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Prevalence & risk factors of musculoskeletal impairments among auto-rickshaw drivers in a city of central India.

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Abstract:
Introduction: *The private and para-transit modes of transportation are in the nascent phase of development in the economy of Indian road transport sector. Which makes working as an auto-rickshaw driver an everyday struggle for the drivers; adding up in the obstacles in attainment of their general health and wellbeing. Auto-rickshaw drivers like other professional drivers are at higher risk of developing work related musculoskeletal disorders in our country especially due to poor road conditions, extended hours of work in bad posture, traffic congestion, poor ergonomic design of the auto-rickshaws and poor maintenance of the vehicle and so on.*
Methodology: *A cross-sectional study was carried out among 231 auto-rickshaw drivers registered with a randomly selected auto-rickshaw driver' union situated in semi-urban area of the city after fulfillment of inclusion and exclusion criteria. Using Standardized Nordic Questionnaire interview sessions followed by clinical examination were conducted for data collection. Chi square test was applied using Epi-Info (V.7.2) and Open-Epi software to analyze the categorical variables and to assess the significance of the association with risk factors for development of musculoskeletal impairment.*
Results: *Most prevalent MSD was reported at shoulder joints (50.6%), neck (42%) and in lower back (40.7%) during last 12 months. The presence of MSD was significantly associated with age, years of driving, age of vehicle (p-value<0.001); BMI (p-value<0.01). The risk of developing MSD increases with increase in years of driving.*
Keywords: *Auto-rickshaw drivers, Professional drivers, Musculoskeletal symptoms, Work related musculoskeletal morbidities (WRMSD).*

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I. Introduction

Globally occupational health sector is demanding more attention from the health care authorities by each passing day, since disorders that follow due to work environment have gradually increased in types and magnitude and have led to aggravated diseases affecting a large number of workers. The economic growth in India is being marked by an inevitable increase in transportation activities of all sectors. In case of total passenger transportation, almost 80% of the load is shared by road transport sector. The occupation of professional drivers take the toll on their health through exposure to the environment at work.[1]

Auto rickshaws also popularly known as tuk-tuk, are a popular mode of public transportation in low- to middle-income countries. Nearly 75 % of the global auto rickshaw population is found in India. Since there is heavy congestion on the roads of India, the small size and narrow body of this three-wheeled vehicle is perfectly suited to navigate the roads.[2]About 2.5 % auto rickshaw vehicle population has increased form 2016 till 2017in Maharashtra state.[3]

People working in transport sector spend more than 8-10 hours a day in traffic. Professional drivers (bus, auto rickshaw, taxi, and truck drivers etc.), have a lifestyle that is not conducive to good health. They are at risk of developing number of health problems as a direct result of the occupational environment in the form of exposure to the air pollutants, higher temperature, effects of seasonal variation irregular, erratic working hours and duration, shift work, poor posture, improper dietary habits, and other work related stress factors.[4]

Driving as a task involves prolonged sitting, a fixed posture and vibration, any of which could directly lead to musculoskeletal trouble. Drivers sit while driving, but more importantly have to sit for long hours while waiting for fares. Sitting in the driving position exerts considerable forces on the spine and can cause a number of problems with the musculoskeletal system especially, backaches, neck problems, pulled muscles, and general stiffness.[5]Studies have shown that when a vehicle is in motion the body is subjected to different forces:

accelerations and decelerations lateral swaying from side to side, and whole body up and down vibrations leading to musculoskeletal troubles which are manifested through pain, stress and decreased work capacity.[6]

Research has concluded that occupational drivers are found to be at an increased risk of developing musculoskeletal impairments as compared to normal population, especially auto rickshaw drivers, due to poor ergonomic design of the vehicle. This might be because drivers are exposed to highest risk factors for back and neck pain such as long-term vibration exposure, poor road quality and shock up mechanism of the vehicle, heavy and frequent lifting. A combination of long term vibration exposure and frequent lifting carries the highest risk of joint pain (neck, shoulders, lower back and knees).[6–8]

With current growth in the transport sector in the country, the working environment of the occupational drivers will deteriorate over the next few years. Thus, professional drivers such as bus drivers are susceptible to multiple health related problems, respiratory impairments being more common amongst them. The hazards of occupation of bus driving which is posing a greater challenge to the health care sector; are justified with a very limited amount is literature. With this background, this study aims to understand the level of deterioration of respiratory health of bus drivers due to their occupation.

