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Research Article

Assessment of Musculoskeletal Pain Among Prolonged Motorcycle Riders

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A B S T R A C T

Introduction: The work-related motorcyclist is extremely prone to driving-related issues due to the duration of riding. They travel to several places within the allotted time every day, which is not only exhausting but also leads to several severe health-related issues which may impact their postural formations. The severity of musculoskeletal problems occurring in motorcyclists may lead to lifelong problems for the individual.

Objective: Assessment of musculoskeletal pain, its severity and abnormal posture among prolonged motorcycle riders

Methods: The study was done among delivery occupation motorcyclists working in Karad. All male delivery motorcyclists were included in this study, 25–35 years of age who rode bikes for more than 3 hours per day. A structured assessment was used for assessing the severity of musculoskeletal pain and an altered range of motion seen among the motorcyclists was noted.

Results: The findings of this study revealed that there was a severity of musculoskeletal problems among delivery motorcyclists. The group analysis demonstrated statistically significant impairments in all outcome measures. A structured assessment was conducted in which, VAS ($p < 0.0001$) and ROM for all the joints ($p < 0.0001$) were seen to have significant differences.

Conclusion: Musculoskeletal pain is common in motorcyclists. The severity of pain was predominantly higher among the delivery motorcyclists in this study. The most altered range of motion was found in the lumbar and cervical regions, which makes it very evident that lower back pain is higher in delivery motorcyclists.

Keywords: Musculoskeletal Pain, Motorcyclists, Delivery, Backpain, Severity

Introduction

India is a developing nation where two-wheelers constitute the most preferred mode of transport due to packed roads, fewer bays, and high fuel rates.[1] Researchers found that due to an increase in workload, the delivery motorcyclists working for several hours suffer from low back pain. In the latest report, the motorcyclist populace in Maharashtra state was 73%.[2] Every motorcyclist has a different riding

posture. Extended contact with difficult posture brings pain and discomfort for the rider producing musculoskeletal problems.[3] The work-related motorcyclist is so prone to driving-related issues due to the duration of riding.[4] They travel to several places within the allotted time every day, which is not only exhausting but also leads to several severe health-related issues which may impact their postural formations.[5] They might not be aware of the improper posture they hold throughout the day and end up causing several problems.[6] The deliverer might not be always aware of the place or the location or the time required to reach the destination which makes them more prone to travel and in search of the proper location, they might spend much of their time on the motorcycle with the same posture for hours.[7] Considering the dangers linked with the motorcyclist associated with two-wheeler riding is important as the system can be considered as an interface between man and machine, which is more vulnerable to discrepancies in features.[8] Also, not much is known about the awareness of musculoskeletal problems in the two-wheelers, mostly in the population riding on a daily basis.[9] A sufficient rate of information is available on the mortality and morbidity count of motorcyclists due to accidents, but there is not much information available regarding musculoskeletal problems and the impact caused by them.[10] The level of pain differs from acute or chronic and can change from dull, constant or abrupt severe pain, affecting the normal living of the motorcyclist.[11] According to the ergonomic statement, the two-wheeler posture is an important factor which should be considered.[12] All the studies which are done prior include motorcycle problems but there is very little data available on the riding posture of the motorcyclist.[13] Mostly, they have a load on their musculoskeletal system the back, neck and spine.[14] When we land on a bad road while driving, most of the pressure is felt on the spine and it absorbs all the pressure.[15] The discomfort experienced by the motorcyclist is due to various factors like joint angles, postures, muscular contractions and pressure distribution while in a seated posture,[16] which indeed makes the motorcyclist acquire the postures which will balance the forces acting on the body and maintain the equilibrium[17].

Based on the determinants leading to the severity of the pain the study is completely based on determining the severity of musculoskeletal pain in delivery occupation, intensity, and postural abnormalities among the delivery motorcyclist working in Karad.

Methodology

This is an analytical study with pre-post study design conducted in the Krishna Institute of Medical Science "Deemed to be University", Karad. Simple random sampling was used for the selection of the 50 participants. This study was conducted over a period of 9 months (January 2023—September 2023).

Once permission was granted from the ethics committee, an assessment of the delivery motorcyclists working in Karad was done. The motorcyclists who were included in the study based on the inclusion criteria were explained the procedure and their consent was taken. Proper assessment was done and the data was collected using VAS and ROM assessments.

Selection Criteria

1. Age group: 25–35 years
2. Motorcycle riders suffering from back pain
3. Duration of use of motorcycle per day: more than 3 hours continuously
4. Experience in bike riding should be more than 3 years.

Outcome Measures

The outcome measures were the VAS scale and ROM assessment. Delivery motorcyclists having work experience of more than 3 hours continuously per day with 3 years of bike riding experience were included. Those who were part-time delivery motorcyclists were excluded.

