

[ORIGINAL ARTICLE]**Work related musculoskeletal disorders in occupational taxi drivers of Mahabaleshwar.**Patel Aaisha Aslam¹, Kulkarni Shweta²¹Intern, ²Associate Professor, Department of Physiotherapy, Tilak Maharashtra Vidhyapeeth, College of Physiotherapy, Pune, India.**ABSTRACT :**

Drivers experience WRMDs as a result of their prolonged posture, mechanical pressures, and long work hours. Additionally, previous studies have demonstrated an increase in low back issues as a result of poor posture, heavy workload like lifting, whole-body vibration etc. The objective was to examine the prevalence of work-related musculoskeletal disorders in Mahabaleshwar's occupational taxi drivers. The participants in this survey-based study totaled 100 individuals. Using the Nordic Musculoskeletal Questionnaire (NMQ), WRMDs were examined. Nearly 87% of the drivers were found to have WRMDs, and 49% of the drivers reported having low back pain. The working hours were also assessed, and it was found that sustained posture for extended periods of time most frequently affected the low back, neck, knees and wrist/hands. This suggests that sustained postures may be one of the risk factors for WRMDs in occupational taxi drivers. Taxi drivers have a higher risk of developing the WRMDs.

Keywords: work related musculoskeletal injuries, posture, low back pain, Nordic musculoskeletal questionnaire, risk factors.

Introduction:

Work-related musculoskeletal injuries (WRMI), often called work-related musculoskeletal diseases (WMSD), are inflammatory disorders that occur as a result of an injury experienced while performing work activities (McLeod G et al, 2018)^[8]. WMSDs are disorders that worsen or continue to persist due to repeated exposure to work-related activities that significantly contribute to the onset or exacerbation of painful symptoms, as well as conditions that increase and remain due to associated with work circumstances (Work-Related Musculoskeletal Disorders & Ergonomics, cdc.gov, 2020)^[14]. Repetitive and frequent labour workloads can cause overuse and put strain on to the nerves, tendons and ligaments, muscles, joints, as well as spinal discs (Work-related Musculoskeletal Disorders (WMSDs) : OSH Answers Ccohs.ca.)^[15].

MSDs are a group of diverse conditions characterized mainly by pain, ranging in intensity from mild intermittent symptoms to severe chronic

and incapacitating conditions (Musculoskeletal disorders and workplace factors. Cdc.gov, NIOSH, 1997)^[9].

Due to persistent mechanical loads exerted on the musculoskeletal system, WMSDs and other postural injuries can cause physiological illness that can develop over time (Haims C.H, and Carayon P, 1998)^[6].

Taxi drivers differ from other professions in terms of the risk of work-related low back illnesses for a variety of reasons. The first is the issue of time; past research have shown that cab drivers spend more time driving than people in other professions (Srivastava, Kiran, 2014)^[13].

According to Copsey and Taylor (2010), Physical risks (road accidents, vibrations, manual handling of weights, and lengthy sitting positions), chemical and biological risks (urban pollution), psychosocial risks (stress and aggression), and individual behaviour risks (smoking and stimulant use) are among the most significant^[3]. A number of these factors are

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thought to raise the risk of musculoskeletal problems among cab drivers (Abledu JK, Offei EB, and Abledu GK, 2014)^[1].

Due to variations in racial background, geographical location, ethnicity, and socio-demographics, the risk and prevalence features of WRMSDs among drivers will indeed differ between the countries and people. In previous studies, it was found that taxi drivers had a prevalence rate of 70.5% in WRMSDs (Fatima S et al. 2021)^[5].

Individuals identify back discomfort as the third most prevalent health condition, after headaches and exhaustion. The specific explanation of the higher prevalence of low back pain (LBP) among professional automobile drivers' populations is frequently unknown. Heavy physical workload, such as lifting, awkward posture, and whole-body vibration, is the most commonly recognized risk factor for LBP (Srivastava, Kiran, 2014)^[13].

According to a study in Australia of systemic review of MSDs associated with occupational driving found that whether driving a bus, coach, truck, van, or taxi, LBP is the MSK condition that occupational drivers report having the most frequently. Meanwhile, there have also been reports of injuries to the neck, shoulder, knee, and feet, among other MSK sites (Pickard, O et al. 2022)^[12].

Mahableshwar is a town and hill station which is situated in the western-Ghats range of Maharashtra. It is popular tourist destination in Maharashtra. As a result, Mahableshwar now has more professional tour guides and taxi drivers. Because of this, there is a high demand for taxi drivers, so it is important to evaluate musculoskeletal conditions in the taxi drivers of Mahableshwar hill station.

