WORK RELATED MUSCULO-SKELETAL DISORDERS AMONG THE TRUCK DRIVERS

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We the under signed certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitle

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Declaration

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent of my supervisor.

Signature: **Date:**

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Contents

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Lastly, my thanks are extended to all those not mentioned in person, participants and who contributed in any way during this research. I wish all of them along and prosperous life.

Acronyms

BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CRP	Center for the Rehabilitation of the Paralyzed
LBP	Low Back Pain
MSD	Musculo-Skeletal Disorder
RULA	Rapid Upper Limb Assessment
SPSS	Statistical Package for the Social Science
US	United States
USA	United States of America
WBV	Whole Body Vibration
WHO	World Health Organization

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Abstract

Purpose: To identify the work-related musculoskeletal disorders among the truck drivers. *Objectives:* The overall objective of this study was the percentage of musculoskeletal disorder (MSD) among truck drivers. Specific objectives were to find out the socio-demographic and ergonomics related factors associated with musculoskeletal disorder. *Methodology:* A cross sectional study was conducted. Eighty truck drivers of Gabtoli truck station have participated in this study. The data were collected by face to face interview including the socio-demographic data; information related to driving, ergonomics related questionnaires and information related to musculoskeletal disorders. Collected data was entered and analyzed using Statistical Package for the Social Sciences (SPSS). *Results:* The proportion of musculoskeletal disorders is 77.5%. Among the musculoskeletal disorder the neck, shoulder and lower back area were found to be the highest pain complaints with 66.1%, 66.1% and 85.5%. Truck drivers also reported greatest discomfort in the neck (66.1%), upper back (79%), shoulder (66.1%), elbow (1.6%), wrist/hand (40.3%), lower back (85.5%), hip/ thigh (20%), knee (58.1%), ankle (22.6%). *Conclusion:* Truck driver are encouraged to explore ways to improve their truck driving interaction efficiency and seek formal training in the operating systems they use in their workplaces, non-ergonomic related factors should be trained-up and need proper ergonomically set up for truck driving work station through occupational health and safety services.

CHAPTER-I: INTRODUCTION

1.1 Background

Musculoskeletal disorders (MSD) are among the most common in the world, affecting individuals of all ages, sexes, socioeconomic classes, and ethnicities (World Health Organization, 2003). The association between MSD and numerous sociodemographic factors is well documented in the literature like population-based studies conducted in Canada, Finland, Sweden, and the United Kingdom identified gender, increasing age, education, and personal smoking history as important predictors of MSD (Mäkelä et al., 1991; Palmer et al., 2002; Schulte et al., 2007). Disorders of the musculoskeletal system are the single largest group of work-related illness in the developed world (Punnett & Wegman, 2004). Some conditions and body regions are associated with certain industries and job features for example; Lower back pain has been connected to warehouse work, repetitive lifting of heavy loads, and prolonged exposure to whole body vibrational forces (Waters et al., 2011). A survey of the general UK population found current smokers 20-50% more likely to report musculoskeletal pain that limited activity as compared to lifetime non-smokers (Palmer et al., 2002).

The correlation between whole body vibration and work-related MSD has been most definitely shown as drivers are exposed to whole body vibration for extended Periods of time, and this has been associated with low back pain (Seidel & Heide, 1986). Despite the strong and consistent link demonstrate between back pain and whole body vibration, there is little evidence that any other body regions are similarly affected to recognize a relationship between exposure to hand-transmitted vibrations (e.g. power tools) and neck and upper extremity symptoms (Palmer et al., 2001). Interestingly the excess risk appears to be higher for distal sites (fingers, wrist) than for proximal ones (neck) with the relationship between weight and musculoskeletal pain is well documented with respect to the back, hip and knee joints (Lievense et al., 2001). Nevertheless, a history of prior injury seems a logical predictor of work-related MSD given the well-documented relationship between chronicity and pain severity (Alexopolous et al., 2006).

Individuals describing higher levels of job stress, inadequate time to complete their work, poor safety climate in the workplace, lack of work freedom, and low job satisfaction in a national survey also reported higher rates of upper extremity and low back pain (Waters et al., 2011). While some of these evaluations may have a direct impact on physical work activities (e.g. lack of work freedom resulting in prolonged static, awkward positioning), musculoskeletal manifestations of work-related stress are likely due to a psychophysiological response resulting in a prolonged increase in muscle tension throughout the neck and shoulders (Lundberg et al., 1999). Workers suffering from musculoskeletal pain at anybody region scored lower on quality of life testing than those without pain, a relationship that remained significant even after adjusting for socio-demographic factors (McDonald et al., 2011).

Occupational driving has often been associated with a high prevalence of neck pain and lower back pain. Truck drivers comprise a large population that is exposed to many risks associated with neck pain and low back pain. High mileage drivers have often been associated with high prevalence of musculoskeletal pain (Gyi & Porter, 1998; Porter & Gyi, 2002). Poor posture in some types of truck has been linked with neck and trunk pain (Massaccesi et al., 2003).

Driving related musculoskeletal problems continue to be a substantial public health Problem affect millions of truck drivers in developing and develop countries commonly involve the cervical spine, back and upper and slightly lower extremity to understanding of these problems has developed rapidly during past decade (Anderson et al., 2000).

In United States, annually 150,000 persons have musculoskeletal disability especially low back pain is more frequent vehicle drivers than in control subjects with static working postures including primarily long term sitting, which appears to increasing the risk of neck pain and back pain which is combination with driving (Shah & Gerber, 1997).

In addition to the work-related financial losses, individuals with MSDs are likely to describe a reduction in the quantity and quality of leisure activities an example US workers with back or arthritis pain were nearly twice as likely to report impairment in

daily activities as a direct result of their pain (McDonald et al., 2011). Functional limitations and the resulting restriction of leisure pursuits may reduce self-perceived quality of life: within a cohort of workers actively on 2-6 weeks of sick leave for a work-related MSD, pain severity and quality of life were moderate correlated (Vanduijn et al., 2004).

1.2 Rationale

Millions of people working in driving and they were suffering from different musculoskeletal disorder. In addition Bangladesh is a poor country, this country always facing a lot of challenges including health. Musculoskeletal disorder adding more burden for the country by contributing mortality and morbidity. As I knew, few studies were conducted before on this topic so I felt this is the area where I had to do something for the patient of musculoskeletal disorder with truck driving. I think the result of the study will be helpful for the prevention of musculoskeletal disorder patients who are suffering in to the musculoskeletal disorder due to truck driving. Prevalence of musculoskeletal disorder among truck driver was not present for Bangladesh but it is very much necessary for take action. To reduce the gap of knowledge this study was necessary.

1.3 Research Question

What are the work-related musculoskeletal disorders among truck drivers?

