

# Prevalence of Low Back Pain in Car Drivers

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**Abstract:** ***Background:** Low back pain is very common and usually occupation related. This study aimed at determining the prevalence of low back pain in car drivers by seeing at the low back disability index due to bad postures of sitting and duration of driving in the car drivers. **Methods:** A total 120 participants were enrolled in this prospective study, all the participants were evaluated by using self-made questionnaire and Oswestry disability index questionnaire. **Results:** The estimated prevalence of low back pain was 40%. By Oswestry disability index questionnaire the minimal low back disability prevalence was 62%. The analysis of the data showed that participants who drove car for >4-5 hrs/day and driving since 15 years on average or drove daily were at greater risk of low back disability. **Conclusion:** These findings concluded that low back pain was prevalent among car drivers and standing for long time is the most affected BADLS. These findings call for preventive strategies and safety guidelines in order to reduce incidence of low back pain or low back disability among car drivers.*

**Keywords:** low back pain, car drivers, posture

## 1. Introduction

Low back pain (LBP) is the most common musculoskeletal disorder affecting the general population, with estimated 80% incidence rate among the active population<sup>[1-6]</sup>. Low back pain affects all ages, re-occur most times, and the frequency increases with age. A higher percentage of adults experience one or more brief episodes of low back pain which are usually associated with injury, bad posture and overuse<sup>[7]</sup>. Assessment of work related musculoskeletal pain among professional drivers in the service of a tertiary institution says that low back pain is a major health problem that affects quality of life, causing morbidity, increase in demand for health care and cost<sup>[8, 9]</sup>. Health problems range from discomfort, minor aches and pains to serious medical conditions requiring time off work and even medical treatment. In more chronic cases, treatment and recovery are often unsatisfactory and the effects could be permanent disability and loss of employment<sup>[10]</sup>. Depending upon the physical movement and the ergonomic and Mechanical design of work tasks, majority of occupations in which individuals are engaged all over the world, are associated with a high risk of developing injury.

Low back pain has been recognized as one of the major cause for decreased efficiency and well-being in the working population, with consequent financial, medical, and socioeconomic implications affecting individuals, employers of organizations, and society at large<sup>[11-13]</sup>. Many etiological factors have been suggested for high prevalence of low back pain, for example prolonged sitting, fixed posture, vibration, loss of lumbar lordosis, asymmetric forces acting on the spine and perhaps periodic lifting, any of which individually could lead to musculoskeletal troubles.

Low back pain and related disorders are the most prevalent and the most frequently reported in driving related occupational disease. In a study of 1000 drivers at motorway service stations in England<sup>[14]</sup>, reported it that 25% of all drivers and 66% of all business drivers were suffering from some low back discomfort at the time of the interview and has been reported as a risk factor for acute herniated lumbar disc in males<sup>[15-16]</sup> and for low back pain in American males

<sup>[17, 18]</sup>, British males<sup>[19]</sup> and French commercial travellers<sup>[20]</sup>. Interestingly, the risks have been noted to be higher for similar exposures, i.e. driving for more than half the working day<sup>[15]</sup>, >4 h/day<sup>[19]</sup> and >20 h/week<sup>[20]</sup>. In addition, driver discomfort has been found to be more prevalent with increased duration of driving.

High prevalence of LBP among professional drivers has been reported in many parts of the world. According to recent surveys conducted among professional drivers at Israel<sup>[22]</sup> and the United Kingdom<sup>[23]</sup>, prevalence of LBP was found to be 45% and 60%, respectively. In 1990, Griffin reviewed 135 studies of whole-body vibration and health problems published between 1944 and 1988. The study populations were mostly tractor drivers, truck drivers, bus drivers, drivers of heavy machinery (earth moving equipment operators, crane operators, excavator operators, etc.) and helicopter pilots. The most frequently reported problems were low back problems (degeneration of spinal vertebrae, herniated discs, osteoarthritis, etc.).

In India, few literature's are available for prevalence of low back pain among car drivers, hence the purpose of our study is to investigate prevalence of low back pain and to explore the relationship between driving and low back pain.