II. Aims and objectives:

1. To find the prevalence of musculoskeletal symptoms among auto-rickshaw drivers in a semi-urban area of a city of central India.
2. To study the epidemiological correlates of musculoskeletal symptoms among them.

III. Methodology:

A cross sectional study was carried out from December 2016 to June 2017in a sub urban area of the city of central India where the randomly selected auto-rickshaw drivers' union was situated. Auto-rickshaw drivers within the age range of 18-55 years, who started driving bus for at least 5 years continuously and currently working in same profession, registered with the randomly selected union, consenting to participate in study were included. Those with previous history or taking treatment of any musculoskeletal ailments before joining the profession; those with history of any injuries, trauma (slip/fall injuries sustained due to any reasons apart from professional driving work); congenital musculoskeletal morbidities and previous limb surgery were excluded from the study.

The information was collected using a structured, pre-tested questionnaire. Standard Nordic questionnaire[9] of musculoskeletal morbidities was used for recording the musculoskeletal symptoms (perception of ache, pain or discomfort in the stated body site). Statistical analysis was done by using Epi Info (version 7.2) and Open Epi software. Categorical variables were analyzed using Pearson's chi square test (x^2). While testing the association the p-value of < 0.05 was considered significant, p-value < 0.01 was considered highly significant, p-value < 0.001 was considered as very highly significant. Ethical clearance through submission of protocol to the Institutional Ethics Committee was obtained before commencement of the study.

IV. Results:

Table 1: distribution of auto-rickshaw drivers (**n=231**) according to their socio-demographic and occupational characteristics.

Socio-demographic characteristic	Number of drivers n (%)
Age group (year)	
20-29	47 (20.3)
30-39	81 (35.1)
40-49	67 (29.0)
≥50	36 (15.6)
BMI	
Normal	133 (57.6)
Pre obese	61 (26.4)
Obese class 1	31 (13.4)
Obese class 2	6 (2.6)
Physical activity	
Yes	68 (29.4)
No	163 (70.6)
Years of driving	

≤ 10	61 (26.4)
11-20	84 (36.4)
21-30	62 (26.8)
> 30	24 (10.4)
Hours of driving (/week)	
≤ 48	97 (42.0)
>48	134 (58.0)
Age of vehicle (year)	
≤ 10	85 (36.8)
>10	146 (63.2)

Mean age= 38.23±9.05 (19.23-57.23)years, Mean BMI= 24.02±2.72 (18.58-29.46)Kg/m^2, Mean years of driving= 18.54±6.25 (6.04-31.04)years, Mean hours of driving= 53.64±6.8 (40.4-67.24) hours/week, Mean age of vehicle= 13.22±3.72 (5.78-20.66)years.

