

## Analysis of Work-Related Musculoskeletal Pain in Bus Drivers

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### Abstract:

#### BACKGROUND:

Professional bus drivers have been found to be at higher risk for developing musculoskeletal pain.

#### OBJECTIVES:

To investigate the prevalence of musculoskeletal pain & to analyse the risk factors at Work-Station in Bus drivers.

#### STUDY DESIGN:

Cross-sectional study

#### METHODS:

100 bus drivers were interviewed. A questionnaire was formulated on the basis of job demand analysis & ergonomic evaluation. Questions included were based on age, musculoskeletal pain, work-related ergonomic & psychosocial factors, and general health habits like addictions, exercise.

#### RESULTS:

Data was analysed by Questionnaire with Numerical Rating Scale. Out of the 100 bus drivers, 20% reported no pain. Prevalence of musculoskeletal pain was 80% ,in that most affected area was Low back (70%),neck (55%),shoulder (47.5%),knee pain (31%) & then wrist & heel pain. The highest risk factors for back & neck pain were along term exposure to vibration & uncomfortable seat position.

#### CONCLUSION:

Work related ergonomic & psychosocial factors showed a significant association with musculoskeletal pain in Bus drivers.

**Keywords:** Bus drivers, Musculoskeletal pain, Disorders

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Date of Submission: 03-09-2021

Date of acceptance: 17-09-2021

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### I. Introduction:

Work-Related Musculoskeletal Disorders (WRMD's) have attracted considerable attention because of its importance in assessing ergonomic risk factors involved in industrial work place. WRMD'S usually causes substantial economic losses to individuals and to the community. WRMD'S (Work-Related Musculoskeletal disorders) develop over time and are caused either by the work itself or by the working environment. It commonly involves the basic, cervical spine and upper limb<sup>1</sup>.

Bus driving is a high risk job and associated with variety of physical and psychological hazards. Study done by SBM Tamrin or Malaysiyan bus drivers reported the risk factors such as whole body vibration (WBV) and posture adopted during driving can lead to low back pain (LBP) in Bus drivers<sup>2</sup>. Numerous Studies have also indicated the importance of the psychological factors regarding the incidence of injury. eg :Job satisfactions. Hence the survey was conducted on bus drivers to find out the relation of the musculoskeletal pain with physical and psychological factors in bus drivers<sup>3</sup>.

Transport or transportation is the movement of people and goods from one place to another. The term is derived from latin words trans (across) and portare (to carry).In India, many forms of public transportation are available for passengers. Among them, buses public both within the bus and on the road is given little priority.

Work-Related musculoskeletal disorders (WRMDs) affect workers in many occupations including those related to operating large vehicles. Urban bus transportation drivers have been found to have high prevalence rates of musculoskeletal problems. Both physical and psychological risk factors affect Work-Related Musculoskeletal disorders (WMSD's)<sup>3</sup>.There are many physical factors that many contribute to increased physical loading in the bus drivers musculoskeletal system, resulting in discomfort and pain.The most

commonly identified physical factors are prolonged sitting, whole-body vibration strenuous work load and prolonged working time<sup>12</sup>.

In terms of individual factors, age, gender, weight and height, the body mass index also important risk factors associated with work related musculoskeletal disorders(WRMD's). In India, the working condition of bus drivers are poor and stressful. However, this problem has not been investigated. Work-Related musculoskeletal disorders(WRMD'S) affect workers in many occupations including drivers of large vehicles. Urban bus drivers have been found to have high prevalence rates of back problems in overseas studies<sup>6</sup>.

**AIM:** Analysis of work-related musculoskeletal pain in Bus Drivers.

**OBJECTIVES:** To find out the prevalence of musculoskeletal pain in bus drivers.

To evaluate the association between musculoskeletal pain and work related factors (physical and psychological).

**NEED OF STUDY**

Musculoskeletal pain is a common problem seen nowadays especially in Bus drivers. Musculoskeletal pain can be caused by over strain.-Poor posture or prolonged immobilization can also cause musculoskeletal pain. Hence there is a need for the awareness of maintaining posture among Bus drivers to avoid musculoskeletal pain.

**MATERIALS AND METHODOLOGY**

**STUDYDESIGN:**

Survey was conducted among bus drivers.100 Bus drivers between the age group of 28-58 were personally interviewed with self design questionnaire.

The questionnaire consisted of 35 items under the 3 headings:

**(i)Personal factors:**

Age, height, addictions, time spent with family and time pressure.

**(ii)Prevalence of musculoskeletal pain**

**(iii)Occupational factors:**

Work-Station design:-Seat, steering wheel position, gear position, adequate leg space.

Working environment: -Vibration, exposure to heat and cold.

Working format: -Total working hours, total driving hours, rest period.

