

WORK RELATED MUSCULOSKELETAL DISORDERS AMONG THE SHOPKEEPERS

A.T.M. Hafizur Rahman

4th Professional B.Sc. in Physiotherapy (B.Sc. PT)

Roll no. - 1595

Reg. no. - 1903

Session: 2010-2011

BHPI, CRP, Savar, Dhaka-1343



Bangladesh Health Professions Institute (BHPI)

Department of Physiotherapy

CRP, Savar, Dhaka-1343

Bangladesh

August 2015

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

**WORK RELATED MUSCULOSKELETAL DISORDERS AMONG
THE SHOPKEEPERS**

Submitted by **A.T.M. Hafizur Rahman**, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B. Sc. PT).

.....
Md. Sohrab Hossain

Associate Professor
Department of Physiotherapy, BHPI &
Head of Programs,
CRP, Savar, Dhaka
Supervisor

.....
Mohammad Anwar Hossain

Associate Professor, Physiotherapy, BHPI &
Head of the Physiotherapy Department
CRP, Savar, Dhaka

.....
Ehsanur Rahman

Assistant Professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....
Md. Shofiqul Islam

Assistant Professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....
Md. Obaidul Haque

Associate Professor & Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

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 & Head of the Physiotherapy Department, Bangladesh Health Professions Institute (BHPI).

Signature:

Date:

A.T.M. Hafizur Rahman

4th professional B.Sc. in Physiotherapy (B.Sc. PT)

Roll no. - 1595

Reg. no. - 1903

Session: 2010-2011

BHPI, CRP, Savar, Dhaka-1343

Contents

Topic	Page No.
Acknowledgement	i
Acronyms	ii
List of figures	iii
Abstract	iv
CHAPTER- I : INTRODUCTION	1-5
1.1 Background Information	1-3
1.2 Rationale	4
1.3 Research question	5
1.4 Objectives	6
1.5 List of variables	6
1.6 Operational definitions	7
CHAPTER- II : LITERATURE REVIEW	8-14
CHAPTER- III: METHODOLOGY	15-17
3.1 Study design	15
3.2 Study site	15
3.3 Study Area	15
3.4 Study population and sampling	15
3.5 Sampling procedure	15
3.6 Subject inclusion criteria	16
3.7 Subject exclusion criteria	16
3.8 Sample Size	16
3.9 Data collection method and tools	16

3.10 Data Analysis	17
3.11 Ethical consideration	17
CHAPTER- IV: RESULTS	18-31
CHAPTER- V: DISCUSSION	32-34
CHAPTER- VI : CONCLUSION&RECOMMENDATIONS	36-37
6.1Conclusion	36
6.2Recommendations	37
REFERENCES	38-43
APPENDIX	44-51
APPENDIX –A: Verbal consent statement (English)	44
APPENDIX –B: Questionnaire (English)	45-47
APPENDIX –C: Verbal consent statement (Bangla)	48
APPENDIX –D: Questionnaire (Bangla)	49-51
APPENDIX –E: Permission letter	52

Acknowledgement

First of all I would like to express my gratitude to the almighty Allah. When I started the study I didn't know whether I could complete it or not but I believed that I can do this. So, I was determined to try my best to make it a success and I am most grateful to almighty Allah.

I would like to express the deepest appreciation to my supervisor Md. Sohrab Hossain Associate Professor, Department of Physiotherapy, BHPI & Head of the Programs, who has the attitude and the substance of a genius, he continually and convincingly conveyed a spirit of adventure in regard to research, and an excitement in regard to teaching. Without his guidance and persistent help this research would not have been possible.

Also, it's my honor to mention Assistant Professor Md. Shofiqul Islam for the good advice, support and guide to conduct this research.

In addition, I would like to thank my honorable Associate Professor Mr. Obaidul Haque, Head of the Department of Physiotherapy, BHPI, Associate Professor Md. Anwar Hossain, Head of the Department of Physiotherapy, CRP and other board members for their support and guide. I also pay my thanks to the staffs of the BHPI library that helps me to find out books for collecting literature of the study.

I would also like to special thanks to BHPI librarian Mrs. Mohosina and library assistant Mr. Anis, Rubel Dakua for their positive help during the project study. Above all I would like to give thanks to the participants of this study. Lastly thanks to all who always are my well-wisher and besides me as friend without any expectation.