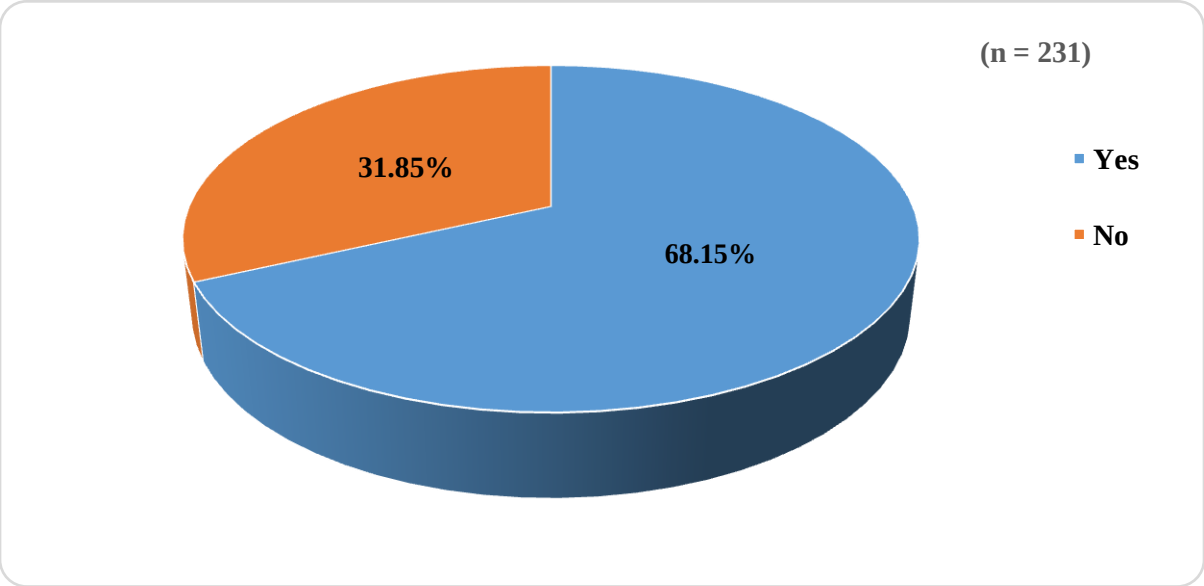

Figure 1: prevalence of musculoskeletal symptoms among auto-rickshaw drivers during last 12 months.

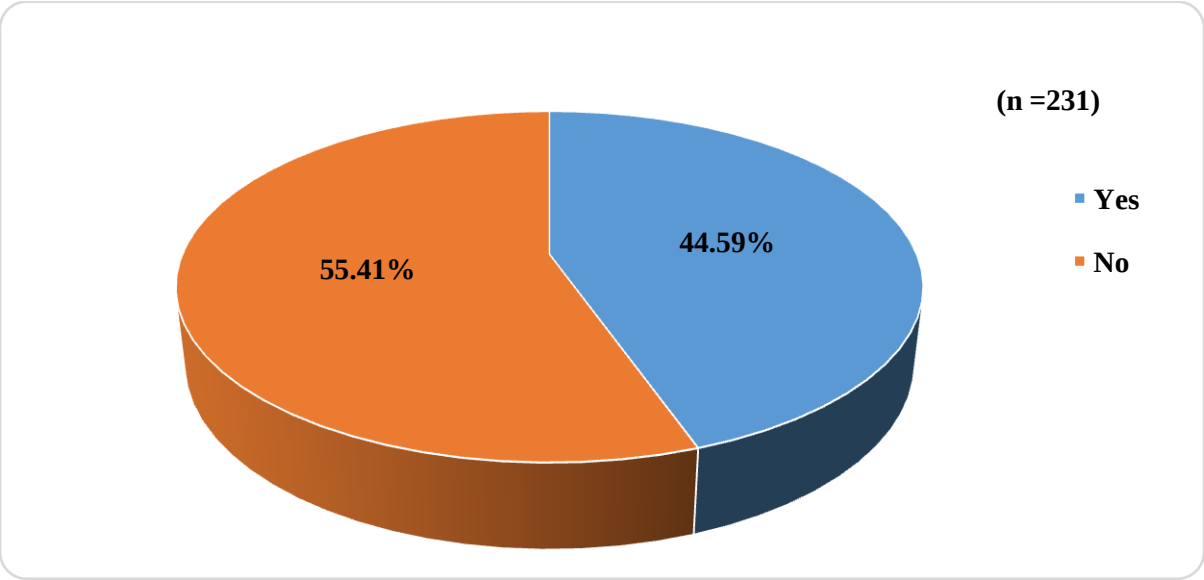

Figure 2: prevalence of musculoskeletal symptoms among auto-rickshaw drivers during last 7 months.