**STUDY SETTINGS:**

Gobichettipalayam Bus stand and & branch

Sathyamangalam Bus stand & branch

Coimbatore Bus stand & branch

**SAMPLEOFPOPULATION:**

The sample population includes 100 bus drivers

**MATERIALS:**

35 Questionnaires with Numerical Pain Scale

**INCLUSIONCRITERIA:**

\* Age : 28-58 years,

\* Sex: Males

**EXCLUSIONCRITERIA:**

\*Bus driving minimum 5hrs.

\* Drivers with any pre existing & any accident musculoskeletal pain.

\*Age below 28 and above 58

**TYPEOFSTUDY:**

\*Only Bus drivers

**DURATIONOFSTUDY:**

\*15 days

**PROCEDURE:**

The survey was done to analysis of work related musculoskeletal pain in Bus drivers' by using questionnaire with numerical pain scale.

Tools and materials used to collect the data Questionnaire comprised of 3 parts as follows. The study was approved by institutional ethical college of cherraans college of physiotherapy.

**SURVEYMETHOD:**

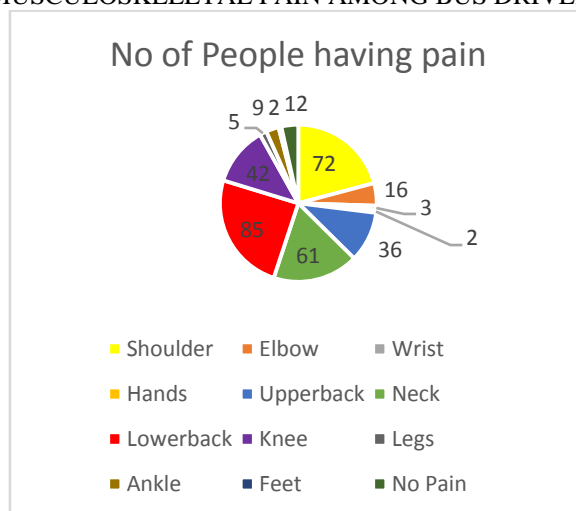
The participants are requested to read the questionnaire for 10 minutes without any distraction. All of them were explained about the questionnaire in Tamil to make a good understanding of questionnaire. Then they are asked to fill up the questionnaire. The duly filled questionnaire was collected and analyzed.

**DATAANALYSIS AND INTERPRETATION**

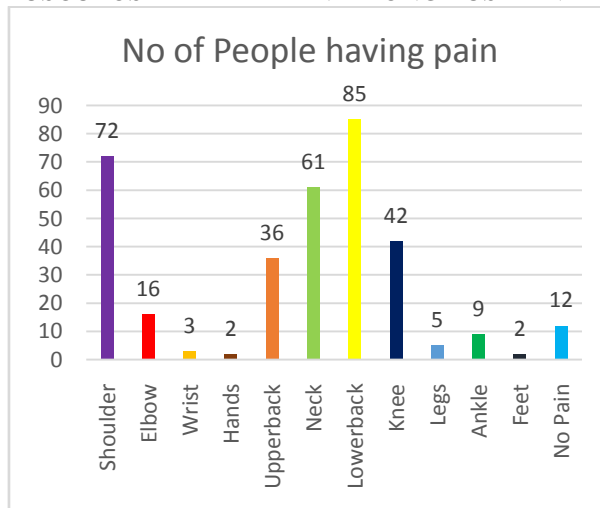
Various	No of People having pain	NRS AVERAGE
Shoulder	72	3.45
Elbow	16	0.65
Wrist	3	0.09
Hands	2	0.05
Upper back	36	1.59
Neck	61	2.96
Lower back	85	5.65
Knee	42	2.1
Legs	5	1.7
Ankle	9	0.41
Feet	2	0.11
No Pain	12	0