Acronyms

BHPI	: Bangladesh Health Professions Institute
BMRC	: Bangladesh Medical Research Council
CRP	: Center for the Rehabilitation of the Paralyzed
CTS	: Carpal Tunnel Syndrome
EU	: European Union
IRB	: Institutional Review Board
MSD	: Musculoskeletal Disorder
OODs	: Occupational Overuse Disorders
RMI	: Repeated Motions Injury
ROM	: Range Of Motion
RSI	: Repetitive Strain Injury
SPSS	: Statistical Package for the Social Sciences
UK	: United Kingdom
USA	: United State of America
WHO	: World Health Organization
WRMD	: Work Related Musculoskeletal Disorder
WMSD	: Work Related Musculoskeletal Disorders

List of Figures

Figure No.	Title	Page No.
Figure No-1	Age of the participants	18
Figure No-2	Weight of the participants	19
Figure No-3	Educational status	20
Figure No-4	Job experience and WRMDs	21
Figure No-5	Number of episode of WRMDs	22
Figure No-6	Symptoms	23
Figure No-7	Affected body part	24
Figure No-8	Severity of the symptoms	25
Figure No-9	Work interruption	26
Figure No-10	Reduce work performance	27
Figure No-11	Safety equipment use	28
Figure No-12	Stressful positions	29
Figure No-13	Receiving treatment	30
Figure No-14	Treatment Consequences	31

Abstract

Purpose: The study was done to identify the WRMDs among the shopkeepers. *Objective:* To identify the common work related musculoskeletal disorders among the shopkeepers. *Method:* The study design was cross-sectional. Total 50 samples were selected conveniently for this study from a selected area, Savar Upozila. Data was collected by using mixed type of questionnaire. Descriptive statistic was used for data analysis. *Result:* The result of the study shows that, participants had WRMDs in age range between 41-50 (50%) years is more vulnerable. Most of the participant's education level was S.S.C. (48%). The duration of job experience 5-15 years (54%) most commonly suffered by the WRMDs. In this research, the researcher found the participants had musculoskeletal disorders with higher prevalence of pain. The result indicates that most discomfort of the body regions is in the HIP (40%), spine (30%) and shoulder (18%). Most common symptom of WRMDs was pain (86%) and the most affected body part was hip (40%). The maximum severity of symptom was moderate (64%). The most common risk factors were working in same position for long time (58%) and performing same task over and over (30%) participants. Only (18%) participants had taken physiotherapy treatment for their condition. The percentages of prognosis were improved in (83%). *Conclusion:* Work related musculoskeletal disorders represent a significant burden for shopkeepers. The study was represents the strong evidence that WRMDs was common among shopkeepers. In order to reduce musculoskeletal problems, correct postural practices, proper design of tools and equipment significantly can prevent MSDs.

Key words: WRMDs, Shopkeepers.

1.1 Background Information

Musculoskeletal disorders (MSD) are a significant public health problem due to their high impact on disability, personal suffering, and absence from work, disability, and their direct and indirect costs to the health care system. Musculoskeletal disorders (MSDs) comprise a major health problem for the general population, affecting their quality of life, demanding increased health care and organization. According to reports from Canada and the Netherlands, the prevalence of musculoskeletal problems range from 29% to 74.5%, respectively. However, the annual consultation rate by health care professionals of musculoskeletal problems is about 20% (Rima et al., 2005). The developed and industrially developing countries musculoskeletal disorders (MSDs) are a leading cause of occupational injury and disability (Shahnavaz, 2007).

The work-related musculoskeletal disorders (MSDs) denote health problems of the locomotor apparatus such as- muscles, nerves, tendons, joints, cartilages, a spinal disc and related tissues, which have been empirically shown or are suspected to have been associated with exposures to risk factors at a workplace (Luttmann et al.,2008). Poor working conditions and the absence of an effective work injury prevention program in industrially developing countries has resulted in a very high rate of MSDs (Jafry & Neill, 2006).