Methods:

Material, study design and setting:

This survey-based study was conducted on Mahableshwar's professional taxi drivers. The study was conducted for six months in the Mahableshwar Taxi Association. A total of 100 participants were chosen for this study based on inclusion and exclusion criteria. Driving since 2 years and the age range of 20 to 75 years old were the inclusion criteria. Any history of trauma, any identified neurological, cardiopulmonary or neuromuscular disorder, as well as any previous orthopaedic, neurological. Or cardiovascular surgery, was a consideration for exclusion criteria. Nordic musculoskeletal questionnaire was the tool

used to assess the musculoskeletal disorders. It has an excellent test-retest reliability of $r=0.945$. Numerous studies in past have translated the Nordic musculoskeletal questionnaire into local languages, showing how simple it is to translate it into other languages.

The Nordic musculoskeletal questionnaire was created as a tool for comparing common complaints, such as low back, neck, and shoulder pain, to those found in epidemiological studies (Crawford, J. O. 2007)^[4]. It has been used in a number of previous studies to examine the prevalence of musculoskeletal disorders in various occupations such as professional drivers, farmers, nurses etc.

Procedure:

The study's protocol included getting approval from the institutional ethical committee. The data collection form was then created in English, translated into the local language of Marathi, validated by the three residents of Mahableshwar.

The subjects were chosen on the basis of inclusion and exclusion criteria and were explained about the aim and method. A consent form was administered to the subjects along with data collection sheet.

Data was gathered into three parts that included an additional sociodemographic questionnaire, occupational factors and the Nordic musculoskeletal questionnaire.

The sociodemographic questions gathered information on participant's demographic variables such as age, height, weight, and education, as well as their behavioral and lifestyle practices which were alcohol any type of addiction, and physical exercise.

The questionnaire also evaluated factors related to the occupation, such as taxi ownership (own or employee), driving experience (years of experience, total number of hours driven daily, and number of days driven per week), and driving time profile. The standardized Nordic Musculoskeletal Questionnaire (NMQ) was mainly to assess the musculoskeletal problems in drivers.

Subjects filled the data by themselves, without any assistance. Lastly the data was collected and analysed by descriptive analysis by Microsoft Excel.

Results:

Demographics:

The table 1 shows the demographics data of the participants involved in this study. The average age of drivers was 41.99 ± 11.37 SD. The 36% of subjects

are in age group of 36 to 45 group, 32% in 25 to 35, 18% in 46 to 55, 9% in 56 to 65, 4% in 66 to 75 and only 1% in less than 25.

The educational status of the subjects which is to be found that most of drivers had completed their education till secondary level (9th and 10th) and senior secondary level (11th and 12th), also it shows that 84% of the selected population was well educated. The majority of taxi drivers, 56 of them did not engage in any physical activity. 44% of subject do

some type of exercise and 56 of subjects does not exercise at all.

Only 8 of the subjects had any known disease or illness, remaining 92 of subjects can be considered that they are not having any disease or illness or they could not know. The most common condition was seen was hypertension and diabetes among the 8 of subjects. 35 of the subjects had addiction and 65 of subjects had not any type of addiction.

This shows the lifestyle behavior of the taxi drivers.

Table 1 : Sociodemographic data, behavioral and lifestyle activities:

Age range (mean)	41.99 ± 11.37SD
Educational status	Primary and upper primary (n=16) Secondary (n=45) Senior secondary (n=30) Diploma, UG, PG (n=9)
Exercise	Yes (n=44) No (n=56)
Any known disease or illness	Yes (n=8) (acidity, hypertension, diabetes, kidney stone, sinus infection) No (n=92)
Any type of addiction	Yes (n=35) No (n=65)

SD: standard deviation; n: number of subjects.

Occupational factors:

Table 2 shows the occupational factors. The average of years of driving was 19.84 ±9.7SD. The percentage of subjects for the driving years 2 to 15 is 45%, for the years 16 to 25 is 35%, 26 to 35 is 17%, and the years 36 to 45 is 6%.

The taxi ownership among the subjects was, 82 of the subjects own the taxi they drive and 18 of the subjects were employee over the taxi they drive.

