

**STUDENT ARTICLE**

## Low Back Pain Among Student Motorcyclists: A Cross-Sectional Study

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### ABSTRACT

**Objective:** To find out the frequency of Low Back Pain (LBP) among motorcyclist students of Dow University of Health Sciences (DUHS).

**Methods:** This cross-sectional study was conducted among medical students of Dow University of Health Sciences Karachi, Pakistan. All male medical students who ride motorcycle were included. A structured questionnaire was used for the collection of data. Information regarding low back pain, most common posture adopts while riding, change position frequently, ever visited consultant for LBP, ever change normal routine due to LBP, reduced physical activity due to LBP in past 1-year, reduced leisure activity due to LBP, and LBP in past week were collected.

**Results:** Of 180 participants, mean age was  $21.89 \pm 3.01$  years. Ninety-five (53%) of students had experienced LBP. Majority of the riders reported upright posture during riding ( $n=117$ , 65%) while bending forward posture was reported by 63 (35%) students. The changed position frequently was also found predominantly higher, i.e. ( $n=131$ , 72.8%). A significant association of LBP was observed with age ( $p$ -value 0.003), time spent on motorcycle per day ( $p$ -value 0.005) and changing position frequently ( $p$ -value 0.003).

**Conclusion:** Low back pain is common in motorcyclists. Age, time spent riding per day and position change were the factors found considerably higher among motorcyclist students suffering from low back pain.

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### INTRODUCTION

Low back pain (LBP) originates in the lower back area, which may refer towards one or both legs. It may be persistent for a day or more.<sup>1,2</sup> The intensity of pain which may be acute or chronic can differ from dull constant to abrupt severe pain, preventing the normal functioning of the person.<sup>3</sup> LBP may be associated with occupations like driving, manual handling and activities involving most of improper body

movements.<sup>4</sup>

Motorbikes are perceived as a basic sort of transport in lower and middle class individuals due to their various benefits like low fuel consumption and easy movement with jammed traffic.<sup>5</sup> Various studies have reported higher LBP in bike riders.<sup>5-7</sup> Literature review has revealed low physical activity, overweight, smoking and drug abuse as modifiable and older age, history of trauma and spinal complications as non-modifiable causative factors for LBP.<sup>8-11</sup>

It is reported that pressure within the disc in lower back can be more serious while being seated than standing and motorcyclists are regularly in sitting position while riding the bike.<sup>12,13</sup> Therefore they are most at risk for LBP. In particular, long term utilization of motorbikes exposed the drivers to musculoskeletal problems, for example low backache, spinal damage and disc prolapse.<sup>14</sup> We conducted a study among students of a medical university who ride motorcycle and investigated the frequency of LBP and its risk factors in these individuals.

## METHODS

The study was a cross sectional study carried out in the Dow University of Health Sciences, Karachi Pakistan from August, 2018 to April, 2019. The study population was motorcyclist male students who ride at least five hours motorcycle per day. Medical students with spinal deformities and non-consenting motorcyclists were excluded.

Epi info sample size calculator was used for the estimation of the sample size. Taking frequency of LBP 65%, margin of error 7%. The final sample size came out to be 178, which we had round off to 180. The selection of the 180 respondents was by purposive sampling technique. A structured questionnaire was used for the collection of data. Information regarding low back pain, most common posture adopts while riding, change position frequently, ever visited consultant for LBP, ever change normal routine due to LBP, reduced physical activity due to LBP in past 1-year, reduced leisure activity due to LBP, and LBP in past week were collected.

Signed informed consent was obtained from each medical student who ride motorcycle after explaining the purpose and benefits of the study. Data were entered and analyzed on SPSS version 21. Frequency and percentages were reported for qualitative variables like presence of LBP. Chi-square test was applied to see the association of LBP with independent variables like age, gender, marital status, educational level, most common posture while riding and change of posture. P-value <0.05 taken as significant.

All procedures followed were in accordance with the ethical standards of the responsible

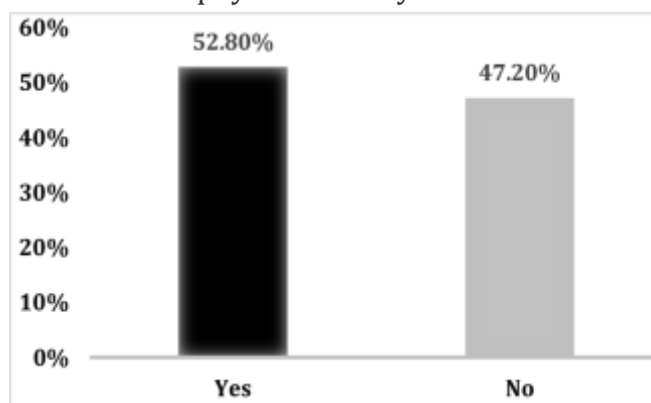
committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

## RESULTS

One hundred and eighty medical students who ride motorcycle participated in the study. The frequency of LBP was found in 95 (52.8%) of the medical students. (Figure 1)

A significant association of LBP was observed with the age of riders (p-value 0.033), time spent on riding per day (p-value 0.005). In particular, LBP was found higher among motorcyclists who spent more time on motorcycle per day as compared to those who spent less time on motorcycle per day, i.e.  $2.61 \pm 1.28$  and  $2.11 \pm 1.05$  respectively. Furthermore, changing position frequently was also observed significantly higher (n=78, 60%) among motorcyclists with LBP as compared to those who did not change position frequently (n=17, 35%) (p-value 0.003). (Table 1)

Approximately, 20% of the participants (n=95) visited their consultants for LBP in last 12 months. Of these 95 patients who visited consultants for LBP, 38 (40%) of the participants reduced their physical activity due to LBP.