Proper history was asked from all included motorcyclists before the procedure was started.

Ethical Approval

The Institutional Ethics Committee of Krishna Institute of Medical Science "Deemed to be University", Karad gave permission to initiate the project work (Protocol number 649/2022-2023).

Data Collection Tools

Determination of Pain

The patient was explained about the visual analogue scale (VAS) which contains a scale ranging from 0 to 10. '0' is the indication of no pain at all and '10' indicates severe pain. The examination was done under two circumstances, pain at rest and pain while driving the bike. The patient was asked to mark between 0 and 10 on the basis of the pain he/ she experiences first while at rest, and then during an activity.

Range of Motion

The range of motion of all the joints starting from shoulder, elbow, wrist, hip, knee, and ankle, was measured using a goniometer. The ranges of cervical and lumbar joints were measured using a measuring tape.

Statistical Analysis

The outcome measures were evaluated at the start of the study. All statistical analyses, including calculation of the mean and standard deviation of pain assessment and range

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of motion, were done using SPSS statistical software. Data analysis of the assessment of all subjects was done using InStat software. In this study, descriptive statistics such as bar diagrams, and percentages were used to statistically assess the acquired data.

Results

Demographic Variables

Pain Assessment

Pain severity at rest and activity is represented in Figure 1 in the delivery occupation motorcyclists; 30 individuals had mild pain at rest, 13 individuals had moderate pain at rest and 7 individuals had severe pain at rest, while 13 individuals had mild pain on activity, 28 had moderate pain and 9 individuals had severe pain on activity. Table 1 shows the p values (< 0.0001) on rest and (< 0.0001) on activity and reveals that pain during activities (driving) was more than pain at rest.

Range of Motion Assessment

Figure 2 represents the range of motion of all the joints. Tables 2 and 3 show the values of cervical and lumbar ROM, respectively.

The mean and standard deviations of range of motions (< 0.0001) were 14% of shoulder joint altered range of motion, 10% of elbow joint altered range of motion, 5% of wrist altered ROM, 6% of knee altered ROM, 12% of hip altered ROM, 7% of ankle altered ROM, 28% of cervical altered ROM, and 18% of lumbar altered ROM.

Table 1.Values of Pain with Participants at Rest and on Activity

Values of Pain	Rest	Activity
Mean (M)	4.2	6.56
Standard deviation (SD)	1.584	1.699
p value	< 0.0001	< 0.0001

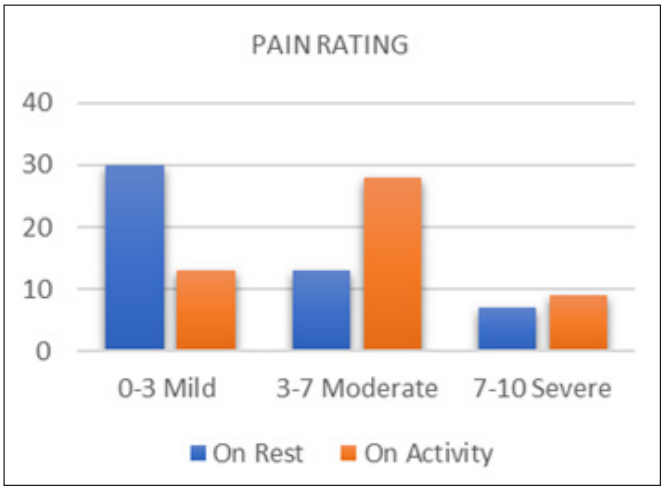

Figure 1.Rating of Pain with Participants at Rest and on Activity

Table 2.Values of Cervical Range of Motion

Cervical ROM	Flexion	Extension	Lateral Right	Lateral Left	Rotation
Mean	38.6	55.7	38.8	37.8	77.4
Standard deviation	5.103	5.551	2.786	2.567	2.764
p value	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Table 3.Values of Lumbar Range of Motion

Lumbar ROM	Flexion	Extension	Lateral Right	Lateral Left	Rotation
Mean	48.34	16.14	16.74	16.14	8.31
Standard deviation	3.398	2.392	2.086	2.045	2.851
p value	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

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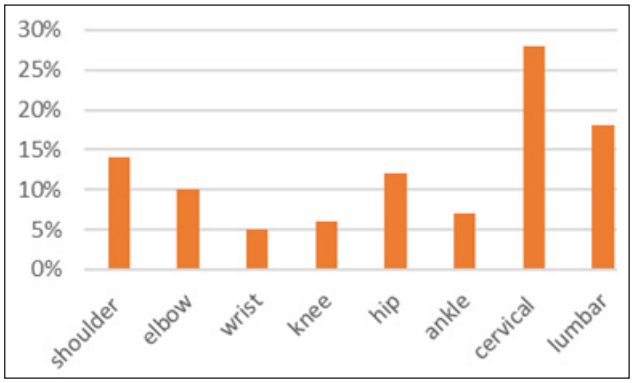