1.4 Objectives of the Study

1.4.1 General Objectives

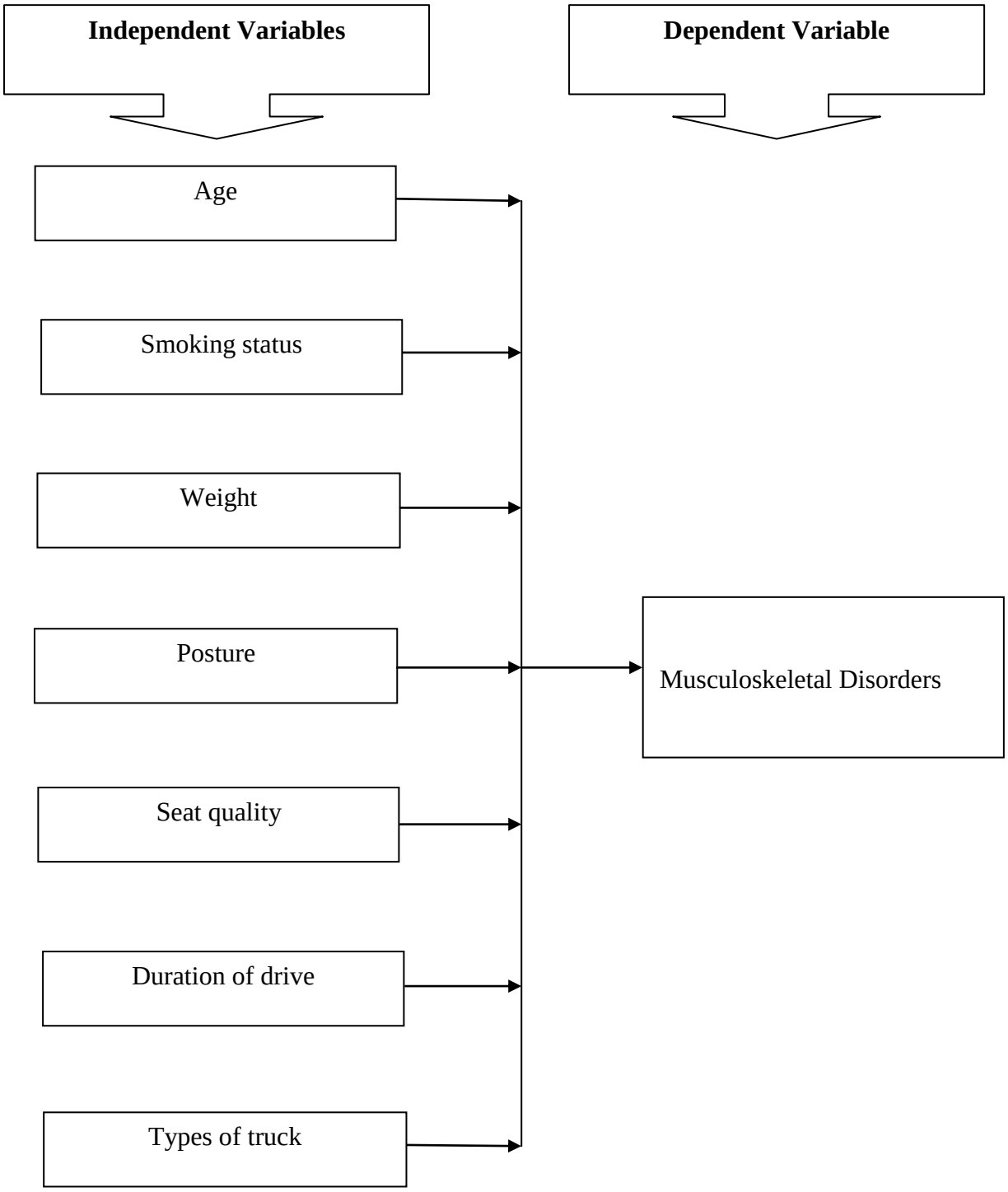
- To identify the work-related musculoskeletal disorders among the truck drivers.

1.4.2 Specific Objectives

- To find out the percentage of musculoskeletal disorders among truck drivers
- To explore the socio-demographic factors among the truck drivers
- To determine the associated factors (seat quality, body weight, duration of drive, smoking status) for the development of musculo-skeletal disorder
- To evaluate the sequence of the most affected body parts for musculoskeletal disorders in truck drivers
- To calculate the number of drivers receive physiotherapy for such disorder

1.5 List of variables

Conceptual frame work



1.6 Operational Definitions

Musculoskeletal disorders

Musculoskeletal disorders (MSD) encompass a wide range of physical health problems involving muscles, ligaments, tendons, joints, blood vessels, and nerves. Pain may occur in any location in the body, though the lower back, neck, shoulder, and wrist are among the most frequently reported sites.

Truck Driver

Truck driver means operator of truck who takes it’s occupationally to earning for living.

CHAPTER-II: LITERATURE REVIEW

Truck drivers are exposed to further occupational stressors: they are routinely required to complete strenuous physical work, including loading heavy goods, decoupling trailers, and strapping down tarpaulins and jumping up and down from cabs and trailers, these mechanically demanding activities are often carried out following long periods of inactivity, and a lack of preparedness is thought to be especially strenuous for the ligaments and muscles of the low back (Phillips, 2012). Among the population of occupational drivers, additional factors may contribute to the symptoms reported among these is prolonged sitting, generally in a posture that is constrained by the driving task, this sitting leads to the expulsion of fluids from the inter-vertebral discs and reduces their ability to cushion the spine (Pope et al., 1998).

Some truck drivers feel constrained to an unhealthy diet (Jack et al., 1998) and other lifestyle factors such as an insufficient exercise and smoking can affect susceptibility to low-back pain. The latter is said to cause malnutrition of the spinal discs, which results in greater vulnerability to mechanical stress (Ernst, 1993). Some of these negative lifestyle factors may well be present to a greater extent among truck drivers than the general population difficult to extract the influence of any one risk factor present in driving trucks therefore, a risk management strategy requires a holistic approach, such that all potential physical stressors are monitored and minimized (European Commission, 2002). Although the Directive has a primary focus on vibration, all risks must be minimized: 'ergonomic design' and 'design and layout of workplaces' are specifically exceed the Exposure Action Value thereby requiring action from their employers (Paddan & Griffin, 2002).

The truck driver's seat has an important to play in fulfilling driver comfort expectations and there is the place where the truck driver spends most of their time according to the 'European Union Legislation for Drivers and Promote' truck drivers require sitting for long periods of time approximately eight hours includes higher risk of back problems, numbness and discomfort in the buttocks due to too high surface pressure under the thighs (Floyd & Roberts, 1958). The study by (Adler et al., 2006) shows that the driver posture is not static and changes over time. Posture and changes

continuous motion are strategies of the driver to avoid mechanical load and ischemia of tissue, which has been identified as one main reason for discomfort. Discomfort feelings, as described by (Helander and Zhang, 1997), is affected by biomechanical factors and fatigue.

Hulshof and van Zanten (1997) reported that truck drivers is exposed to whole body vibration while driving for some periods of time and this has been causing low back pain and some types of truck have been linked with neck and trunk discomfort. In the study by (Porter et al., 2003), it was observed that buttock discomfort is increased for the prolonged sitting and uneven pressure distribution at buttock may cause the discomfort for truck driver.

Truck drivers comprise a large category of workers that are exposed to many risks associated with LBP. Static work posture, whole-body vibration (WBV) and manual material handling (heavy physical work) are a few of the risk factors that have been associated with LBP amongst truck drivers (Karwowski & Marras, 2000). Occupational related LBP is related to mechanical causes, the onset of which normally occurs whilst a person is at work and it reflects both confusion about epidemiologic principles and gaps in the scientific literature (Punnett & Wegman, 2004). Professional drivers present 3 times the risk for LBP when compared to workers involved in other types of work (Kelsey & Hardy, 1975).

In the study by Okunribido et al. (2006) it was established that lifting; pushing and carrying tasks were performed by the majority of the drivers for these activities were part of their daily work, and were in the majority of the time performed immediately after long stints of driving and the tasks were performed frequently, but loading and unloading of goods generally involved handling of light and medium weight loads (10 kg) and/or exertion of low hand forces. In the study by Hedberg (1985) it was established that loading and unloading were the most strenuous tasks performed by the group of drivers over the workday, such that, average heart rate ranged between 82 and 128 beats/min and the drivers tended to work at above 40% of their maximum oxygen capacity for 36% of the task time with low physical effort was experienced by the drivers however; the high frequency of lifting immediately after driving was established as more of a problem. In the study by Bernard (1997) support of most

studies which have concluded that WBV is a significant risk factor associated with LBP, a review of laboratory studies have also demonstrated WBV effects on the vertebrae, inter vertebral discs, and supporting musculature. Both experimental and epidemiologic evidence therefore suggests that WBV may act in combination with other work-related risk factors such as prolonged sitting, lifting, and awkward postures to cause increased risk of back disorder.

Static work postures include isometric positions where very little movement occurs along with cramped or inactive postures that cause static loading on the muscles also include prolonged standing or sitting and sedentary work (Bernard, 1997). Several studies have presented evidence that a positive smoking history is associated with LBP, sciatica, or inter vertebral herniated disc, (Finkelstein, 1995); whereas in others, the relationship was not supported (Kelsey, 1990). However, it is still a matter of debate whether these associations really represent causal associations (Burdorf & Sorock, 1997).

A few studies have also indicated that smoking leads to reduced perfusion and malnutrition of tissues in the spine (Holm & Nachemson, 1988). If this is true, one would also expect that repetitive mechanical stress on these tissues (e.g., in the form of heavy physical work) might be more harmful than it would be to healthy tissues, and more inclined to evoke symptoms of strain in smokers than in non smokers (Ernst, 1993).