The average hours of driving the taxi daily were 8.43 ±2.26SD. The number of hours spent driving each day was 55 of subjects drive between the hours of 4 and 6, 39 of subjects drive between the hours of 7 and 9, and 36 of them drive between the hours of 10 and 13. Additionally, the number of driving days per week was 57 of subjects drive 7 days a week, 23 of them drive 6 days a week, 17 drive 5 days a week, and 3 drive 4 days a week. The average days of driving was 6.34 ±0.86SD.

Table 2: Occupational factors

Years of driving (mean)	19.84 ± 9.7SD
Taxi ownership	Own (n=82) Employee (n=18)
Hours of driving daily (mean)	8.43 ± 2.26SD
Days of driving weekly (mean)	6.34 ± 0.86SD

SD: standard deviation; n: number of subjects

NMQ assessment:

The Nordic musculoskeletal questionnaire component of trouble during the last 12 months is shown in Table 3 by body region. The prevalence of

low back pain is 49%, neck pain is 44%, one or both knees are 43%, one or wrists or hands are 40%, upper back pain is 35%, one or both ankles or feet are 35%, one or both shoulders are 34%, one or both elbows are 26%, and one or both hips or thighs are 22%. This

shows that the prevalence of musculoskeletal disorders in taxi drivers over a 12 months period in which the Lower back area is most frequently affected.

Table 3: Trouble (ache, pain, discomfort, numbness) during last 12 months

Sr no	Body region	Yes (n)	No (n)	Total	Affected %
1	Lower back	49	51	100	49%
2	Neck	44	56	100	44%
3	One or both knees	43	57	100	43%
4	One or both wrists/hands	40	60	100	40%
5	Upper back	35	65	100	35%
6	One or both ankles/feet	35	65	100	35%
7	One or both shoulders	34	66	100	34%
8	One or both elbows	26	74	100	26%
9	One or both hips/thighs	22	78	100	22%

n: number of subjects; Affected %: number of subjects having pain

The Nordic musculoskeletal questionnaire of during the last 12 months prevention from normal work because of trouble is displayed in Table 4 (answered by those who experienced trouble in the last 12

months). The prevalence is 48% in the neck, 65% in one or both shoulders, 69% in one or both elbows, 40% in one or both wrists/hands, 49% in one or both hips/thighs, 53% in one or both knees, and 57% in one or both ankles/feet.

Table 4: During last 12 months prevention of normal because of trouble (answered by those who had trouble during last 12 months)

Sr no	Body region	Yes (n)	No (n)	Total	Affected %
1	Neck	21	23	44	48%
2	One or both shoulders	22	12	34	65%
3	One or both elbows	18	8	26	69%
4	One or both wrists	16	24	40	40%
5	Upper back	17	18	35	49%
6	Lower back	25	24	49	51%
7	One or both hips/thighs	16	6	22	73%
8	One or both knees	23	20	43	53%
9	One or both ankles/feet	20	15	35	57%

n: number of subjects; Affected %: number of subjects having pain

The last component of Nordic musculoskeletal questionnaire, trouble during last 7 days is shown in Table 5 (answered by those who experienced trouble during last 12 months). The prevalence is 84% neck pain, 82% either one or both shoulders pain, 81%

either one or both elbows pain, 85% either one or both wrists/hands pain, 57% upper back pain, 84% lower back pain, 84% either one or both hips or thighs, 65% either one or both knees, and 63% either one or both ankles or feet. This depicts four distinct body area's acute pain. From which it can be seen that wrists, lower back, hips/thighs, and neck are the most acute.

Table 5: Trouble during the last 7 days (answered by those who had trouble last 12 months)

Sr no	Body region	Yes (n)	No (n)	Total	Affected %
1	Neck	37	7	44	84%
2	One or both shoulders	28	6	34	82%
3	One or both elbows	21	5	26	81%
4	One or both wrists	34	6	40	85%
5	Upper back	20	15	35	57%
6	Lower back	41	8	49	84%
7	One or both hips/thighs	18	4	22	82%
8	One or both knees	28	15	43	65%
9	One or both ankles/feet	22	13	35	63%

n: number of subjects; Affected %: number of subjects having pain

Risk factor:

The daily driving hours and the three most prevalent

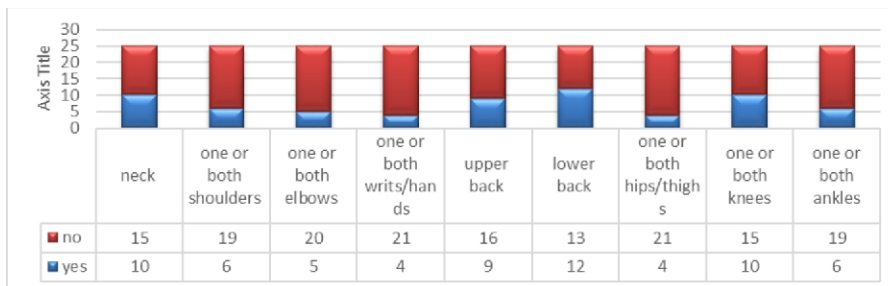
MSK disorders are shown in tables 6, 7, and 8. When driving for 4 to 6 hours per day, as shown in Table 6 and Figure 1, the lower back is most frequently affected, followed by the neck and the knees.