**Figure 1: Frequency of low back pain among students riding motorcycle (n=180)**

## DISCUSSION

This study estimate the prevalence of LBP in motorcyclist students of DUHS, Karachi, Pakistan. This study revealed that almost half of the recruited students of DUHS experienced LBP which is parallel to a study conducted in Ilesa Nigeria, which revealed 41% presence of LBP but their targeted population was commercial

**Table 1: Comparison of Low back pain during bike riding with general characteristics (n=180)**

	LBP during bike riding			p-value
	Total n (%)	Yes n (%)	No n (%)	
Age, years	21.89 ±3.01	22.35 ±3.15	21.39 ±2.78	0.033*
1st bike riding age, years	16.06 ±2.85	16.32 ±2.67	15.78 ±3.02	0.206*
Time spent on riding per day	2.37 ±1.20	2.61 ±1.28	2.11 ±1.05	0.005*
<b>Marital status</b>				
Married	6	5 (83)	1 (17)	0.127**
Unmarried	174	90 (52)	84 (48)	
<b>Education level</b>				
Undergraduate	163	85 (52)	78 (48)	0.622**
Postgraduate	17	10 (59)	7 (41)	
<b>Most common posture while riding</b>				
Bending forward	63	38 (60)	25 (40)	0.137**
Sitting Upright	117	57 (49)	60 (51)	
<b>Change position frequently</b>				
Yes	131	78 (60)	53 (40)	0.003**
No	49	17 (35)	32 (65)	

\*\*Chi-square test applied, \*Independent t-test applied, p-value <0.05 taken as significant  
All data presented as number (%), LBP: Low Back pain

motorcyclists.<sup>15</sup> Another study which was conducted among staff in a rural hospital in Nigeria, found overall prevalence rate of LBP in 46% of the participants among whom drivers presented a prevalence rate of 20%.<sup>16</sup> Additionally, a study conducted in India which examined the musculoskeletal discomfort in all regions of the body among the non-occupational motorcyclists. The highly affected area was low back region which was 65% among studied population.<sup>5</sup>

In the current study, significant statistical associations exist between LBP and age of participants, sitting position, changing position while riding and time duration spent on motorcycle per day. In contrary to this finding, a research carried out in June 2013 in Dhaka, Bangladesh found out that the prevalence of LBP in car drivers who were older than 40 years was 4.67 times greater than those whose age was

between 25-40 years.<sup>17</sup> Another study conducted in India among non-occupational motorcyclists in 2017 showed that younger non-occupational motorcyclists experienced LBP more frequently as compared to those who were more experienced because they were less prone to get injured while riding a motorcycle.<sup>5</sup>

In this study, students who rode motorcycle for longer hours in day, experienced LBP frequently. The reason for this could be that muscle power is decreased due to a sustained posture for >20 minutes leading ligaments and joint capsules towards lesser stability and reduced flexibility resulting in structural deformities.<sup>18</sup> These findings are in agreement with a previous study in which it was found that participants who drive for more than 7 hours/day i.e. (8-16 hours/day) increased the risk of LBP by around multiple times than those who drive for 1-7 hours/day, although the study was among car drivers unlike

this study.<sup>17</sup> Ogundele *et al* conducted a study in Nigeria, also reported that a higher proportion of full-time commercial motorcyclists who worked for more than 8 hours per day reported LBP than the part time commercial motorcyclists who gave less than 7 hours per day.<sup>15</sup>

Majority of the motorcyclists in this study changed their position more frequently while riding a motorcycle due to low back pain. This could be due to the discomfort they experienced during sitting position on the motorcycle.<sup>12</sup>

Furthermore, sitting position i.e. bending forward while riding caused low back pain in many participants of our study. However, this finding was non-significantly associated with low back pain. Various researches reported the relation between low back pain and forward flexion of trunk and flexion of lumbar spine in sitting position for longer periods.<sup>19,20</sup> These factors could be the reasons for the onset of low back pain in motorcyclists who ride for prolonged periods in sustained flexed posture.<sup>21</sup> However, a previous study found that bending forward during riding was associated with LBP in a greater proportion of participants than sitting upright while riding. Therefore, it is necessary to educate motorcyclist regarding the proper sitting position.<sup>15</sup> We can relate this finding to another previous study which found that when lumbar spine is loaded on vertical axis for prolonged periods, it puts sustain compression on the spinal discs by fatiguing the muscles of the back. Once the disc is compressed, it may not be able to bear larger loads and when instant pressures are applied while stopping the motorcycle, it can cause some significant spinal trauma.<sup>5</sup>

This study had few limitations; firstly, we have only reported findings from a single center, i.e. DUHS. Secondly, this was a survey-based study in which we have reported students' reported LBP. The physical examination or diagnostic was not performed by the researchers. Lastly, musculoskeletal disorders among motorcyclists were not reported in this study. To validate the finding of this study large scale multicenter studies are recommended to screen motorcyclist for the low back pain and its possible consequences.

## CONCLUSION

The finding of our study has shown considerable number of medical students who ride motorcycle had pain in lower back region. The most common factor observed in the current study was time spent on riding motorcycle. Moreover, frequent change in the posture while riding was also reported by majority of the motorcyclists.

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