Low back pain and spinal disorder are the two main long term health effects, which mainly results from harm to the lumbar part of the vertebral column and thoracic region and the long term risks associated with WBV are low back pain, degenerative spinal changes, lumbar scoliosis, and disc disease, disorder of gastro intestinal systems, herniated disc and abnormalities in reproductive organs and short term effects are more common and include head ache, abdomen pain, nausea, chest pain, discomfort, blurred vision, muscle fatigue and loss of balance (Seidel & Heide, 1986). A high incidence of spinal disorders is observed in professional drivers; in particular, back and neck pain result in high rates of morbidity and low retirement age these significant association between trunk and neck scores and all self-reported pains, ache or discomforts in the trunk or neck regions in all subjects. Significantly different

posture scores were also recorded for drivers using an adjustable vs. a non-adjustable seat (Magnusson et al., 1996).

Awareness of WBV is growing, measuring and evaluating it are expensive, complicated and difficult and it is a major concern for vehicle operators because of the long and short term effects it can cause. The effects come from the amount, frequency, direction, and size of the vibrations, along with the posture of the driver (Pan, 2009). Wikström et al. (1994) reviewed 45 studies (published between 1958 and 1992) of long-term exposure to whole-body vibration the main conclusion was that many years of exposure to whole body vibration might contribute to injuries and disorders of the lower back. Bovenzi and Hulshof (1999) presented a review of 45 epidemiological studies (published from 1986 to 1997) describing the occurrence of low back disorders in occupational groups of drivers (mainly truck, tractor, bus drivers and crane operators) of the selected studies suggested that occupational exposure to whole-body vibration is associated with an increased risk of low back pain.

Comfort is an attribute which has increased demand from the drivers and it is depends on different features and environment during the driving which is a very subjective issue because it is the final determination of the customer and evaluations are based on their opinions having experienced the seat (Runkle, 1994). Commercial trucks are unique in that they are specifically designed to transport heavy loads over long distances, where for the trucks; high priority has been given to durability and functional efficiency. On the contrary, automobiles are made to comfortably accommodate passengers over relatively shorter distances (Ahmedian et al., 2002).

CHAPTER-III: METHODOLOGY

3.1 Study Design

Descriptive cross-sectional study was conducted to determine the musculoskeletal disorders among truck drivers.

3.2 Study Population

The study population were truck driver whose age between 25 years to 65 years.

3.3 Study Area

This study was conducted in Gabtoli truck station situated in Dhaka, Bangladesh.

3.4 Sample Size

The equation of sample size calculation are given below-

$$n = \left\{\frac{Z(1-\frac{\alpha}{2})}{d}\right\}^2 \times pq$$

Here,

$Z(1-\frac{\alpha}{2})$= 1.96

P= 0.5

q= 1-p

=1-0.5 = 0.5

d= 0.05

According to this equation the sample should be more than 384 people but due to lack of opportunity the number of the sample were 80 selected randomly.

3.5 Inclusion & Exclusion Criteria

3.5.1 Inclusion Criteria

- Only male truck drivers were included because female are not available
- Drivers must be willing to participate in the study
- All age range were included

3.5.2 Exclusion Criteria

- Drivers having any musculoskeletal disorder arising from traumatic origins (i.e. motor vehicle accident, sporting activity or any other health and safety incident due to evaluate exact occupational cause
- Drivers having a history of any musculoskeletal disorder prior to entering the driving profession due to investigate the exact occupational cause

3.6 Sampling Technique

Sample populations were selected purposively to interview the study population considering the inclusion and exclusion criteria.

3.7 Data Collection Instrument/ Tools

Data were collected by semi-structured questionnaires, pen, paper, file and check-list.

3.8 Data Collection Technique

Data collections were taken by face to face interview in a quite palace as possible.

3.9 Data Analysis

The data were analyzed by Statistical Package for Social Science (SPSS) software version 16 in which include firstly data entry and then data analysis.

3.10 Ethical Consideration

- Ethical permission was taken from the Ethical Committee of BHPI, before starting the collection of data
- An informed consent taken from an individual participant
- Participants were allowed to withdraw themselves at any stage of the study
- Data store with confidentiality of the responds
- Followed the guidelines of WHO and BMRC

3.11 Informed Consent

Before conducting research with the respondents, it is necessary to gain consent from the subjects. For this study, interested subjects were given consent forms and the

purpose of the research and consent forms were explained to the subject verbally. They were told that participation is fully voluntary and they have the right to withdraw at any time. They were also told that confidentiality will be maintained. Information might be published in any presentations or writing but they will not be identified. The study results might not have any direct effects on them but the members of Physiotherapy population may be benefited from the study in future. And the subjects would not be embarrassed by the study. At any time the researcher will be available to answer any additional questions in regard to the study.

3.12 Limitations

- The findings of the study may not be analyzed to represent the whole country
- The sample size was small and chosen purposively due to time constrain and financial limitation

CHAPTER-IV : RESULTS

Age group

The study was conducted on 80 participants of truck drivers. Out of the participants mean age was 40.14 (±6.68) years. The range is 28 with minimum age 27 years and maximum 55.Among the participant's highest number were at the age of 40 and the number were 8 (10%). Among the age of the participants, n=18 (27-34) years were 22.5%, n=19 (35-39) years were 23.8%, n=21 (40-44) years were 26.3%, and n=22 (45-55) years were 27.4% (Figure-1).

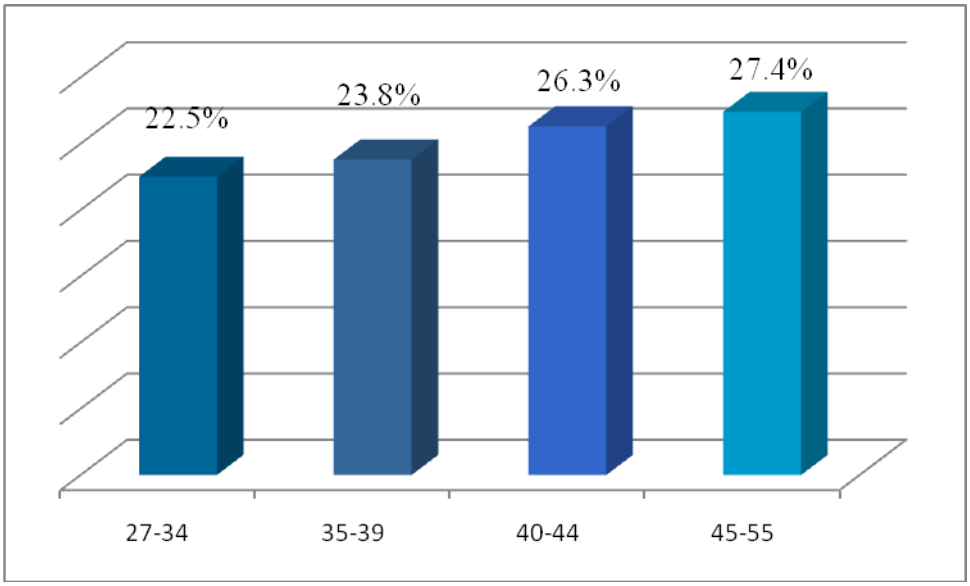


Figure-1: Age of the participants

Duration of driving

Analysis showed that, among the 80 truck drivers n=9 (11.2%) drive daily average less than 8 hours, n=34 (42.5%) drive daily average 8-10 hours, n=36 (45%) drive daily average 10-12 hours, n=1 (1.2%) drive daily average more than 12 hours (Figure-2).

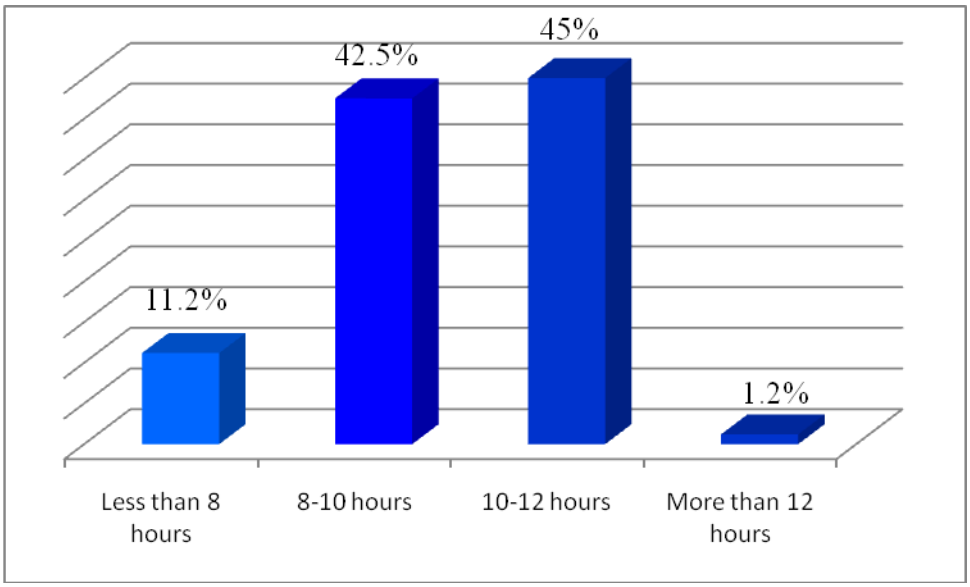


Figure-2: Duration of driving of the participants

Musculo-skeletal disorders

Analysis showed that, among the 80 truck drivers n=62 (77.5%) have any musculo-skeletal disorder in their body, n=18 (22.5%) have no musculo-skeletal disorder in their body (Figure-3).