Table 6 : Subjects driving taxi for 4 to 6 hours daily:

Body region	Yes (n)	No (n)	Total	Affected %
Neck	10	15	25	40%
One or both shoulders	6	19	25	24%
One or both elbows	5	20	25	20%
One or both wrists/hands	4	21	25	16%
Upper back	9	16	25	36%
Lower back	12	13	25	48%
One or both hips/thighs	4	21	25	16%
One or both knees	10	15	25	40%
One or both ankles	6	19	25	24%

n: number of subjects; Affected %: number of subjects having pain; Bold: common regions.

Figure 1 : shows the graphical representation for the body regions affected in subjects who drive for 4 to hours daily.



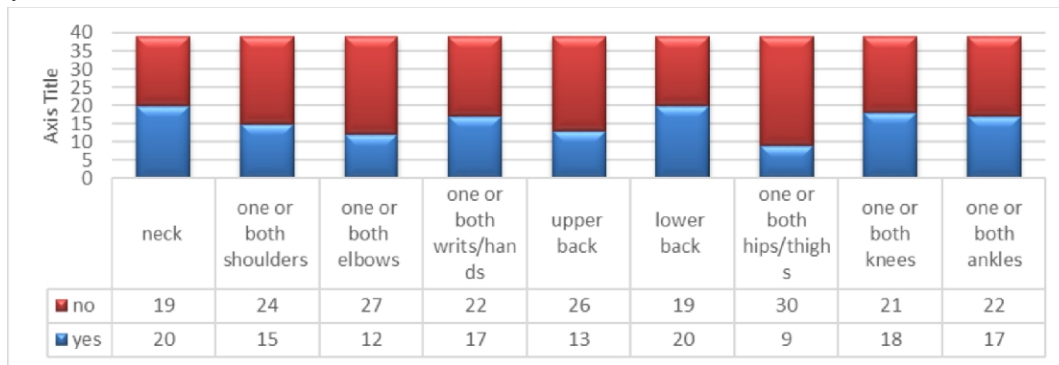
When driving for 7 to 9 hours per day, as shown in Table 7 and Figure 2, the lower back and neck are most frequently affected, followed by the knees.

Table 7 : Subjects driving 7 to 9 hours daily:

Body region	Yes (n)	No (n)	Total	Affected %
Neck	20	19	39	51%
One or both shoulders	15	24	39	38%
One or both elbows	12	27	39	30%
One or both wrists/hands	17	22	39	43%
Upper back	13	26	39	33%
Lower back	20	19	39	52%
One or both hips/thighs	9	30	39	23%
One or both knees	18	21	39	46%
One or both ankles	17	22	39	43%

n: number of subjects; Affected %: number of subjects having pain; Bold: common regions.

Figure 2 : Shows the graphical representation for the affected body regions in subjects who drive for 7 to 9 hours daily.



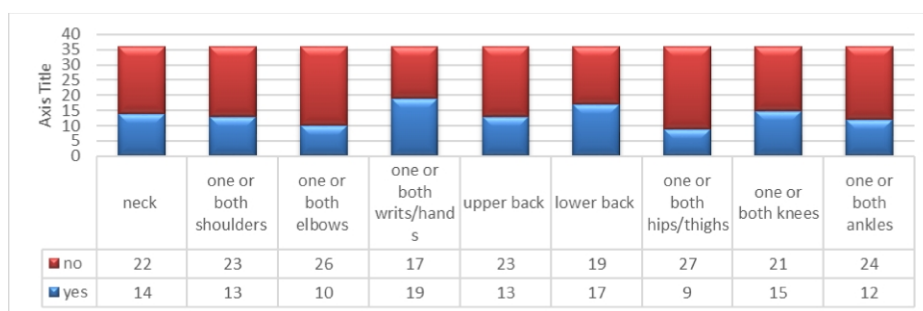
The most common areas of injury are the wrists/hands, followed by the lower back and knees, as shown in the Table 8 and Figure 3, which represents driving for 10 to 13 hours per day.