A high prevalence of the work-related musculoskeletal disorders (MSDs) have been recorded among workers who are exposed to manual labor, work in unusual and restricted postures, repetitive and static work, vibrations and poor psychological and social conditions. Musculoskeletal disorders have been described as the most hair- notorious and common causes of severe long term pain and physical disability that may affect hundreds of millions adopted of people across the world (Aweto et al., 2015). The economic loss due to those disorders affects not only the individual but also the organization and the society as a whole (Choobineh & Tabatabaee, 2009).

Musculoskeletal disorders (MSDs) were recognized as having occupational etiologic factors as early as the beginning of the 18th century (Kumar et al., 2011).

Shopkeepers are the group of people involves in shop keeping & this is the only source of income for them most of the cases (Answer, 2015). A significantly larger proportion of men than women usually work in standing position (58% versus 51%), male workers were significantly higher among those who work in a standing posture to compared to those who usually work sitting (27.8% versus 21.7%), 28.6% for moving around and 30.4% for standing in a fixed posture versus 17.4% for standing with freedom to sit, among those who work seated, men are more likely to work in a fixed position 5.9% of men versus 1.2% of women (Tissot et al., 2009).

Bangladesh one of the developing country in the world having high density (901/Sq.km) of population where only 40% male & 30% female are literate (Bellamy, 2008). Musculoskeletal disorders (MSDs) were recognized as having occupational etiologic factors as early as the beginning of the 18th century (Kumar et al., 2011). Risk factors of WMSDs include workplace activities such as heavy load lifting, repetitive tasks, and awkward working postures, demographic characteristics factors are also known to be important predictive variables (Linton & Kamwendo, 2006). A high prevalence of work-related musculoskeletal disorders has been recorded among workers who are exposed to manual labor, work in unusual and restricted postures, repetitive and static work, vibrations, and poor psychological and social conditions (Burdorf, 2007).

In America, the proportion of WMSDs by repetitive movements was 33.6% in 1992. It peaked at 34.7% in 2000. In 2007, it decreased to 28.9% by various measures (Kim et al., 2010). In Britain 750,000 people working in the previous 12 months reported suffering from work-related MSD. Of these around 335,000 had to take time off work as a result of their work-related condition. The estimated working days lost is around 9,862,000 (back: 4,820,000; upper limb and neck: 4,162,000; and lower limbs 2,204,000) (Prins et al., 2007).

In Sweden, WMSDs took up more than 57% of occupational diseases (Kim et al., 2010). In Germany around 37% of all employees reported suffering from low back pain. Especially, the rapid increase mainly occurred in workplaces with over 1,000 employees and the social issue of labor management disputes was on the rise. In addition, the expense of the compensation insurance was 5.9 billion won in 2000 that became 105.3 billion in 2004 and 163.3 billion won in 2007. This data shows the considerable social expenses of WMSDs (Kim et al., 2010).

1.2 Rationale

Work-related musculoskeletal disorders are one of the most important occupational health problems for the shopkeepers. The disorders can cause long periods of work disability and treatment is often necessary. This study will be helpful to explore common musculoskeletal complaints among the shopkeepers.

Shopkeepers may provide proper recommendation for every single risk which will be helpful for them. Beside this it will help to established ergonomic guidelines for space, equipment, furniture and environmental conditions which are mandatory in the design of workplace. Knowledge about the lacking areas especially, about their posture before doing their activities will be given with this study. So investigator can help them to teach and give proper education about the posture the condition and preventive methods.

Beside this it will help to professional development which is mandatory for current situation. From this study researcher can identify the risk factors of the workplace which are harmful. Research on this sector will help to set up prevention strategies as research is the reliable area of policy making and problem solving by discovering the magnitude and facts relating work related musculoskeletal disorder. MSDs may cause a great deal of pain and suffering among shopkeepers.

On the other hand this study will be helpful for professions or professionals of physiotherapy and with this connection other professionals will have a chance to gather their knowledge from this study.

1.3 Research question

What is the common work related musculoskeletal disorders among the shopkeepers on one selected market?

Aims: To identify the work related musculoskeletal disorders among the shopkeepers.

1.4 Objectives

General objectives

To identify the common work related musculoskeletal disorders among the shopkeepers.

Specific objectives

1. To explore the socio-demographic characteristics of shopkeepers with musculoskeletal disorders.
2. To establish the different body parts involved with musculoskeletal disorders & the risk associated with such disorders.
3. To find out the number of experience & episode of WRMD among the shopkeepers
4. To investigate types of treatment receive & consequences.