Figure 2.Range of Motion of Joints

Discussion

The study was done in 9 months among delivery occupation riders in Karad. The research was undertaken with the aim of studying the severity of musculoskeletal pain among prolonged delivery motorcycle riders in Karad taluka. Researchers found that the number of individuals in the occupation of delivery suffering from low back pain is increasing in number as the workload is increasing.[18] They travel to several places within the allotted time every day, which is not only exhausting but also leads to various severe health-related issues which may impact their postural formations.[16] The person might not be always aware of the place or the location or the time required to reach the destination which makes them more prone to travel and in search of the proper location they might spend much of their time on the motorcycle with the same posture holding them for hours.[19]

Despite having previous studies on similar topics, there is very little data available on the riding posture of the motorcyclist.[20] Generally, it is seen that the posture exerts major pressure on the musculoskeletal system, the back, neck and the spine.[17] A bad road causes a lot of pressure on the spine.[21] Numerous factors like joint angles, postures, muscular contractions and pressure distribution while in a seated posture, contribute to the discomfort experienced by the motorcyclists,[22] which makes the motorcyclist adopt postures which balance the forces acting on the body and maintain the equilibrium[23].

A study done by Ullah et al.[1] concluded that there is moderate pain among Peshawar occupational motorcyclists, hence there is a large number of populations suffering from the same related problem and there is a high number of people having pain in the lower back region.

In a study done by Memon et al.[2] on motorcyclists of the age group of 21–30 years having maximum riding time, the results showed that age, duration of riding and the position of the motorcyclist were the major factors.

Detailed assessment was carried out in this study. Data was collected using VAS, ROM and posture assessment. The main inclusion criterion of the participants was delivery motorcyclists having experience of more than 3 years and working for more than 3 hours per day.

Data analysis of the assessment of all subjects was done using InStat software. Range of motion assessment was done where the ranges of all the joints were measured with the help of a goniometer and the difference between the normal ranges and altered ranges was compared. The ranges of each joint were written separately and assessed. It was found that the majority of the altered range of motion was found in the lumbar area followed by the cervical area. Depending on the altered ranges, the data was analysed and a demography was made which stated that the lumbar region was the most affected area in delivery occupation.

The maintenance of proper posture by the motorbike rider is very important in order to avoid the discomfort caused for a lifetime. It may also lead to various postural-related problems which can affect the drivers and may lead to the development of compensatory curves in the spine, it is a need of cause to find a proper solution which may help the delivery occupation to travel not only safely but also healthily.

Conclusion

A total of 55% had severity-rated pain on the VAS scale and the significant mean value for the lumbar region was higher for the affected range of motion. The study concluded that statistically significant altered ROM of the lumbar region existed among the motorcyclists in the delivery occupation working in Karad.

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Conflict of Interest: None

References

1. Ullah QF, Shah SN, Adil SS, Javed S, Baqir M, Naqvi SM. Prevalence of musculoskeleton pain among occupational motorcyclist and its impact on work efficiency and long term health care in Peshawar: a cross-sectional study. Research Square 1937798 [Preprint]. 2022 Aug 30 [cited 2023 Oct 17]. Available from: https://www.researchsquare.com/article/rs-1937798/v1 [Google Square]
2. Memon A, Imran A, Aftab S, Nawaz U, Ishaque F. Low back pain among student motorcyclists: a cross-sectional study. J Dow Univ Health Sci. 2013;13(2):113-6. [Google Scholar]
3. Wójcik R, Trybulec B. Occurrence and intensity of spinal pain in motorcyclists depending on motorcycle type. Cent Eur J Sport Sci Med. 2017;20(4):81-91. [Google Scholar]
4. Sultan SR, Naeem Atta M, Siddiqui O, Yaqoob H, Abbas

S, Sajid A, Hayder A, Maqbool S. Prevalence of low back pain in bike riders: a cross sectional study: low back pain in bike riders. Pak J Health Sci. 2022;3(4):18-22. [Google Scholar]