TABLE: 1 SCORES OF NUMERICAL RATING SCALE (NRS) MUSCULOSKELETAL PAIN AMONG BUS DRIVERS

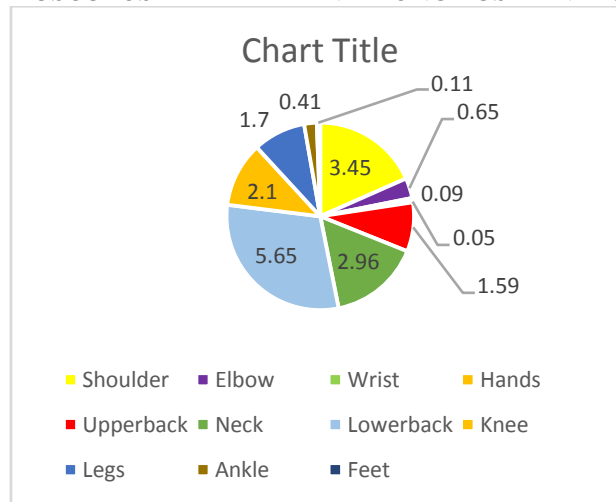
**Fig 1: NO OF PEOPLE HAVING MUSCULOSKELETAL PAIN AMONG BUS DRIVERS**



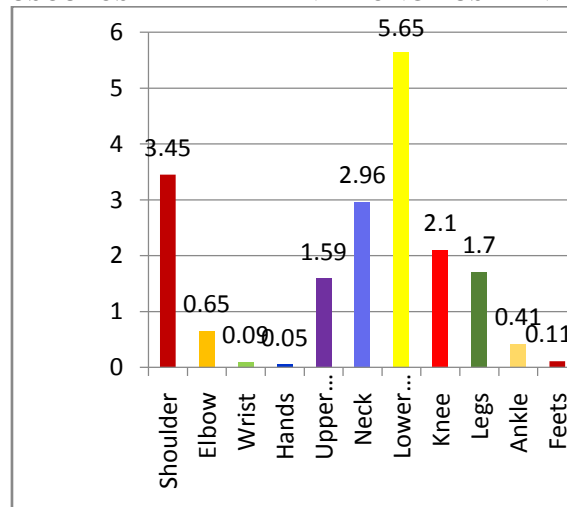
**Fig 2 : NO OF PEOPLE HAVING MUSCULOSKELETAL PAIN AMONG BUS DRIVERS**



**Fig 3 : AVERAGE SCORES OF NUMERICAL RATING SCALE(NRS) MUSCULOSKELETAL PAIN AMONG BUS DRIVERS**



**Fig 4 : AVERAGE SCORES OF NUMERICAL RATING SCALE(NRS) MUSCULOSKELETAL PAIN AMONG BUS DRIVERS**



## II. Discussion:

The present study showed the prevalence of musculoskeletal pain was 88% . Ergonomic factors like uncomfortable seat and steering wheel position, vibration, bad road condition and psychosocial factors such as inadequate rest period, tiredness, less time for family, time pressure may be responsible for musculoskeletal pain .

The working hours of bus drivers are 8 hrs/day with a weekly off day. They cover one long route and two short route in a day . They get one break of 30 min for long route and 15 min break between two short routes.

### PREVALENCE OF LBP

This study indicated 85% prevalence of LBP among bus drivers. The factors contributing to LBP can be uncomfortable seat position ,sitting for prolonged period & whole body vibration<sup>15</sup>. The survey was done in the Coimbatore division were road conditions are suboptimal thereby causing in jerks on the low back region.

The time required to complete the specific route increases during peak hours because of traffic congestion. The seat of drivers does not provide support to the lumbar spine leading to increase in the disc pressure.

The driver's seat is made up of hard cushion and is narrow. This kind of prolonged sitting cause discomfort to the low back region. To avoid discomfort, the drivers adapt awkward posture like slump sitting, unequal weight bearing on ischial tuberosity. When this awkward posture maintain for prolong period with no lumbar support leads to increase in intra-discal pressure and ultimately LBP. Bad road condition is contributing factors for LBP<sup>2</sup>.

Whole body vibration (WBV) is an obvious risk factor for LBP. Meta-analysis of 15 articles shows strong relation between LBP and WBV<sup>12</sup>. Yamazki et al explains that vibration increases production of matrix degrading & proteolytic enzymes affecting the extra cellular matrix metabolism of intravertebral disc cell<sup>13</sup>.

#### PREVALENCE OF SHOULDER & NECK PAIN

The present study showed the prevalence of neck pain in 61%, Shoulder pain in 72% and upper back 36% of Bus drivers. The high prevalence of shoulder pain can be attributed to uncomfortable gear & steering wheel position & neck pain can be attributed to uncomfortable seat position.

Seat without upper back support induces the forward head & protracted shoulder, thereby increasing the stress on cervical spine<sup>1</sup>. Continuous isometric contraction of upper limb musculature is required while controlling the steering wheel increases the stress on shoulder, neck & wrist musculature. Work performed in prolonged static posture requires a low level muscle of contraction of upper limb that Triggers chronic localized pain

Drivers are exposed to WBV in everyday work routine and they have high prevalence of Musculoskeletal pain .

#### PREVALENCE OF KNEE PAIN

The prevalence of knee pain is 42% and is significantly associated with the seat position and inadequate leg space.

#### EFFECTS OF ADDICTION

As to smoking, smoking leads to decrease in perfusion and malnutrition of the para vertebral soft tissues & inter vertebral disc and hence interferes with the tissue healing<sup>13</sup>. Nicotine, released as a result of smoking, influences the central nervous system altering the perception of pain, which would explain MSK pain in other region of the body<sup>13</sup>.

#### PSYCHOSOCIAL STRESS FACTORS

Work related psychosocial stress factors such as job satisfaction, stress, mental demands and poor supervision ratings were found to correlate with LBP in professional drivers<sup>31</sup>. In present study, inadequate rest periods, time pressure, less time for family showed significant correlation with MSK pain. Swenson&Andersons, proposed that psychological stress contributes to increase tone in musculature resulting in increase Metabolic strain on spinal structure. It also produces fatigue that could predispose drivers to traumatic injury<sup>18</sup>.

Ethical clearance- Taken from ethical.....committee in cherraan's college of physiotherapy

**Source of funding-** Self

**Conflict of Interest –nil**

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