## 2. Methods

This study is a prospective type of study. The data for the study was collected with consent by interview and direct method with the self-made questionnaire and Oswestry disability index questionnaire. Total 120 subjects participated in the research survey out of which there were 20 dropouts and 100 samples were analyzed. All the car drivers who had been driving regularly. Inclusion criteria were car drivers who had been driving car regularly at least for >2 times/week and >1 hr. /day. Age group of 20–60 years were recruited in the study, who have been driving for at least 2 years and drivers with the history of traumatic back injury in the last 12 months prior to this study among participants were excluded from the study. The survey instrument is the Oswestry low back disability questionnaire. This is a standardized questionnaire that helps for keep

record with people suffering from low back disability and percentage of the disability. The Oswestry Disability Index is an extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability. The test is considered the 'gold standard' of low back functional outcome tools<sup>[1]</sup>. This questionnaire gives information about pain intensity, affecting ADLs, IADLs and social life also the occupational life. A new self-made questionnaire section is also used to assess socio demographic information of the participants which includes age, sex, academic qualification, marital status, age from which started driving, posture while driving and average period spent in each driving session.

### 3. Results

| Graph no. | Name of the graph  | Results                 |
|-----------|--|-------------------------|
| 1.        | Pain intensity (% of people having pain)   | 40%                     |
| 2.        | Duration of driving the car<br>a. 2hrs<br>b. 4hrs  | 23%<br>14%              |
| 3.        | Frequency of driving<br>a. Daily<br>b. 2 times a week  | 77%<br>20%              |
| 4.        | Time of driving<br>a. Day<br>b. Day and night  | 68%<br>32%              |
| 5.        | Seat compatibility<br>a. Comfortable<br>b. satisfactory  | 46%<br>54%              |
| 6.        | Posture while driving<br>a. slouching back<br>b. forward head<br>c. erect<br>d. leaning to 1 side                          | 44%<br>29%<br>26%<br>1% |
| 7.        | Sitting<br>a. pain on prolonged sitting<br>b. comfortable only in certain chairs   | 11%<br>26%              |
| 8.        | Personal care<br>a. with pain  | 17%                     |
| 9.        | Lifting<br>a. with pain  | 39%                     |
| 10.       | Walking<br>a. with pain  | 24%                     |
| 11.       | Standing<br>a. with pain   | 51%                     |
| 12.       | Sleeping<br>a. with pain   | 27%                     |
| 13.       | Social life<br>a. with pain  | 7%                      |
| 14.       | Travelling<br>a. with pain   | 22%                     |
| 15.       | Interpretation of scores<br>a. minimal low back disability<br>b. moderate low back disability<br>c. no low back disability | 62%<br>5%<br>33%        |

### 4. Discussion

In our study, prevalence rate of low back pain was 40%. It shows there is a relationship between car drivers and musculoskeletal problems. The risk was identified among drivers on an average whose duration of driving was 4-5

hours and those who were driving since 15 years on an average.

In our study 32% drivers used to drive in daytime as well as in the night. 7% have social life affected because of pain. 22% have travelling difficulties due to pain. 18% people have occasional sleep disturbances due to pain.

Low back pain has been identified as one of the most costly disorder in the worldwide population, and activities such as sitting, whole body vibration and awkward postures have been associated with the risk of developing low back pain<sup>23</sup>. 46% people were not having satisfactory seating. Uncomfortable seat, back support and gear level were observed to be associated with a higher prevalence of LBP<sup>20, 24</sup>. Previous studies show that some types of car seats contribute to the development of Low back pain, particularly, in people who drive for long hours<sup>[25-27]</sup>. The car seat and its backrest usually keeps the driver's hip in an angle 90° or less, thus predisposing the lower lumbar discs to a greater pressure; the resultant forces subsequently contributes to injury of the low back and degeneration of the lumbar spine<sup>[27]</sup>. Loss of rigidity or sagging of the car seat (usually due to wear and tear) has also been suggested to predispose the low back to injury, and it has been established that this causes the knees to be elevated higher than the pelvis<sup>[26, 27]</sup>. This might result in the concentration of the gravitational forces of the upper part of the body at the lower lumbar spine<sup>[27]</sup>.