1.5 List of variables

Independent variables

1. Socio demographic factors, for example: age, sex, education
2. Types of work
3. Work experience
4. Body parts

Dependent variables

Work related musculoskeletal disorders

1.6 Operational definitions

Musculoskeletal disorder

Musculoskeletal disorders affect the soft tissue of the body, such as the muscles, tendons, ligaments, nerves etc.

Work related musculoskeletal disorder

Work-related musculoskeletal disorders (WRMD) are the disorders of muscles, tendons, ligaments and nerves that develop due to work related factors such as repetitive work or activities with awkward postures with symptoms of pain, aches, paresthesia, tingling, numbness and stiffness etc. Some examples of musculoskeletal disorders include back pain, neck pain, carpal tunnel syndrome, tendonitis and tenosynovitis etc.

Shopkeepers

A person who owns or manages a shop or small store.

The term musculoskeletal disorder denotes health problems of the locomotors apparatus, i.e. muscles, joints tendons, the skeleton, cartilage, the vascular system, ligaments, nerves and the localized blood circulation system (Kumar et al., 2011). Musculoskeletal disorders, which are often soft-tissue injuries, occur when there is a mismatch between the physical requirements of the job and the physical capacity of the human body (Safe Computing Tips, 2011).

Musculoskeletal injuries affect muscles, tendons, ligaments and nerves. These injuries can develop when the same muscles are used repeatedly or for a long time without taking time to rest. The chance of getting this type of injury increases if the force exerted is high and or the job required an awkward postures. Some examples of musculoskeletal disorders include back pain, neck pain, carpal tunnel syndrome, tendonitis and tenosynovitis. Other expressions used to describe MSDs include Repetitive Strain Injuries (RSIs), Work related musculoskeletal disorder (WRMD, Cumulative Trauma Disorders, Overuse Injuries, Repetitive Motion Disorders) (Department of labor statistics, 2012).

MSDs are disorders that affect the musculoskeletal system, resulting from a repetitive exposure to loading. Upper limbs (the hand, wrist, elbow and shoulder), the neck and lower back are particularly vulnerable to MSDs. Lower limbs and the upper back may also be affected (Pinder et al., 2007). Work related musculoskeletal disorders are the most common self-reported, work related illness in many workplaces that is characterized by discomfort, impairment, disability, or persistent pain in joints, muscles, tendons or other soft tissues (Putz-Anderson et al., 2007).

Musculoskeletal disorders are sometimes called ergonomic injuries and illnesses. Ergonomics is the study of the worker's interaction with tools, equipment, environment, jobs, tasks, work methods, work rates, and other systems. The federal Bureau of Labor Statistics (BLS) has defined musculoskeletal disorders (MSDs) as injuries and disorders

to muscles, nerves, tendons, ligaments, joints, cartilage, and spinal discs. MSDs do not include injuries resulting from slips, trips, falls, or similar accidents. Examples of MSDs include many kinds of sprain and strain, carpal tunnel syndrome, tendinitis, sciatica, and low back pain. MSDs result from bodily reactions due to bending, climbing, crawling, reaching, or twisting, and from overexertion and repetitive motion (Maire and Ross-Motta, 2007).

Work-related musculoskeletal disorders (WMSDs) are a group of painful disorders of muscles, tendons, and nerves. Work activities which are frequent and repetitive, or activities with awkward postures cause these disorders which may be painful during work or at rest (Work-related Musculoskeletal Disorders, 2005). This is difficult to predict to measure the time to develop a WRMD. An employee may notice symptoms such as muscle, joint or tendon soreness within the first several weeks of a new job. Workers with pre-existing medical problems may be at higher risk of developing symptoms those healthy workers. Some disorders may take several years before symptoms are identified. Some employees may never develop a WRMD. The prevalence of MSDs increases as people enter their working years. By the age of 35, most people have had their first episode of back pain (Guo et al., 2009). Musculoskeletal impairments are among the most prevalent and symptomatic health problems of middle and old age (Bruce & Bernard, 2007).