Table 8 : Subjects driving 10 to 13 hours daily:

Body region	Yes (n)	No (n)	Total	Affected %
Neck	14	22	36	39%
One or both shoulders	13	23	36	36%
One or both elbows	10	26	36	27%
One or both wrists/hands	19	17	36	52%
Upper back	13	23	36	36%
Lower back	17	19	36	47%
One or both hips/thighs	9	27	36	25%
One or both knees	15	21	36	41%
One or both ankles	12	24	36	33%

n: number of subjects; Affected %: number of subjects having pain; Bold: common regions.

Figure 3 : Shows the graphical representation for the body regions affected in subjects who drive 10 to 13 hours daily.



Discussion:

The study’s aim was to determine the prevalence of musculoskeletal disorders (MSDs) among taxi drivers in Mahabaleshwar, Maharashtra, as well as the risk factors that contribute to them. We conducted a survey-based study and discovered an 87% of the subjects were affected. The lower back was the part of the body that was most affected around 49% of the subjects.

The study demonstrates that the lower back, neck, knees, and wrists/hands are the areas most frequently affected. Due to the sustained posture that is developed while driving for extended periods of time, the number or hours spent driving each day is a risk factor for these injuries. Past studies have shown that lengthy sitting position and long driving hours can contribute to MSK disorders in taxi drivers (Srivastava, Kiran, 2014)^[13].

Nunes IL and Bush PM (2012) they provided an overview of Work-Related Musculoskeletal Disorders, associated risk factors, and tools that can help reduce the risks of these injuries. The use of ergonomic, biomechanical, and engineering principles can help to reduce the risks and occurrence of Work-Related Musculoskeletal Disorders. The bones, tendons, ligaments, joints, muscles, nerves, and vessels in the body are damaged by improper posture, highly repetitive activities, or dealing with heavy loads, among other occupational risk factors that studies have shown to cause fatigue, pain, and WMSDs. The effective design of ergonomics tools, equipment, processes and work environments can have a significant impact on the risks and occurrence of Work-Related Musculoskeletal Disorders^[10].

Srivastava S and Kiran UV (2014) they conducted a study and discovered that taxi drivers frequently experience pain, discomfort, and loss of function in their back, neck, and limbs. Work-related musculoskeletal problems affect nearly every area of the body, particularly the back, neck, lower, and higher limbs, depending on physical movement characteristics, ergonomics, and the mechanical design of work tasks. According to the findings of the study, drivers' jobs are extremely stressful. Taxi drivers differ from other professions in terms of the risk of work-related musculoskeletal problems for a variety of reasons. They are required to work in extremely inconvenient conditions, such as long periods of driving, a poorly designed work environment, and so on^[13].

Abledu JK, Offei EB, and Abledu GK (2014) they discovered musculoskeletal disorders were assessed to be present in 70.5 percent of the cab drivers. Lower back pain (34.3 percent), upper back pain (16.7 percent), neck pain (15.2%), shoulder pain (11.0 percent), knee pain (10.0 percent), hip/thigh pain (2.9 percent), elbow pain (4.8 percent), ankle/feet pain (2.4 percent), and wrist/hand pain (2.4 percent) were the most common MSD domains (1.9 percent). They were at a higher risk of acquiring MSDs if they drove cab for more than 12 hours per day or at least 5 days per week, considered their employment as stressful, and were unsatisfied with their job. In order to lower the frequency of musculoskeletal disorders in cab drivers these findings urge for preventive interventions and safety recommendations^[1].

Musculoskeletal disorders are widespread illness among cab drivers. In order to define effective

prevention strategies, it is necessary to consider how and when to describe work stress and help determine other related factors 11 (Ngatcha Tchounga CC et al. 2022)^[11].

Conclusion:

The current study results emphasized the significance of prevalent musculoskeletal disorders in occupational taxi drivers in multiple body regions, with the lumbar region being the most frequently affected. The present research comes to the conclusion that Mahabaleshwar's taxi drivers experience a high frequency of MSK disorders. Lower back, neck, knees, and wrists/hands were the most frequently affected body parts. This interferes with their daily activities and prevents them from carrying out numerous tasks. It also has an impact on their occupation. Therefore, the importance of teaching occupational taxi drivers about preventive measures and posture education cannot be overstated.

Conflict of interest:

There are no conflicts of interest among the authors.

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