Table 2: distribution of auto-rickshaw drivers (**n=231**) according to history of perceived musculoskeletal symptoms at different body sites:

Musculoskeletal symptoms (Aches/pains/discomfort)	Number of drivers n (%)				
	Experienced during last 12 months			Absence from work during last 12 months	Experienced during last 7 days
	Right	Left	Both		
Shoulders	34 (14.7)	14 (6.1)	69 (29.9)	9 (3.9)	12 (5.2)
Elbows	20 (8.7)	15 (6.5)	37 (16.0)	0 (0)	8 (3.5)
Wrists/hands	7 (3.0)	4 (1.7)	43 (18.6)	0 (0)	9 (3.9)
Neck	97 (42.0)			12 (5.2)	45 (19.5)
Upper back	84 (36.4)			18 (7.8)	12 (5.2)
Lower back	94 (40.7)			25 (10.8)	21 (9.1)
One/both hips	18 (7.8)			0 (0)	7 (3.0)
One/both knees	59 (25.5)			14 (6.1)	23 (10.0)
One/both ankles	34 (14.7)			4 (1.7)	10 (4.3)

Table 3: distribution of auto-rickshaw drivers (**n=231**) according to factors associated with presence of musculoskeletal symptoms during last 7 days:

Characteristic	Musculoskeletal symptoms during last 7 days n (%)		X^2 value	P value	Odds ratio (95% C.I.)
	Yes	No			
Age (years)					
>40	59 (57.3)	39 (30.5)	15.72	<0.001	3.06 (1.78-5.46)
≤40	44 (42.7)	89 (69.5)			
BMI					
Pre-obese & Obese	31 (30.1)	67 (52.3)	10.67	<0.01	3.9 (2.3-6.8)
Normal	72 (69.9)	61(47.7)			
Physical activity					
No	68 (66.0)	95 (74.2)	1.474	>0.05	0.67 (0.38-1.19)
Yes	35 (34.0)	33 (25.8)			
Years of driving					
≤ 10	24 (23.3)	37 (28.9)	X^2 for trend =11.042	<0.001	3.05 (1.75-5.3)
11-20	26 (25.2)	58 (45.3)			0.96
21-30	35 (34.0)	27 (21.1)			1.99
>30	18 (17.5)	6 (4.7)			4.63
Hours of driving					
>48	62 (60.2)	72 (56.2)	0.221	>0.05	1.17 (0.69-1.99)
≤ 48	41 (39.8)	56 (43.8)			
Age of vehicle (years)					

>10	61 (59.2)	24 (18.8)	38.48	<0.001	6.29 (3.48-11.4)
≤ 10	42 (40.8)	104 (81.2)			

V. : Discussion

Out of total 485 drivers registered with the selected auto-rickshaw driver's Union situated in an urban slum of the city, 231auto rickshaw drivers participated in the study and all were male. Majority of them were below 40 years of age (55.4%). Maximum number of drivers belonged to the Class IV (51.1%), about 26.0% were from class III, and 13.9% belonged to Class V. Least of them belonged to the Class II (9.1%) of socio economic status while none belonged to Class I of the modified Prasad's classification of socio-economic status. According to WHO classification for BMI, about 42.4% were either pre-obese or obese. 70.6% of them reported no history of regular physical activity[10] apart from that during their work.