The risk factors for the development of musculoskeletal disorders are- repetitive work; painful positions, carrying or moving heavy loads, other risk factors such as - prolonged standing or walking (Johnos, 2011). Musculoskeletal disorders are sometimes called ergonomic injuries and illnesses. Ergonomics is the study of the worker's interaction, environment, with jobs, tasks, tools, work methods, equipment work rates etc. (Maire & Ross-Motta, 2007).

Musculoskeletal disorders can developed when the same muscles are used over and over again or for a long time without taking time to rest. The chance of getting this type of injury increases if the force exerted is high and/or the job requires an awkward posture.

Some examples of musculoskeletal disorders include back pain, carpal tunnel syndrome, tendonitis and tenosynovitis (Department of Labor Statistics, 2012). Musculoskeletal disorders, which encompass a range of conditions, including repetitive strain injuries (RSI) or cumulative trauma disorders (CTDs), and chronic back strain, have been reported to account for a significant amount of sickness absence in a number of the developed countries. Work-related musculoskeletal disorders (WMSDs) include all MSDs that are induced or aggravated primarily by work and the circumstances of its performance. Most WMSDs are cumulative disorders, mainly affect the back, neck, shoulders and upper limbs, but can also affect the lower limbs. Some MSDs, such as carpal tunnel syndrome in the wrist, are specific because of their well-defined signs and symptoms (Johnos, 2011). Pain in the lower back area that can relate to problems with the lumbar spine, the discs between the vertebrae, the ligaments around the spine and discs, the spinal cord and nerves, muscles of the low back, internal organs of the pelvis and abdomen, or the skin covering the lumbar area (Ostgaard, 2011).

There are mainly four different groups of factors may potentially contribute to WRMDs there are physical or biomechanical work related factors, organizational or psychosocial work related factors, Individual or personal factors and factors relating to social context (Pinder et al., 2007). The typical postures & activities of shopkeepers make them one of the most vulnerable groups of being LBP. They bend frequently, twist right & left, lift up heavy objects & transfer. The sitting systems of the shopkeepers are inappropriate, low height & without back support. They stay in one sitting position for long time (Bellamy, 2008). Most of the cases the posture is too poor to cause the LBP (Ebnezer, 2008).

This is difficult to predict to measure the time to develop a WRMD. An employee may notice symptoms such as muscle, joint or tendon soreness within the first several weeks of a new job. Workers with pre- existing medical problems may be at higher risk of developing symptoms those healthy workers. Some disorders may take several years before symptoms are identified. Some employees may never develop a WRMD (Department of labor and industries, 2007).

The length of daily working hours as a risk factor for the development of musculoskeletal complaints was studied, it was found that some sample worked 8 hours per day and few were worked 5 hours per day. Working part time was shown to postpone the occurrence of sick leave due to musculoskeletal disorders by approximately half a year, there was no lasting effect on the reduction in working hours on sick leave due to shoulder- neck complaints, but a reduction in low back complaints was identified. It is suggested that any reorganization of work activities to counteract musculoskeletal injuries from repetitive work should aim to break up the muscular activity patterns over time periods considerably shorter than the 5 hours working per day of the part time workers in the present study (Meligrsted and Westgaard, 2005).

Although the onset mechanisms are not clearly established, it is generally agreed that the injuries result from overuse, beyond the body's recover because a structure is abused repetitively and is made to endure a work load that it cannot tolerate without negative consequences (Simoneau et al., 2006). According to (Work-related Musculoskeletal Disorders, 2005), Pain is the most common symptom associated with WMSDs. In some cases there may be joint stiffness, muscle tightness, redness and swelling of the affected area. Some workers may also experience sensations of "pins and needles," numbness, skin color changes, and decreased sweating of the hands. WMSDs may progress in stages from mild to severe. Neck or head postures, adverse or extreme head or neck postures, or static postures of the head and/or neck can caused work related musculoskeletal disorder (Moore, 2012). Heavy physical work has been defined as work that has high energy demands or requires some measure of physical strength. Some biomechanical studies interpret heavy work as jobs that impose large compressive forces on the spine (Marras et al., 2005).

Heavy physical work appeared to include other potential risk factors for back disorder, particularly lifting and awkward postures. Lifting is defined as moving or bringing something from a lower level to a higher one. The concept encompasses stresses resulting from work done in transferring objects from one plane to another as well as the effects of varying techniques of patient handling and transfer. Forceful movements include

movement of objects in other ways, such as pulling, pushing, or other efforts. Several studies included in this review used indices of physical workload that combined lifting/forceful movements with other work-related risk factors (particularly heavy physical work and awkward postures). Some studies had definitions for lifting which include criteria for number of lifts per day or average amount of weight lifted (Nathan et al., 2010).