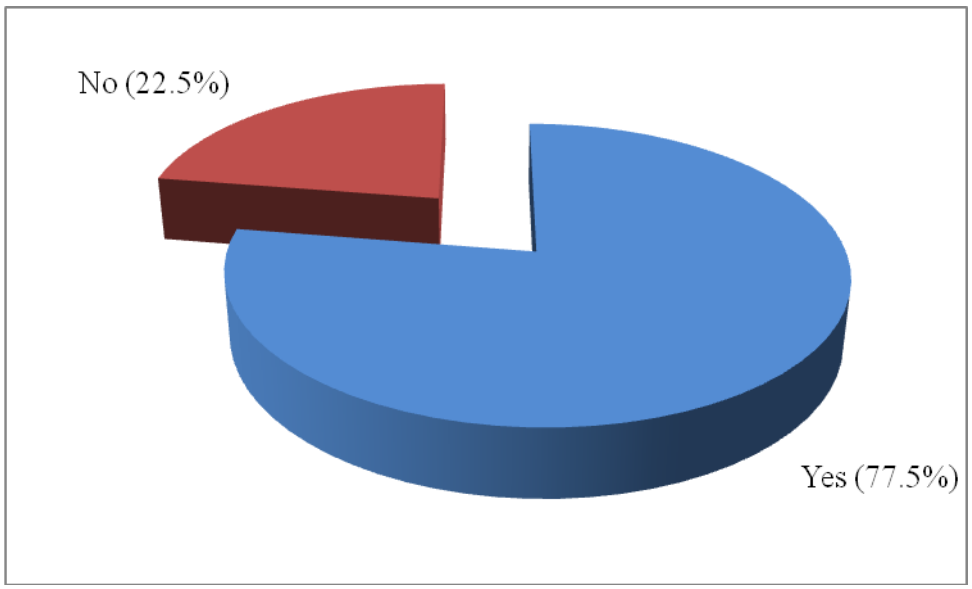


Figure-3: Musculo-skeletal disorders of the participant

Quality of seat

Among the 62 participant who have any musculoskeletal disorder, n=35 (56.5%) have comfortable driving seat, n=27 (43.5%) have no comfortable driving seat (Figure-4).

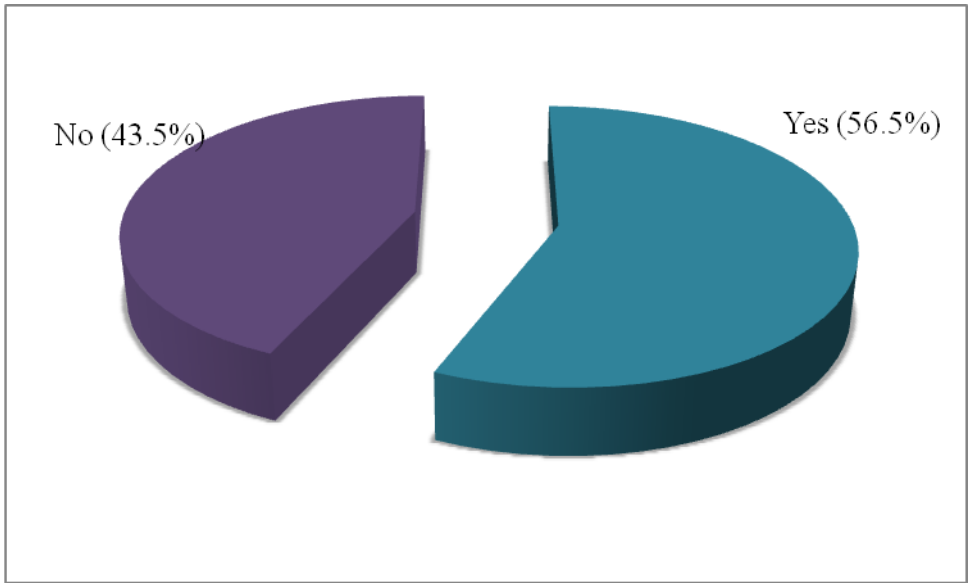


Figure-4: Quality of seat

Body weight

Analysis showed that, among the 62 participant who have any musculoskeletal disorder mean weight was 67.29 (±7.602) kg. The range is 45 with minimum weight 82 kg and maximum 55.Among the participant's highest number were at the weight of 65 kg and the number were 11 (17.7%). Among the weight of the affected participants, n=12 (45-60 kg) were 22.5%, n=9 (62-64) kg were 23.8%, n=25 (65-72) kg were 26.3% and n=16 (74-82) kg were 27.4% (Figure-5).

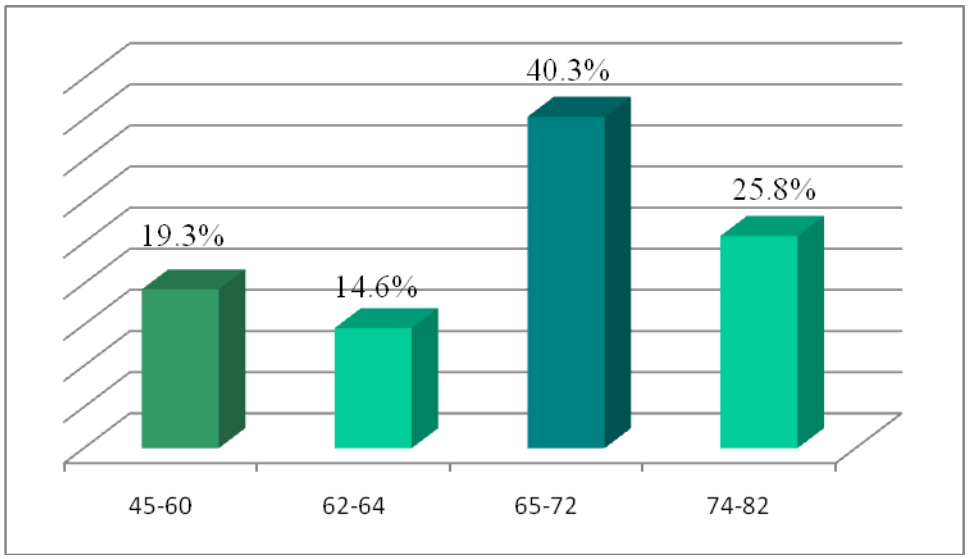


Figure-5: Weight of the affected participants

Smoking status

Analysis showed that, among the 62 participant who have any musculoskeletal disorder n=33 smokers were 53.2%, n=11 non- smokers were 17.7% and n=18 ex-smokers were 29% (Figure-6).