5. Ogundele OA, Afolabi OT, Fehintola FO, Olorunsola A, Adelosoye A. Prevalence and management practices of low back pain among commercial motorcyclists in Ilesa Southwest, Nigeria. Sci J Public Health. 2017;5(3):186-91. [Google Scholar]
6. Dutta K, Basu B, Sen D. Evaluation of postural, psychosocial stress and driver behaviour of motorbike riders in India. Occup Ergon. 2017;13(S1):25-36. [Google Scholar]
7. Lewis V, Kennerley R. A preliminary study to investigate the prevalence of pain in elite dressage riders during competition in the United Kingdom. Comp Exerc Physiol. 2017;13(4):259-63. [Google Scholar]
8. Gyi DE, Porter JM. Musculoskeletal problems and driving in police officers. Occup Med (Lond). 1998;48(3):153-60. [PubMed] [Google Scholar]
9. Samad NI, Maridin AF, Hamzah NA, Anua SM, Mamat MN, Nawi MN. Prevalence of back pain among food delivery riders in Kota Bharu, Kelantan: a preliminary study. J Energy Saf Technol. 2022;5(2):52-60. [Google Scholar]
10. Hafzi MI, Rohayu S, Faradila PN, Wong SV. Prevalence and risk factors of musculoskeletal disorders of motorcyclists. Malays J Ergon. 2011;1:1-10. [Google Scholar]
11. Anoop GA, Binoosh SA. A study on musculoskeletal disorders among two-wheeler riders of Kerala state in India. Proceedings of the 4th Kerala Technological Congress – KETCON 2019. Vol. 6. Thrissur: Government Engineering College; 2019. p. 411-8. [Google Scholar]
12. Chawathe VS, Mhambre AS, Gaur AK, Pusnake VJ, Sharma R, Wangdi NI. Prevalence of pain in medical representatives using two-wheeler for daily commute. J Musculoskelet Ultrasound Pain Med. 2017;3(2):61-5. [Google Scholar]
13. Shetty R, Siddapur T, Palekar T. Correlation between pain and disability in cervical and lumbar spine in two-wheeler riders. Acta Sci Orthop. 2022;5(10):79-83. [Google Scholar]
14. Bovenzi M, Rui F, Negro C, D'Agostin F, Angotzi G, Bianchi S, Bramanti L, Fest GL, Gatti S, Pinto I, Rondina L, Stacchini N. An epidemiological study of low back pain in professional drivers. J Sound Vib. 2006;298(3):514-39. [Google Scholar]
15. Akinbo SR, Odebiyi DO, Osasan AA. Characteristics of back pain among commercial drivers and motorcyclists in Lagos, Nigeria. West Afr J Med. 2008 Apr;27(2):87-91. [PubMed] [Google Scholar]
16. Tiemessen IJ, Hulshof CT, Frings-Dresen MH. Low back pain in drivers exposed to whole body vibration: analysis of a dose-response pattern. Occup Environ Med. 2008 Oct;65(10):667-75. [PubMed] [Google Scholar]
17. Araújo NC, Souza OF, Morais MJ, Leitão FN, Bezerra IM, Abreu LC, Rodrigues LM. Osteomuscular symptoms on motorcycles in the city of Rio Branco, Acre, Brazil, West Amazon. Medicine (Baltimore). 2021 Apr 23;100(16):e25549. [PubMed] [Google Scholar]
18. Bovenzi M. Metrics of whole-body vibration and exposure-response relationship for low back pain in professional drivers: a prospective cohort study. Int Arch Occup Environ Health. 2009 Jul;82(7):893-917. [PubMed] [Google Scholar]
19. Rozali A, Rampal KG, Bahri MT, Sherina MS, Azhar SS, Khairuddin H, Sulaiman A. Low back pain and association with whole body vibration among military armoured vehicle drivers in Malaysia. Med J Malaysia. 2009 Sep;64(3):197-204. [PubMed] [Google Scholar]
20. Chen JC, Chen YJ, Chang WP, Christiani DC. Long driving time is associated with haematological markers of increased cardiovascular risk in taxi drivers. Occup Environ Med. 2005 Dec;62(12):890-4. [PubMed] [Google Scholar]
21. Zomalhèto Z, Mikponhoué RC, Wanvoègbe A, Adikpéto I, Ayélo P. [Prevalence and factors associated with low back pain among motorcycle drivers in Porto-Novo (Benin)]. Pan Afr Med J. 2019 Mar 7;32:107. French. [PubMed] [Google Scholar]
22. Mirpuri S, Traub K, Romero S, Hernandez M, Gany F. Cardiovascular health status of taxi/ for-hire vehicle drivers in the United States: a systematic review. Work. 2021;69(3):927-44. [PubMed] [Google Scholar]
23. Yitayal MM, Ayhualem S, Fiseha B, Kahasay G, Gashaw M, Gebre H. Occupational lower back pain and associated factors among taxi drivers in Mekelle city, north Ethiopia: a cross-sectional study. Int J Occup Saf Ergon. 2022 Dec;28(4):2046-51. [PubMed] [Google Scholar]

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