It was revealed that majority of the drivers (62.8%) have been working for ≤ 20 years and only about 10.4% were working for > 30 years as auto-rickshaw driver. About 58% of them were working for > 48 hours/week, which is clearly in excess of the current recommendations. The mean hours of driving per week was about 53.64±6.8 hours and average driving hours per week being 40.4 - 67.24 hours. Mean age of the vehicle driven by them was found out to be 13.22±3.72 where about 63.2% drivers drove an auto-rickshaw of > 10 years from manufacture. Very few of them reported the ownership pf the vehicle majority using vehicles on contract basis. Therefore, proper maintenance of these auto-rickshaws seem as a very rare scenario leading to poor ergonomic working conditions.

Prevalence of musculoskeletal symptoms during last 12 months: About 68.15% of the auto rickshaw drivers reported presence of one or more musculoskeletal symptoms. The prevalence of musculoskeletal symptoms reported during last 7 days among drivers climbed down to about 44.59%.The major impairments of musculoskeletal system found out were in shoulder joints (50.6%), neck (42%) and in lower back (40.7%) during last 12 months; and during last 7 months maximum participants reported discomfort in neck (19.5%), knees (10%) and lower back (9.1%) respectively. This observations point in the direction of impact of poor posture and ergonomic design of driver's seat to be the important contributors to the impairments. About 10.8% drivers with complaint of lower back pain reported were unable to go for work during past 12 months. These results were more or less consistent with other studies done among professional drivers.

Robb M.J. et al (2007)[10] conducted a study among professional truck drivers and reported the 12 month prevalence of the symptoms to be 81% while 7 days prevalence recorded to be 34%. In a study conducted among taxi drivers in Nigeria, by **Onawumi A. et al (2012)**[11] about 67% of drivers reported discomfort in neck, 18% & 20% reported symptoms in right & left wrist joints respectively, 29% in upper back, 30% in lower back, and 19% in hip joints. **Jadhav A. et al (2016)**[12], in their study found out lower back pain and neck pain as the most prevalent musculoskeletal impairments among bus drivers.

Epidemiological correlates of musculoskeletal impairments: A very having highly significant association between reported musculoskeletal symptoms during last 7 days and age (>40 years) (p value < 0.001, OR= 3.06, 95% C.I. OR= 1.78-5.46), age of vehicle (>10 years) (p value < 0.001, OR= 6.29, 95% C.I. OR= 3.48-11.4). A linear trend of association was seen between the symptoms and years of driving(>20 years) (p value <0.001, OR= 3.05, 95% C.I. OR= 1.75-5.3) suggesting that as years of work as an auto-rickshaw driver increases by 10 years or so, the risk of developing musculoskeletal impairment also increases. BMI of >25 $kg/m^2$was also a significant factor revealed to be associated with presence of musculoskeletal impairment (p value < 0.01, OR= 3.9, 95% C.I. OR= 2.3-6.8). Hours of driving and physical activity were not statistically associated with presence of musculoskeletal symptoms (p value > 0.05). This finding is unique in this study as compared to other studies done in similar settings. This difference in findings can be attributed to the fact that poor road conditions and poor ergonomic maintenance of the auto-rickshaw are more contributory factors to the development of musculoskeletal impairment as compared to hours of driving per week.

In a similar study done by **Shaik R. et al (2014)**[13] among auto rickshaw drivers found out that 63.66% had low back pain, 58.66% had knee troubles and 52.33% had neck problems. They identified risk factors for musculoskeletal discomfort among drivers as follows; age, duration of driving and ergonomic design of drivers cabin (p value <0.05). **Noda M. et al (2015)**[14]revealed that 15.5% of auto-rickshaw drivers reported low back pain in last 4 months and the number of hours worked/week and engine type were significantly associated with low back pain (p<0.05).

Borle A. et al (2012)[15]conducted study among M.S.R.T.C. bus drivers reported about similar prevalence of MSD. They found out a significant relationship between musculoskeletal discomfort and age, duration of driving(linear trend), daily average driving (linear trend), hours of driving (p value < 0.001) and BMI ≥ 30 (p value < 0.05).