Bending is defined as flexion of the trunk, usually in the forward or lateral direction. Twisting refers to trunk rotation or torsion. Awkward postures include non-neutral trunk postures (related to bending and twisting) in extreme positions or at extreme angles. Risk is likely related to speed or changes and degree or deviation from non-neutral position (Nathan et al., 2010). Static work postures include isometric positions where very little movement occurs, along with cramped or inactive postures that cause static loading on the muscles. In the studies reviewed, these included prolonged standing or sitting and sedentary work. In many cases, the exposure was defined subjectively and/or in combination with other work-related risk factors.

Different studies show about 50% of workers have been or will be affected by knee pains and complaints will be more frequent as the population ages and careers will be longer. The increase in prevalence depends on mechanical or morphological causes as well as psychosocial state and work organization. Lesions of the meniscus, well known for a long time, seem to be stable in the statistics of Social Security as well as the hygroma; the use of knee-pads (overalls with built-in cushions) is strongly recommended while working in kneeling or squatting position. The squatting or kneeling position extended for longer than one hour a day, often recovering from these two positions (more than 30 times a day), lifting or carrying heavy loads, often climbing (around 30 times per day) stairs or ladders. These gestures and postures are unavoidable in some jobs; in those cases, advices given by the specialist of occupational medicine and the ergonomist may improve or alter the habits of the worker or of his entire team (Part, 2009).

Foot pain is very common, especially in women, owing to inappropriate footwear.

Overuse, repetitive strain and minor, easily forgettable injuries may result in chronic foot and ankle pain (Balint et al., 2013). Inflammation of tendons and/or tendon sheaths because of repetitive movements, often non-strenuous (Safety & Health Assessment & Research for Prevention, 2011).

Irritation of the levator scapulae and trapezium, all muscles of the neck causes tightening of the muscles in the neck. Neck stiffness as well as headaches also presents. Headaches are often described as a pressure sensation around the head. Pain may build and intensify at the end of day Inflammation of tendons and/or tendon sheaths of the fingers due to repetitive movements and gripping too long, too tightly, or too frequently. So inability to move fingers smoothly, with or without pain (Safety & Health Assessment & Research for Prevention, 2011).

Result inflammation of the bursa (sack-like cavity) between skin and bone, or bone and tendon. It can occur at the knee, elbow, or shoulder due to kneeling, pressure at the elbow repetitive shoulder movements. Characterized by pain and swelling at the site of the injury. The heavy feeling, aching pain, stiffness in upper back and neck, due to overhead activity of arms in extended position (Safety & Health Assessment & Research for Prevention, 2011). De Quervain's disease is one of the most common tendon disorders of the hand. It develops when the tendons on the side of the wrist and at the base of the thumb become irritated from repetitive bending of the wrist. De Quervain's Disease can usually be diagnosed by using a simple test this involves closing the fists around the thumb and bending the wrist towards the little finger. A person with this disorder will feel acute pain or tensing of the tendons on the side of the wrist (Safety & Health Assessment & Research for Prevention, 2011). Rotator cuff tendinitis is the most common tendon disorder of the shoulder. Shoulder pain, Stiffness and also problem in reaching behind on upper back (Safety & Health Assessment & Research for Prevention, 2011).

Physical therapy can reduce the recurrence of back pain and neck-shoulder Pain. In order to be effective, however, the exercise should include vigorous exercise. And be repeated at least three times a week (Podniece, 2008). Physical Therapist assesses an individual's

physical ability to do a specific job or activity and aids in developing a safe return to work program (Occupational health solution). All exercises should be performed slowly and comfortably to avoid injury. When performing strengthening and flexibility exercises, remember to breathe naturally and do not hold your breath; exhale during exertion and inhale during relaxation. A program of strengthening, stretching, and aerobic exercises will improve your overall fitness level. Research has shown that people who are physically fit are more resistant to back injuries and pain and recover quicker when they do have injuries than those who are less physically fit (Healthy Back Exercises: Strengthen and Stretch, 2011).

