%), hip/thigh/buttocks (n = 35, 17.7%), and knee (n = 25, 12.6%).

Table 3: Risk Factors of WRMSDs among the Long-Distance Bus Drivers

Variable	Frequency (n=338)	Percent
How long do you sit while at work?		
<4hrs	51	15.1
4-8hrs	88	26.0
>8hrs	199	58.9
How often do you lift/carry heavy luggage in course of your work?		
Never	91	26.9
Rarely	48	14.2
Sometimes	110	32.5
Always	89	26.3
Do you feel regular vibrations while driving?		
Yes	101	29.9
No	237	70.1
What is your driving posture?		
Leaned backward with my back just touching the seat and my head just on the headrest	259	76.6
Leaned forward with my back not touching the seat and my head not touching the headrest	79	23.4

Table 4: Sociodemographic Factors Associated with WRMSDs.

Variable	Ever had muscle/joint pain		χ^2	df	p-value
	Yes (n=198)	No (n=140)			
Age					
18-24 years	4 (2.0%)	2 (1.4%)	8.619	3	0.035*
25-31 years	16 (8.1%)	25 (17.9%)			
32-38 years	48 (24.2%)	24 (17.1%)			
39 years and above	130 (65.7%)	89 (63.6%)			
Level of education					
Primary	37 (18.7%)	31 (22.1%)	1.147	2	0.563
Secondary	140 (70.7%)	98 (70.0%)			
Tertiary	21 (10.6%)	11 (7.9%)			
Marital status					
Single	22 (11.1%)	31 (22.1%)	7.549	1	0.006*
Married	176 (88.9%)	109 (77.9%)			
How long you have been working as driver					
2-4 years	2 (1.0%)	11 (7.9%)	11.155	3	0.011*
>4-6 years	11 (5.6%)	8 (5.7%)			
>6-8 years	26 (13.1%)	13 (9.3%)			
>8 years	159 (80.3%)	108 (77.1%)			
Has muscle or joint discomfort ever been identified or treated in your previous role?					
Yes	84 (42.4%)	19 (13.6%)	32.224	1	<0.001*
No	114 (57.6%)	121 (86.4%)			

Table 4 showed the sociodemographic factors identified to be associated with WRMSDs, and it was shown that age, marital status, duration of years respondent has been driving, and being diagnosed with muscle/joint pain in previous occupation were significantly associated with occurrence of WRMSDs in the present occupation. WRMSDs increased as the respondents age increased, from 2.0% among respondents between 18-24 years to 65.7% among those 39 years and above ($\chi^2=8.619$, $p=0.035$). It was also shown that most (88.9%) of the respondents who had ever experience muscle/joint pain in the present occupation were married as against 11.1% who were still single, and there was a statistically significant difference in this ($\chi^2=7.559$, $p=0.006$). Also, the occurrence of muscle/joint pain was shown to be significantly higher among respondents who have been driving for over 8 years than among those who have not driven for that long ($\chi^2=11.155$, $p=0.011$) and also significantly higher among respondents who had ever been diagnosed or treated for muscle/joint pain before, than among those who had ($\chi^2=32.224$, $p<0.001$).

Table 5: Risk Factors Significantly Associated with WRMSD

Variable	Ever had muscle/joint pain		χ ²	df	p-value
	Yes (n=198)	No (n=140)			
Number of hours spent sitting					
<4hrs	21 (10.6%)	30 (21.4%)	8.436	2	0.015*
4-8hrs	58 (29.3%)	30 (21.4%)			
>8hrs	119 (60.1%)	80 (57.1%)			
How often you lift/carry heavy luggage in course of your work					
Never	56 (28.3%)	35 (25.0%)	1.719	3	0.633
Rarely	31 (15.7%)	17 (12.1%)			
Sometimes	62 (31.3%)	48 (34.3%)			
Always	49 (24.7%)	40 (28.6%)			
Feel regular vibrations while driving					
Yes	60 (30.3%)	41 (29.3%)	0.041	1	0.840
No	138 (69.7%)	99 (70.7%)			
Driving posture					
Good	37 (18.7%)	42 (30.0%)	5.861	1	0.015*
Bad	161 (81.3%)	98 (70.0%)			

*=Statistically Significant; df=Degree of Freedom

In table 5 above, association of risk factors with occurrence of WRMSD was assessed, and it was shown that number of hours respondent spent sitting, and respondent’s driving posture were significantly associated with occurrence of WRMSD. Among the respondents who had ever had muscle/joint pain, 60.1% spent over 8 hours sitting, 29.3% spent 4-8 hours sitting while 10.6% spent less than 4 hours sitting, and this was significantly different (χ²=8.436, p=0.015). Similarly, occurrence of WRMSD was significantly higher among respondents who assumed bad driving posture (81.3%) than among those who assumed good driving posture (18.7%), (χ²=5.861, p=0.015). Other risk factors assessed (frequent lifting/carrying of heavy luggage in the course of doing their work, regular feeling of vibrations while driving), did not show any statistically significant relationship with occurrence of WRMSD.