VI. Conclusion:

The observations of this study revealed that musculoskeletal impairments among auto-rickshaw drivers had a highly significant association with age of the driver, years of driving and age of the vehicle (correlating with poor ergonomics). In addition, a significant association was observed between musculoskeletal impairment and obesity. The risk of having musculoskeletal discomfort rises with increase in the years of driving. These observations expose certain factors present in the work environment of the auto-rickshaw drivers which can have adverse effects on their musculoskeletal system. Imparting health education about maintenance of vehicle, avoidance of roads with poor condition and taking frequent breaks during work might be of some benefit. Periodic health checkups for the road transport workers should be planned through public private partnership approach; which might help in timely detection of the damage and intervening with appropriate technology and guidance for health promoting behavior can be provided to the professional drivers.

References:

[1]. Batawi MA. The Work of the World Health Organisation in Occupational Health. Occup Health (Auckl) [Internet]. 1974;228–36. Available from: http://linkinghub.elsevier.com/retrieve/pii/B9780433126805500239
[2]. Mani A, Pallavi P. Review of Literature in India's Urban Auto-rickshaw Sector: A Synthesis of Findings. 2012.
[3]. Government of Maharashtra. Economic Survey of Maharashtra 2016-17. 2016;(56):164. Available from: https://mahades.maharashtra.gov.in/files/publication/ESM_Eng2016_17.pdf
[4]. Majumdar D, Jash T. Merits and Challenges of E-Rickshaw as An Alternative form of Public Road Transport System: A Case Study in the State of West Bengal in India. Vol. 79, Energy Procedia. Elsevier B.V.; 2015. 307-314 p.
[5]. Whitelegg J. Health of Professional Drivers. Heal (San Fr. 1995;(May):1–10.
[6]. Silverstein BA, Stetson DS, Keyserling WM, Fine LJ. Work-related musculoskeletal disorders: Comparison of data sources for surveillance. Am J Ind Med. 1997 May 1;31(5):600–8.
[7]. Magnusson ML, Pope MH, Wilder DG, Areskoug B. Are occupational drivers at an increased risk for developing musculoskeletal disorders? Spine (Phila Pa 1976). 1996;21(6):710–7.
[8]. Schirnding, Von Y. Framework for Linkages between Health, Environment and Development [Internet]. Health in Sustainable Development Planning: the Role of Indicators. 2002. Available from: http://www.who.int/wssd/resources/indicators/en/
[9]. Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Biering-Sørensen F, Andersson G, et al. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. Appl Ergon. 1987;18(3):233–7.
[10]. Robb MJM, Mansfield NJ. Self-reported musculoskeletal problems amongst professional truck drivers. Ergonomics. 2007;50(6):814–27.
[11]. Samuel OA, Babajide LE. The prevalence of work-related musculoskeletal disorder among occupational taxicabs drivers in Nigeria. Ijrras. 2012;11(3):561–7.
[12]. Jadhav A. Comparative cross-sectional study for understanding the burden of low back pain among public bus transport drivers. Indian J Occup Environ Med. 2016;20(1):26.
[13]. Rahul Shaik, Christie Kiran Gotru, Chintada Ganapathi Swamy RS. THE PREVALENCE OF MUSCULOSKELETAL DISORDERS AND THEIR ASSOCIATION WITH RISK FACTORS IN AUTO RICKSHAW DRIVERS - A SURVEY IN GUNTUR CITY. Int J Physiother. 2014;1(1):2–9.
[14]. Noda M, Malhotra R, DeSilva V, Sapukotana P, DeSilva A, Kirkorowicz J, et al. Occupational risk factors for low back pain among drivers of three-wheelers in Sri Lanka. Int J Occup Environ Health. 2015;21(3):216–24.
[15]. Amod B, Shubhangi A, Sandeep G, Prashant T. Study of Occupational Factors Associated with Low Back Pain in Truck Drivers of Nagpur City, India. Int J Med Heal Sci. 2012;1(3):53–60.

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