Strengthening exercises help increase muscle tone and improve the quality of muscles. Muscle strength and endurance provide energy and a feeling of wellness to help you perform daily, routine activities. Adequate core strength that comes from abdominal and back muscles helps stabilize the spine, allows proper spinal movement, and makes it easier to maintain correct posture. Strong hip and leg muscles are important to perform proper lifting techniques and body mechanics. Flexibility is the ability to move arms and legs through their full range of motion. Stretching will help improve your flexibility. Adequate flexibility of tissues around the spine and pelvis allows full, normal spinal movement, prevents abnormal force on the joints and decreases the possibility of injury. Stretching also prepares muscles for activity; stretching should be done both before and after each vigorous workout to prevent muscle strain and soreness and to help avoid injuries. When performing flexibility exercises, stretch as far as you can and hold the stretch for 10 seconds and then ease back. Each stretching exercise should be performed slowly in both directions, with no sudden jerking or bouncing. Bouncing is more likely to injure or strain a muscle or joint (Healthy Back Exercises: Strengthen and Stretch, 2011).

3.1 Study Design

This study aimed to find out the work related musculoskeletal disorders among the shopkeepers. For this reason a quantitative research model in the form of a cross-sectional design is used. Cross-sectional study is selected because in this way it is possible to identifying a defined population at a particular point in time. Through the cross-sectional study easily comparing results among those of different ages, gender, or ethnicity (Hicks, 2006).

3.2 Study site

This study was conducted in Savar upozila, Dhaka, Bangladesh.

3.3 Study area

Musculoskeletal Conditions of the shopkeepers.

3.4 Study population and sampling

A population refers to the members of a clearly defined set or class of people, objects or events that was the focus of the investigation. So, all of shopkeepers of Bangladesh who fulfill the inclusion and exclusion criteria of this study were the population of this study. But it was not possible to study the total population within the time of this study, so took only 50 shopkeepers as sample that were selected conveniently from Savar Bazar according to the inclusion and exclusion criteria. Use the convenience sampling technique due to the time limitation and also for the small size of population and as it was the one of the easiest, cheapest and quicker method of sample selection.

3.5 Sampling procedure

The study was conducted by using the convenience sampling methods because it was the easiest, cheapest and quicker method of sample selection. It will be easy to get those subjects according to the criteria concerned with the study purpose through the convenience sampling procedure.

3.6 Subject inclusion criteria

1. All ages were included as there was objective of the study to explore the relationship between age and work related musculoskeletal disorders, so samples are selected from all age group.
2. Subject who were willing to participate in the study otherwise they will not give exact information that was helpful to the study.

3.7 Subject exclusion criteria

1. Subject who were not willing to participate in the study.
2. Subject who were medically unstable. Because medically unstable patient can be confused with the question that can mislead the result of the study.

3.8 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,

$$Z(1 - \frac{\alpha}{2}) = \text{Confidence level at 95\% (standard value of 1.96).}$$

$$d = 0.05$$

$$p = 0.78$$

$$q = (1-p) = (1-0.78)$$

$$=0.22$$

According to this formula of sample size calculation, the actual sample size was about 263 but due to the limitation of time took only 50 samples conveniently from the population for this study.

3.9 Data collection method and tools

In this study data were collected by using both structured and semi structured mixed type questionnaire. Mixed type questionnaire include only close ended questions. Firstly, introduced her and describe the project study as well its purpose and also provided consent form to the participant and explained that to build a trustful relationship. After obtaining consent by sign and asked pre-determine question to the participant and gave

time to understand the questions fully so that they might be answered accurately. During the interview, wrote down field notes and observed the facial expression to collect accurate data from the participants because in grounded theory of qualitative research observation and interviewing both were commonly used for data collection. During the interview use pen, paper, written questionnaire, file, consent paper.

3.10 Data analysis

Data was analyzed with the software named Statistical Package for Social Sciences (SPSS) Version 20.0. Data resolve numerically coded and captured in Microsoft Excel, using an SPSS 20.0 version software program. Microsoft Office Excel 2007 used to decorate the table, bar graph and pie charts.