Table 6 Predictors of Muscle/Joint Pain

Variable	AOR	95% CI for AOR		p-value
		Lower Bound	Upper Bound	
Age				
18-24 years	5.346	0.616	46.378	0.128
25-31 years	0.905	0.375	2.183	0.825
32-38 years	1.662	0.866	3.188	0.126
39 years and above	1			
Marital status				
Single	0.348	0.158	0.768	0.009*
Married	1			
How long you have been working as driver				
2-4 years	0.246	0.048	1.265	0.093
>4-6 years	2.019	0.637	6.400	0.233
>6-8 years	1.560	0.698	3.486	0.279
>8 years	1			
Ever been diagnosed/treated for muscle or joint pain in your previous occupation				
Yes	5.714	3.046	10.721	<0.001*
No	1			
Number of hours spent sitting				
<4hrs	0.350	0.166	0.741	0.006*
4-8hrs	1.100	0.609	1.988	0.752

>8hrs	1			
Driving posture				
Good	1.344	0.735	2.458	0.337
Bad	1			

AOR=Adjusted Odds Ratio; CI=Confidence Interval; *=Statistically Significant

In table 6, the logistic regression analysis was used to identify variables that significantly predicted occurrence of WRMSD of the variables included into the model, only 'marital status', 'ever been diagnosed/treated for muscle or joint pain in your previous occupation', and 'number of hours spent driving' significantly predicted WRMSD. Respondents who were single were about 34.8% less likely to develop WRMSD than those who were married (AOR=0.348; 95% CI for AOR=0.158-0.768; $p=0.009$), those who had ever been diagnosed/treated for muscle or joint pain in their previous occupation were about 6 times more likely to develop WRMSD than those who had not (AOR=5.714, 95% CI for AOR=3.046-10.721; $p<0.001$), while those who spent less than 4 hours sitting while driving were about 35% less likely to develop WRMSD than those who spent over 8 hours sitting while driving (AOR=0.350; 95% CI for AOR=0.166-0.741; $p=0.006$) were as those who spent 4-8 hours sitting while driving did not differ significantly compared with those who spent over 8 hours.

IV. DISCUSSION

The current study reports a significant association between prevalence of WRMSD and duration of driving and hours spent sitting while driving (prolonged sitting) among the study participants. A study on association between low back pain with working more than 8 hours daily and work duration of more than 10 years agrees with the result of this study.¹⁹

This study finding is also similar with the findings by Nigerian study, which reported significant association between musculoskeletal disorders and years of driving and prolonged sitting.²⁰ This can be explained by how a part of the body reacts when kept in a fixed position. The muscles remain contracted as long as the task last, compressing the blood vessels and preventing blood flow to other parts of the body. The contracted body part becomes tired even with less activity as reported in a United state study.²¹ These similarities in these findings can further be explained by what happens when a part of a body performs repetitive movements over and over, and even more frequently for a long time, fatigue sets in which predisposes the exposed body part to WRMSD, without adequate rest/recovery time.

Age of the drivers and marital status was significantly associated with the prevalence of WRMSDs. This may be linked the higher number of the participants who were married, aged 39 years and above. This contradicts the finding of research from Accra, Ghana that found no significant association between age and prevalence of WRMSD²². The fact that the aging process distorts the normal integrity of the Musculoskeletal structures leads to degenerative alterations that accelerate and exacerbate WRMSDs could explain our findings. However, this finding agrees with the report of a Nigerian and United states study which reported significant association between age, marital status with the prevalence of WRMSD.^{21,23}

The awareness of WRMSD among long distance bus drivers was found to be low, since 57.4% of the study participants haven't heard about it. This could be due to their level of education as 70.7% of the study respondents had secondary level of education. This result is similar to the findings of a study among small business owner in Canada.²⁴ This level of awareness suggests that the respondents may be unknowingly engaging in behaviors that predispose them to WRMSD. This is in contrary with a survey by the Health Safety and Executive (2016), reported in the United Kingdom on the improved awareness of WRMSDs that has led to changes in their work pattern, job design and general behaviors of workers.

Majority of the respondents had positive attitude towards the prevention of WRMSDs. The perception that it is possible to prevent WRMSDs by taking a break after 2-3 hours of driving reflects a positive attitude. A lot of the respondents agreed that the use of seat belt always as well as leaning back with the head on the head-rest as a driving posture are positive attitudes towards the prevention of WRMSDs among long-distance bus drivers.

V. CONCLUSION

Work-related musculoskeletal disorders (WRMSDs) are a significant source of occupational stress, and are associated with various risk factors including age, prolonged sitting while driving, extended driving durations, and awkward driving postures. Despite a lack of awareness about WRMSDs among many participants, a majority of long-distance drivers viewed these disorders as an inevitable and unavoidable aspect of their job, reflecting a negative attitude towards prevention

RECOMMENDATION

- There should be health education programs focused on increasing the awareness of WRMSDs and prevention of risk factors among drivers.
- This will hopefully ensure the drivers make necessary adjustment such as the proper driving posture and regular use of seat belts to reduce their risk of developing WRMSDs.
- Transport company managers should provide time to time professional assessment of the driver's seat and driving posture and as a matter of policy ensure that long-distance drivers stop at every 2-3 hours for leg breaks.
- The management of the transport companies should ensure that long-distance drivers go leave/vacation periods by sensitizing them on the need to ensure adequate recovery and rest for fatigued body parts.

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