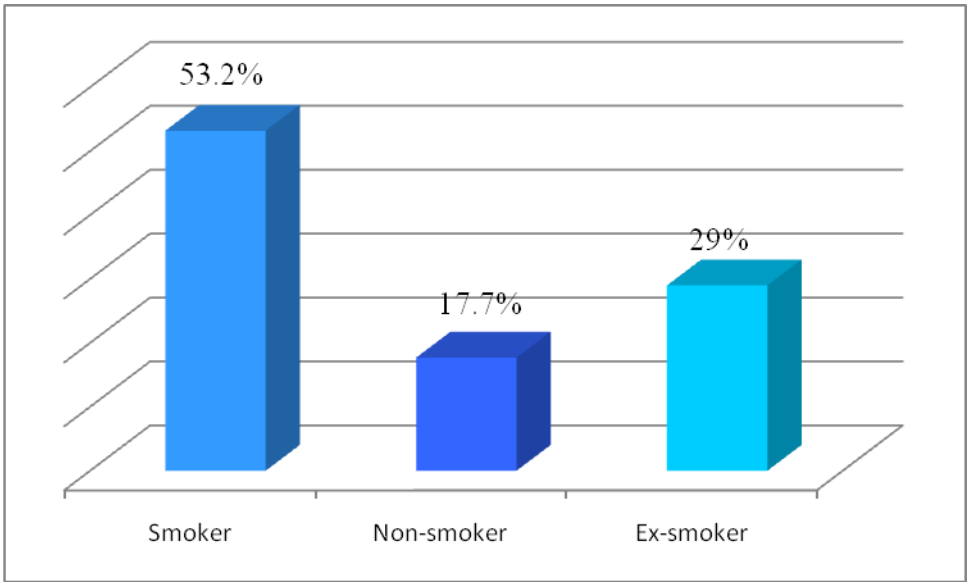


Figure-6: Smoking status

Disorder at neck

Result showed that, among the 62 participant who have any musculoskeletal disorder n=13 had trouble (pain, discomfort) sometimes at neck 21%, n=16 had trouble (pain, discomfort) regularly at neck 25.8%, n=12 had trouble (pain, discomfort) chronically at neck 19.4% and n=21 had never trouble (pain, discomfort) at neck 33.9% (Figure-7).

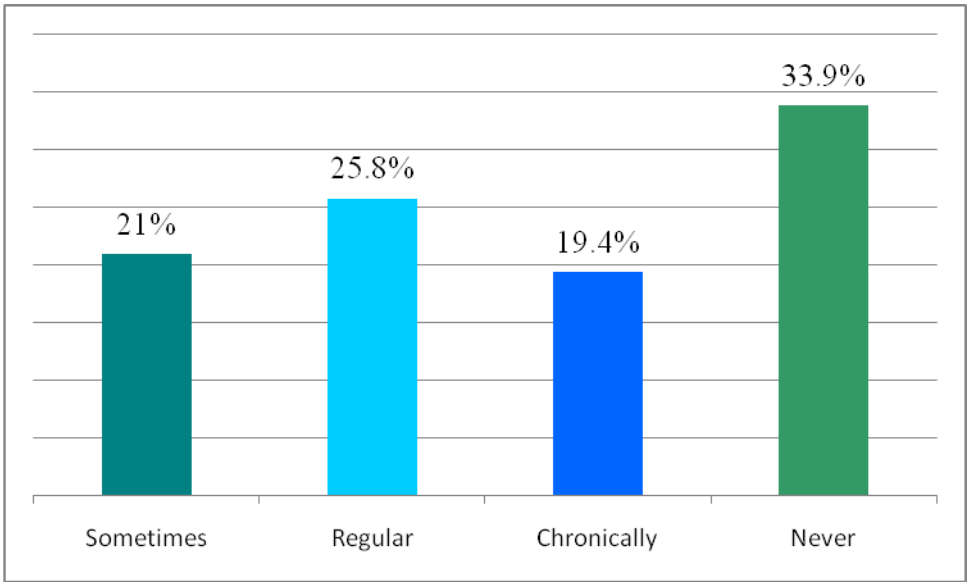


Figure-7: Disorder at neck

Disorder at upper back

Result showed that, among the 62 participant who have any musculoskeletal disorder n=16 had trouble (pain, discomfort) sometimes at upper back 26%, n=22 had trouble (pain, discomfort) regularly at upper back 35.5%, n=11 had trouble (pain, discomfort) chronically at upper back 17.7% and n=13 had never trouble (pain, discomfort) at upper back 21% (Figure-8).

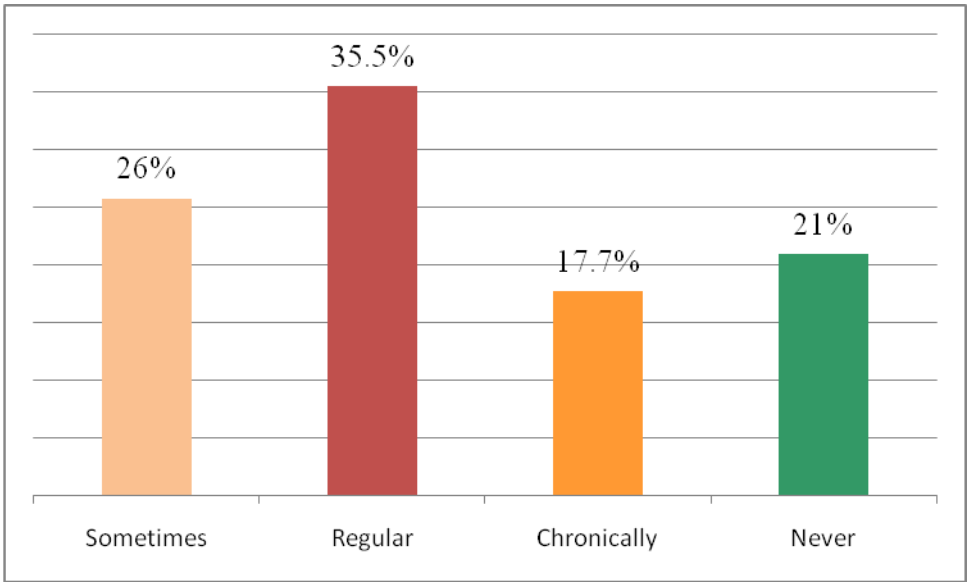


Figure-8: Disorder at upper back

Disorder at shoulder

Result showed that, among the 62 participant who have any musculoskeletal disorder n=10 had trouble (pain, discomfort) sometimes at shoulder 16%, n=23 had trouble (pain, discomfort) regularly at shoulder 37.1%, n=8 had trouble (pain, discomfort) chronically at shoulder 12.9% and n=21 had never trouble (pain, discomfort) at shoulder 33.9% (Figure-9).

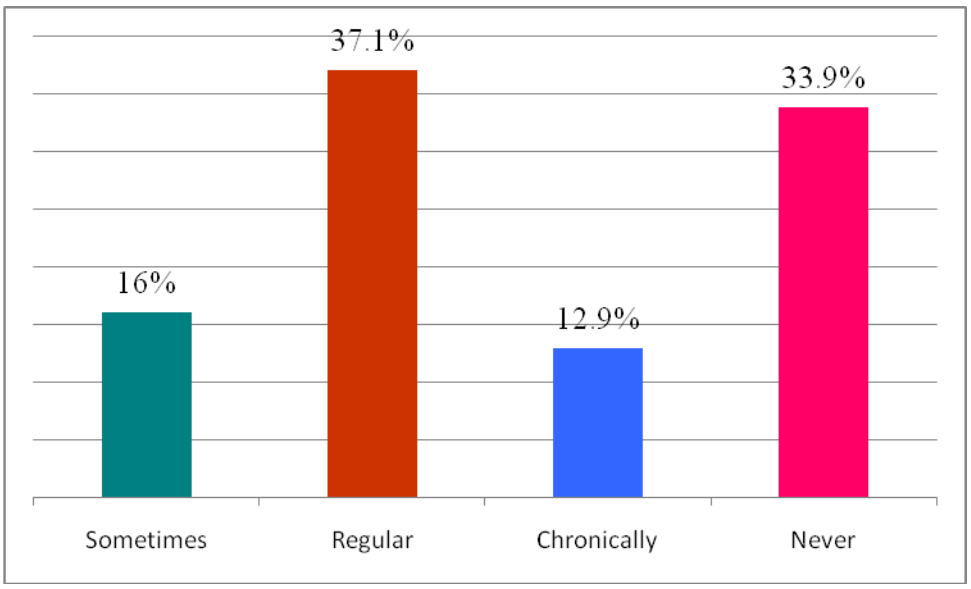


Figure-9: Disorder at shoulder

Disorder at lower back

Result showed that, among the 62 participant who have any musculoskeletal disorder n=8 had trouble (pain, discomfort) sometimes at lower back 13%, n=12 had trouble (pain, discomfort) regularly at lower back 19.4%, n=33 had trouble (pain, discomfort) chronically at lower back 53.2% and n=9 had never trouble (pain, discomfort) at lower back 14.5% (Figure-10).