11% people have pain in prolonged sitting and 26% are comfortable only in certain chairs and positions, it may be because uncomfortable car seat and altered postures. 49% people seat with slouching posture, 29% with forward head posture, contributing to development of low back pain as it predisposes lower lumbar disc with greater pressure. Sitting for prolonged periods of time can be a major cause of back pain, because increased stress of the back, neck, arms and legs and can add a tremendous amount of pressure to the back muscles and spinal discs. Additionally, sitting in a slouched position can overstretch the spinal ligaments and strain the spinal discs. When seated with a lumbar support, the intrinsic and abdominal muscles are no longer active. They cease to support your spine as it rests. Weight on each disc becomes uneven, and disc bulge occurs. The extrinsic and intrinsic muscles (which are smaller and shorter) become weaker and overstretched. Using the lumbar support found in all seats also reduces circulation to these muscles as person lay against them. Most of the people do not use seats upright properly, and over time, may slouch while seated. Here the pelvis develops a posterior tilt, leading to greater disc imbalance and risk of injury.

Placing arms and hands steering wheel, allows us to relax the upper body further. Relaxing exacerbates the curve in spine. Our natural and balanced lumbar S-shaped curve becomes a C-shaped curve. Other muscles like the abdominals and the transverse abdominals relax, resulting in less support. Hamstring and quadriceps muscles become progressively shorter (and weaker). The progression causes them to pull on the pelvis during activity, thereby reducing our pelvic mobility. The inclination of the seat back to an

angle of  $100-110^\circ$  is preferred as, this angle decreases the pressure on the discs in the low back.

Study concluded that 39% people have pain while lifting heavy objects. 24% people have pain while walking. The extensor muscles are attached to back of the spine. They enable standing and lifting objects. These muscles include the large paired muscles in the lower back, called erector spinae, which help hold up the spine, and gluteal muscles. The flexor muscles are attached to the front of the spine and enable flexing, bending forward, lifting, and arching the lower back. The oblique muscles are attached to the sides of the spine and help rotate the spine and maintain proper posture. Overusing, bad posture leads to malalignment of muscles which leads to inflammation in the muscle and then pain. Which results in activity limitations such as lifting heavy objects and walking.

51% people have pain on prolonged standing. When the facet joints or certain other structures in the spine become injured or inflamed, the large back muscles can spasm and cause low back pain and marked limitation in motion. An episode of lower back pain that lasts for more than two weeks can lead to muscle weakness (since using the muscles hurts, the tendency is to avoid using them). This process leads to muscle wasting and subsequent weakening, which in turn causes more back pain because the muscles of the back are less able to help hold up the spine. Another key structure in low back pain is the hamstring muscles, the large muscles in the back of the thighs. Patients with tight hamstrings tend to develop low back pain, and those with lower back pain tend to develop tight hamstrings. Muscle strength and flexibility are essential to maintaining the neutral spine position. Weak abdominal muscles cause hip flexor muscles to tighten causing an increase in the curve of the low back. An unhealthy posture results when the curve is overextended called lordosis or swayback. Proper posture corrects muscle imbalances that can lead to low back pain by evenly distributing weight throughout the spine.

Thus, our aim of the project which is to find out is there any relationship between low back pain and car driving in Indian car drivers. And our objective of the research which is to analyse low back pain in car drivers in relation to their long hours of sitting, standing after long time driving and sitting postures concludes that 62% had minimal low back disability and 5% have moderate low back disability.

## 5. Conclusion

Study concludes that 63% people had minimal low back disability resulting in hampering performance with the daily life activities and social life. Study identified the duration of driving and type of seating posture while driving as risk factors for low back pain among the participants.

## 6. Recommendations

An interventional study can be done to see the effects of manual therapy on low back pain. A study can be done on larger sample size.

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