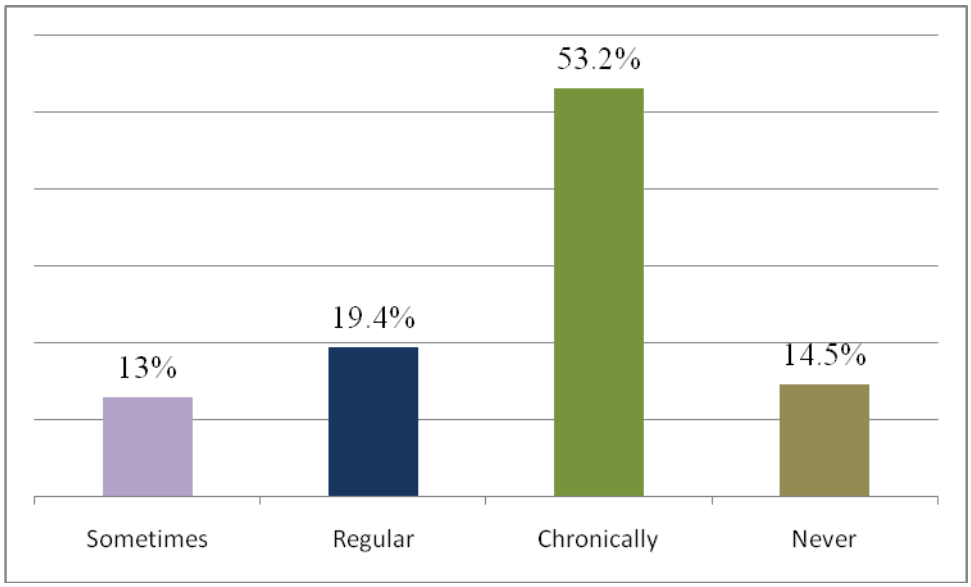


Figure-10: Disorder at lower back

Disorder at knee

Analysis showed that, among the 62 participant who have any musculoskeletal disorder n=3 had trouble (pain, discomfort) sometimes at knee 4.8%, n=19 had trouble (pain, discomfort) regularly at knee 30.6%, n=14 had trouble (pain, discomfort) chronically at knee 22.6% and n=26 had never trouble (pain, discomfort) at knee 41.9% (Figure-11).

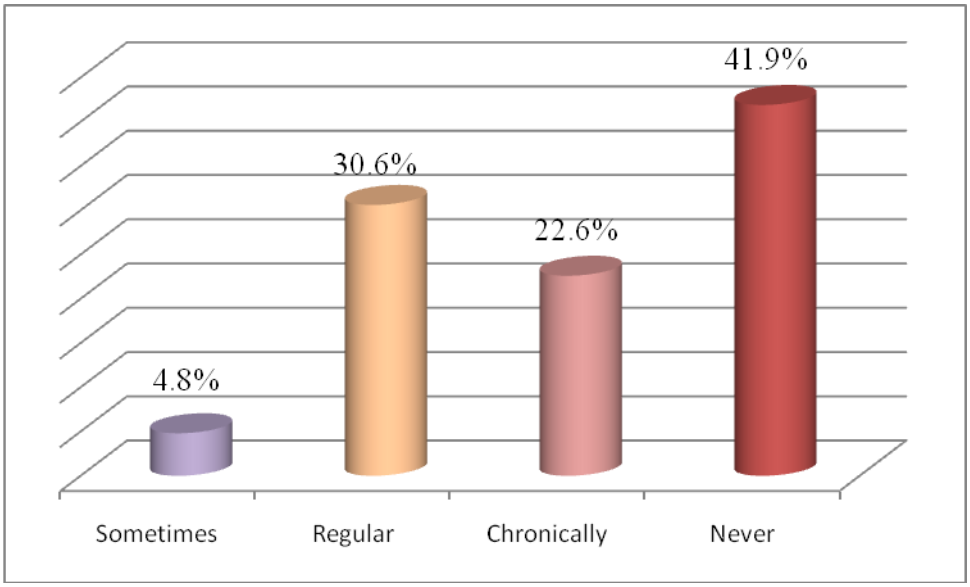


Figure-11: Disorder at knee

Taken any physiotherapy treatment

Among the 62 participant who have any musculoskeletal disorder, n=4 (6.5%) have taken any physiotherapy for treatment choice, n=58 (93.5%) have no taken any physiotherapy for treatment choice (Figure-12).

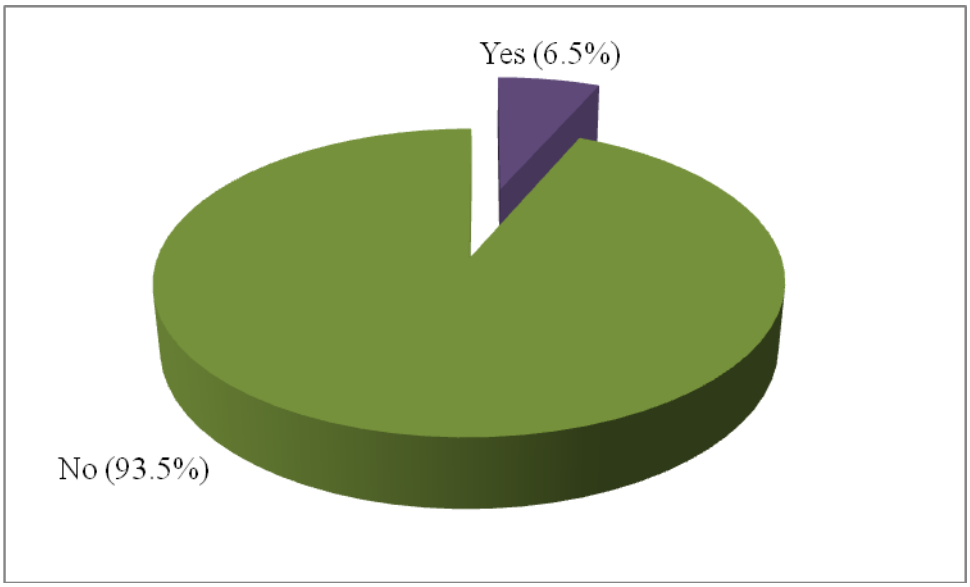


Figure-12: Taken any physiotherapy treatment

CHAPTER-V: DISCUSSION

The study was conducted on 80 participants of truck drivers. Out of the participants mean age was 40.14 (±6.68) years. The range is 28 with minimum age 27 years and maximum 55.Among the participant's highest number were at the age of 40 and the number were 8 (10%). Among the age of the participants, n=18 (27-34) years were 22.5%, n=19 (35-39) years were 23.8%, n=21 (40-44) years were 26.3%, and n=22 (45-55) years were 27.4%. Analysis showed that, among the 62 participant who have any musculoskeletal disorder n=33 smokers were 53.2%, n=11 non- smokers were 17.7% and n=18 ex- smokers were 29%. Smokers comprised 41% of the respondents, 11% were ex-smokers, the remaining 48% were non-smokers (Gyi & Porter, 1998).

Analysis showed that, among the 80 truck drivers n=62 (77.5%) have any musculo-skeletal disorder in their body, n=18 (22.5%) have no musculo-skeletal disorder in their body. Most participants (81%) reported musculoskeletal problems ("ache, pain, discomfort") in at least 1 area in the past 12 months, with 2.83 problems reported on average. The greatest proportion of problems was from the low back (60%), with high numbers reporting shoulder, knee and neck trouble (39%, 35% and 34% respectively ((Mansfield & Marshall, 2001).

Among the 62 participant who have any musculoskeletal disorder mean weight was 67.29 (±7.602) kg. The range is 45 with minimum weight 82 kg and maximum 55.Among the participant's highest number were at the weight of 65 kg and the number were 11 (17.7%). Among the weight of the affected participants, n=12 (45-60 kg) were 22.5%, n=9 (62-64) kg were 23.8%, n=25 (65-72) kg were 26.3% and n=16 (74-82) kg were 27.4%. The prevalence of overweight was greater among drivers (72.0%). Signs of musculoskeletal disorders were frequent among the workers and their symptoms did not exhibit any association with the length of working day, nutritional status or level of physical activity (Massaccesi, et. al., 2003).

Neck, back, shoulder and knee/thigh areas had the highest 12-month prevalence rates ranging from 35% to 60%, and about 80% of the discomfort was related to truck-driving. Occupational factors of prolonged sitting and anthropometric mismatch were

perceived to be most related to musculoskeletal discomfort. On physical examination, grip strength was significantly related to neck and shoulder discomfort (Magnusson, et. al., 1996).

The most commonly indicated body areas in which pain, aching, or discomfort were reported were the lumbar spine (70%), cervical spine (54%), shoulders (47%), and thoracic spine (36%). Professional rally drivers and co-drivers also reported greatest discomfort in the lumbar spine (55%), cervical spine (73%), shoulders (55%), and thoracic spine (55%) (Mansfield & Marshall, 2001).

Result showed that, among the 62 participant who have any musculoskeletal disorder n=41 had trouble (pain, discomfort) at neck 66.1% and n=21 had never trouble (pain, discomfort) at neck 33.9%; n=49 had trouble (pain, discomfort) at upper back 79% and n=13 had never trouble (pain, discomfort) at upper back 21%; n=41 had trouble (pain, discomfort) at Shoulder 66.1% and n=21 had never trouble (pain, discomfort) at Shoulder 33.9%.

Several cross-sectional studies on LBP have been conducted in countries like the United States, Scandinavia, Israel, The Netherlands and Belgium. The prevalence rates of LBP from these countries ranged from 30% to 92% (Karwowski & Marras, 1999). Four studies reviewed, have concluded that there is a high prevalence (59%, 50.3%, 60% and 79%) of LBP in truck drivers (Andrusaitis. et al., 2006; Ramroop, 2006).

Among the 62 participant who have any musculoskeletal disorder, n=35 (56.5%) have comfortable driving seat, n=27 (43.5%) have no comfortable driving seat; n=53 had trouble (pain, discomfort) at lower back 85.5% and n=9 had never trouble (pain, discomfort) at lower back 14.5%; n=36 had trouble (pain, discomfort) at knee 58.1% and n=26 had never trouble (pain, discomfort) at knee 41.9%.

In the study by Ramroop (2006) who evaluated the prevalence of LBP in refuse truck drivers from an area, it was found that the prevalence of LBP amongst these drivers were 79%. The point prevalence of LBP after driving was 69%, 64% indicated that

they experienced pain during the past week and 51% of the respondents indicated that they were experiencing pain at the time the questionnaires was administrated to them.

CHAPTER-VI: CONCLUSION & RECOMMENDATIONS

6.1 Conclusion

The factors that contribute to cause the MSD's are diverse and might include prolonged sitting, poor postures, exposure to whole-body vibration and other non-driving factors. The prevalence of musculoskeletal disorders is 77.5%. Among the musculoskeletal disorder the neck, shoulder and lower back area were found to be the highest pain complaints with 66.1%, 66.1% and 85.5% respectively. In this study the highest co-related factors of MSD's among the truck drivers are: age 45-55 years were 27.4%, primary school completed educational status were 62.5%, driving duration 19-26 years were 27.5%, average daily drive 10-12 hours were 45%, vibration exposure during driving were 100%, the level of knee joint and hip joint not same in seating position were 91.9%, not comfortable driving seat were 43.5%, driving chair adjustable were 100%, no chair head support were 82.3%, no chair neck support were 87.1%, weight 65-72 kg were 26.3%, smoker were 53.2%.

Truck drivers also reported greatest discomfort in the neck (66.1%), upper back (79%), shoulder (66.1%), elbow (1.6%), wrist/hand (40.3%), lower back (85.5%), hip/ thigh (20%), knee (58.1%), ankle (22.6%). Pain was the highest describe symptoms 45.2%, during resting period notice of the symptom most 69.4%, to relief from symptom rest were 61.3%, as treatment physiotherapy taken 6.5%, after taken physiotherapy improves from symptom were 100%. The result of this study would help in preventing occupational injury associated with truck driving which can be control and preventable through proper knowledge of posture, health education and proper practice of a healthy lifestyle.

6.2 Recommendations

- Based on the findings of present study and other information's gathered during the study, suggesting following recommendation fewer than two broad headings recommendation for policy making & recommendation for further research.
- A campaign should organize to build consciousness among vulnerable population; government should take initiative for the better transport and road and infrastructures for the truck drivers.
- Further research should be carried out in a broader aspect for more reliable, stronger, scientifically valid result, research should do involving almost all areas considering all over the Bangladesh.

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APPENDIX

Appendix-1: Bengali Consent Form

সম্মতিপত্র

(অংশগ্রহনকারীকে পড়ে শোনাতে হবে)

আসসালামুআলাইকুম/ নমস্কার, আমার নাম এফ এম আতিকুর রহমান, আমি এই গবেষনা প্রকল্পটি বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট (বিআইচপিআই), ঢাকা বিশ্ববিদ্যালয়- এ পরিচালনা করছি যা আমার ৪র্থ বর্ষ বি এস সি ইন ফিজিওথেরাপি কোর্সের অধিভূক্ত । আমার গবেষনার শিরোনাম হল " ট্রাক চালকদের কাজ জনিত পেশি-অস্থির ব্যাধি"। আমি আপনাকে কিছু ব্যক্তিগত এবং ট্রাক চালনার কিছু তথ্য সম্পর্কে প্রশ্ন করতে চাই । এতে আনুমানিক প্রায় ১৫ মিনিট সময় লাগবে।

আমি আপনাকে অবগতি করছি যে, এটা আমার অধ্যয়নের অংশ এবং অন্যকোন উদ্দেশ্যে ব্যবহৃত হবে না। এই গবেষনা আপনার বর্তমান ও ভবিষ্যত চিকিৎসায় কোন প্রকার প্রভাব ফেলবেনা। আপনি যে সব তথ্য প্রধান করবেন তার গোপনীয়তা বজায় থাকবে এবং আপনার প্রতিবেদনের ঘটনা প্রবাহে এটা নিশ্চিত করা হবে যে এই তথ্যের উৎস অপ্রকাশিত থাকবে। এই অধ্যয়নে আপনার অংশগ্রহন সেচ্ছাপ্রনোদীত এবং আপনি যে কোন সময় এই অধ্যয়ন থেকে কোন নেতিবাচক ফলাফল ছাড়াই নিজেকে প্রত্যাহার করতে পারবেন। এছাড়াও কোন নির্দিষ্ট প্রশ্ন অপছন্দ হলে উত্তর না দেয়ার এবং সাক্ষাতকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকারও আপনার আছে।

এই অধ্যয়নে অংশগ্রহনকারী হিসেবে যদি আপনার কোন প্রশ্ন থাকে তাহলে আপনি আমাকে অথবা/ এবং মোহাম্মদ ওবায়দুল হক, সহযোগী অধ্যাপক এবং বিভাগীয় প্রধান, ফিজিওথেরাপি বিভাগ, বিআইচপিআই, সিআরপি, সাভার, ঢাকা-১৩৪৩-তে যোগাযোগ করতে পারেন।

আমি শুর" করার পূর্বে আপনার কি কোন প্রশ্ন আছে?

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে যাচ্ছি।

হ্যাঁ ☐

না ☐

১। অংশগ্রহণকারীর স্বাক্ষর .....তারিখঃ

২। সাক্ষাৎগ্রহনকারীর স্বাক্ষর .....তারিখঃ

Appendix-2: English Consent Form

VERBAL CONSENT FORM

(Please read out to the participants)

Assalamualaikum/Namasker, my name is F.M.Atikur Rahman, I am conducting this study for a B.Sc. in Physiotherapy project study dissertation titled "Work-Related Musculoskeletal Disorders among the Truck Drivers" under Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related information regarding common disorders among the truck drivers. You will perform some tasks which are mention in this form. This will take approximately 15 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. All information provided by you will be treated as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous and also all information will be destroyed after completion of the study. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me, researcher and/or Md. Obaidul Haque, Course Co-ordinator, Department of physiotherapy, BHPI, CRP, Savar, Dhaka.

Do you have any questions before I start?

So, may I have your consent to proceed with the interview or work?

☐ Yes

☐ No

Signature of the Participant _____ Date:

Signature of the Interviewer _____ Date:

Appendix-3: Bengali Questionnaire

ট্রাক চালকদের পেসি-অস্থির ব্যাধি চিহ্নিত করার প্রশ্নমালা

ভাগ-কঃ ব্যক্তি-সামাজিক বৈশিষ্ট্য

প্রশ্ন	উত্তর
ইাম	
ঊয়স	.....বছর
ঠিকানা	
শিক্ষাগত যোগ্যতা	১. বিদ্যালয়ে প্রাপ্ত শিক্ষা নাই ২. প্রাথমিক শিক্ষার চেয়ে কম ৩. প্রাথমিক শিক্ষা সম্পন্ন ৪. মাধ্যমিক শিক্ষা সম্পন্ন ৫. উচ্চমাধ্যমিক শিক্ষা সম্পন্ন ৬. ডিগ্রী অধবা এর উপরে

ভাগ-খঃ চালনা সম্পর্কে তথ্য

প্রশ্ন	উত্তর
আপনি কত বছর ধরে গাড়ী চালান?	.....বছর
কি ধরনের ট্রাক আপনি চালান?	১. ৫ টনের কম ২. ৫ টন ৩. ৫ টনের বেশি
দিনে(গড়ে) কতঘন্টা আপনি ট্রাক চালান?	১. ৮ ঘণ্টার কম ২. ৮-১০ ঘণ্টা ৩. ১০-১২ ঘণ্টা ৪. ১২ ঘণ্টার বেশি
চালনার সময় কি কম্পন প্রকাশ পায়?	১. হ্যাঁ ২. না
ট্রাক চালনার জন্য আপনার কি কোন পেসি-অস্থির ব্যাধি আছে?	১. হ্যাঁ ২. না

ভাগ-গঃ কর্মদক্ষতা সম্পর্কিত তথ্য

প্রশ্ন	উত্তর
চালনার সময় কি আপনার ঘাড় ও মাথা খাড়া থাকে?	১. হ্যাঁ ২. না
চালনার সময় কি আপনার মাথা ও দেহ সম্মুখমুখী থাকে?	১. হ্যাঁ ২. না
চালনার সময় কি আপনার বাহু ও কনুই দেহের কাছাকাছি থাকে?	১. হ্যাঁ ২. না
চালনার সময় কি আপনার হাঁটু ও উরুসন্ধি একই অবস্থানে থাকে?	১. হ্যাঁ ২. না
আপনার আসনটি কি আরামদায়ক?	১. হ্যাঁ ২. না
আপনার আসনটি কি তুলার উপাদান দ্বারা তৈরি?	১. হ্যাঁ ২. না
ক্লান্তি দূর করার জন্য আপনি কি অবস্থান পরিবর্তন করেন?	১. হ্যাঁ ২. না
আপনার আসনটি কি নিয়ন্ত্রনযোগ্য?	১. হ্যাঁ ২. না
আপনার চেয়ারে কি মাথার অবলম্বন আছে?	১. হ্যাঁ ২. না
আপনার চেয়ারে কি ঘাড়ের অবলম্বন আছে?	১. হ্যাঁ ২. না
ডান পায়ে চাপ দেয়ার জন্য এক্সালেটর ও ব্রেক কি আপনার আরামদায়ক অবস্থানে আছে?	১. হ্যা ২. না
বাম পায়ে চাপ দেয়ার জন্য ক্লাপস কি আপনার আরামদায়ক অবস্থানে আছে?	১. হ্যাঁ ২. না

ভাগ-ঘঃ পেশি-অস্থির ব্যাধি সম্পর্কে তথ্য

প্রশ্ন	উত্তর
উচ্চতা	.....মিটার
ওজন	.....কেজি
ধূমপায়ী কিনা?	১. ধূমপায়ী ২. অধূমপায়ী ৩. প্রাক্তন ধূমপায়ী
ধূমপায়ী হলে দিনে কতবার ধূমপান করেন?	১. ১০ এর কম ২. ১০-২০ ৩. ২০ এর বেশি

আপনার দেহের কোন অংশে কি পীড়া (ব্যাথা, অস্বস্ড়ি) আছে?

	হ্যাঁ	হ্যাঁ	হ্যাঁ	ইা
	মাঝেমাঝে	প্রায়ই	পুরোনো	কখনোই না
ঘাড়	☐	☐	☐	☐
পিঠ	☐	☐	☐	☐
কোমর	☐	☐	☐	☐
স্কন্ধ	☐	☐	☐	☐
কনুই	☐	☐	☐	☐
কব্জি/হাত	☐	☐	☐	☐
উর ঁ/উর ঁসন্ধি	☐	☐	☐	☐
হাঁটু	☐	☐	☐	☐
গোড়ালি	☐	☐	☐	☐

প্রশ্ন	উত্তর
আপনার লক্ষণটি বর্ণনা করার ভাল শব্দ কোনটি?	১. ব্যাথা ২. যন্ত্রণা ৩. শিরটান ৪. রণন ৫. অবশতা ৬. জড়তা
কত সময় ধরে আপনার লক্ষণটি প্রকাশ পেয়েছে?	১. কয়েকদিন ২. এক সপ্তাহ ৩. কয়েক সপ্তাহ ৪. এক মাস ৫. কয়েক মাস ৬. এক বছর ৭. অনেক বছর ৮. অজানা
কখন আপনার লক্ষন উলে-খ পায়?	১. কাজের সময় ২. কাজের পরে ৩. বিশ্রামের সময়
কি আপনার লক্ষন থেকে মুক্তি দেয়?	১. বিশ্রাম ২. ঔষধ ৩. অন্যান্য
আপনি কি কখনো ফিজিওথেরাপি নিয়েছেন?	১. হ্যা ২. না
নিয়ে থাকলে ফলাফল কি?	১. উন্নত ২. খারাপ ৩. অপরিবর্তিত

অংশগ্রহনকারীর স্বাক্ষর

সাক্ষাৎগ্রহণকারীর স্বাক্ষর

জরিপটি সম্পূর্ণ করার জন্য ধন্যবাদ

Appendix-4: English Questionnaire

Questionnaire to Identify Work-Related Musculoskeletal Disorders among the Truck Drivers

Section-A: Socio-Demographic Characteristics

Question	Response
Name	
Age	..……yrs
Address	
Educational status	1. No formal schooling 2. Less than primary school 3. Primary school completed 4. Secondary school completed (SSC) 5. Higher secondary completed (HSC) 6. Bachelor degree or Above

Section-B: Information Related to Driving

Question	Response
How long are you driving?	……..mm/yyyy
Which type of truck do you drive?	1. Less than 5 tone 2. 5 tone 3. More than 5 tone
How much times do you drive the truck daily (average)?	1. Less than 8 hours 2. 8-10 hours 3. 10-12 hours 4. More than 12 hours
Is there vibration exposure during driving?	1. Yes 2. No

Have you any musculo-skeletal disorder due to truck driving?	1. Yes 2. No

Section-C: Ergonomics Related Factors (Driving Related)

Question	Response
Is your head and neck remain upright (not bend down/back) during driving?	1. Yes 2. No
Head and trunk to face forward (not twisted) during driving?	1. Yes 2. No
Upper arm and elbows to be close to body (not extended outward)	1. Yes 2. No
Is the level of knee joint and hip joint same in seating position?	1. Yes 2. No
Is your seat comfortable?	1. Yes 2. No
Is the seat made of a padded breathable material?	1. Yes 2. No
Changes feel position to relieve fatigue?	1. Yes 2. No
Is the driving chair adjustable?	1. Yes 2. No
Has the chair head support?	1. Yes 2. No
Has the chair neck support?	1. Yes 2. No
Are the exalter and break proper positioned (comfortable) to push with (right foot)?	1. Yes 2. No

Are the claps proper positioned (comfortable) to push with (left foot)?	1. Yes 2. No

Section-D: Information Related to Musculoskeletal Disorders

Question	**Response**
Height	…….Meter
Weight	……Kg
Smoking status	1. Smoker 2. Non-smoker 3. Ex-smoker
If smoker, Amount of sticks daily intake (Average)	1. Less than 10 2. 10-20 3. More than 20

Have you ever had trouble (pain, discomfort) from your following question body parts?

	Yes	Yes	Yes	No
	Sometimes	Regular	Chronically	Never
Neck	☐	☐	☐	☐
Upper back	☐	☐	☐	☐
Lower back	☐	☐	☐	☐
Shoulders	☐	☐	☐	☐
Elbows	☐	☐	☐	☐
Wrists/ Hands	☐	☐	☐	☐
Hips/ Thighs	☐	☐	☐	☐

Knee				
Ankle				

Question	Response
What words best describe your symptoms?	1. Pain 2. Aching 3. Cramp 4. Tingling 5. Numbness 6. Stiffness
How long this condition developed?	1. A few days 2. A week 3. Few weeks 4. A month 5. Few months 6. A year 7. Many years 8. Not known
When did you notice of the symptom most?	1. During work 2. After work 3. During resting period
Which factor relief your symptom?	1. Rest 2. Medication 3. Others
Have you taken any physiotherapy?	1. Yes 2. No
If yes, Then what was the result?	1. Improve 2. Worse 3. Unchanged

Signature of the participant **Signature of the Interviewer**

Thanks for completing the survey