3.11 Ethical consideration

The aims and objectives of this study must be informed to the subjects verbally. So, gave the consent from to the subject and explained them. The subjects had the rights to withdraw themselves from the research at any time. It supposed to assured the participant that his name or address would not be used. The information of the subjects might be published in any normal presentation or seminar or writing but they would not be identified. The participant must be informed or given notice that the result would not be harmful for them. It would be kept confidential and also ensuring the confidentiality of participant's information. At any time the researcher available to answer any additional questions in regard to the study. The proposal of the study was approved by the ethical committee of the member of faculty of physiotherapy Department. The study had done by following the guide line given by local ethical review committee and also followed WHO and BMRC guidelines. Strictly maintained the confidentiality and informed consent must be taken. All the interviews were taken in a confidential to maximize the participant's and feelings of security.

Socio-demographic Information

Age of the participants

Analysis reveals that among the 50 participants, who had suffered from WRMD, the lowest age was 22 years and highest age was 58 years. Frequency of WRMD were 12% (n=6) participants in between 21-30 years, 28% (n=14) participants in between 31-40 years, 50% (n=25) participants in between 41-50 years, 10% (n=5) participants in between 51-60 years (Figure-1).

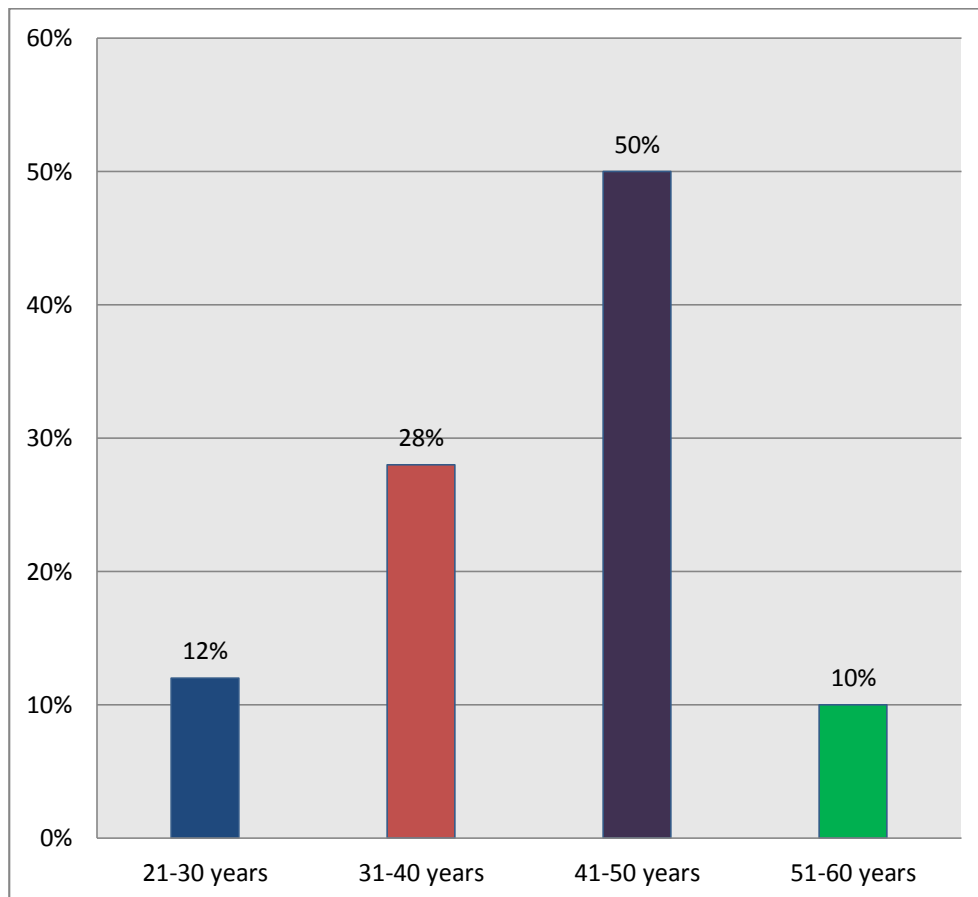


Figure-1: Age of the participants

Weight of the participants

Analysis showed that among the 50 participants 2% (n=1) participant's weight in between the range 41-50 kg, 22% (n=11) participant's weight in between 51-60 kg, and 76% (n=38) participant's weight in between 61-70 kg (Figure-2).

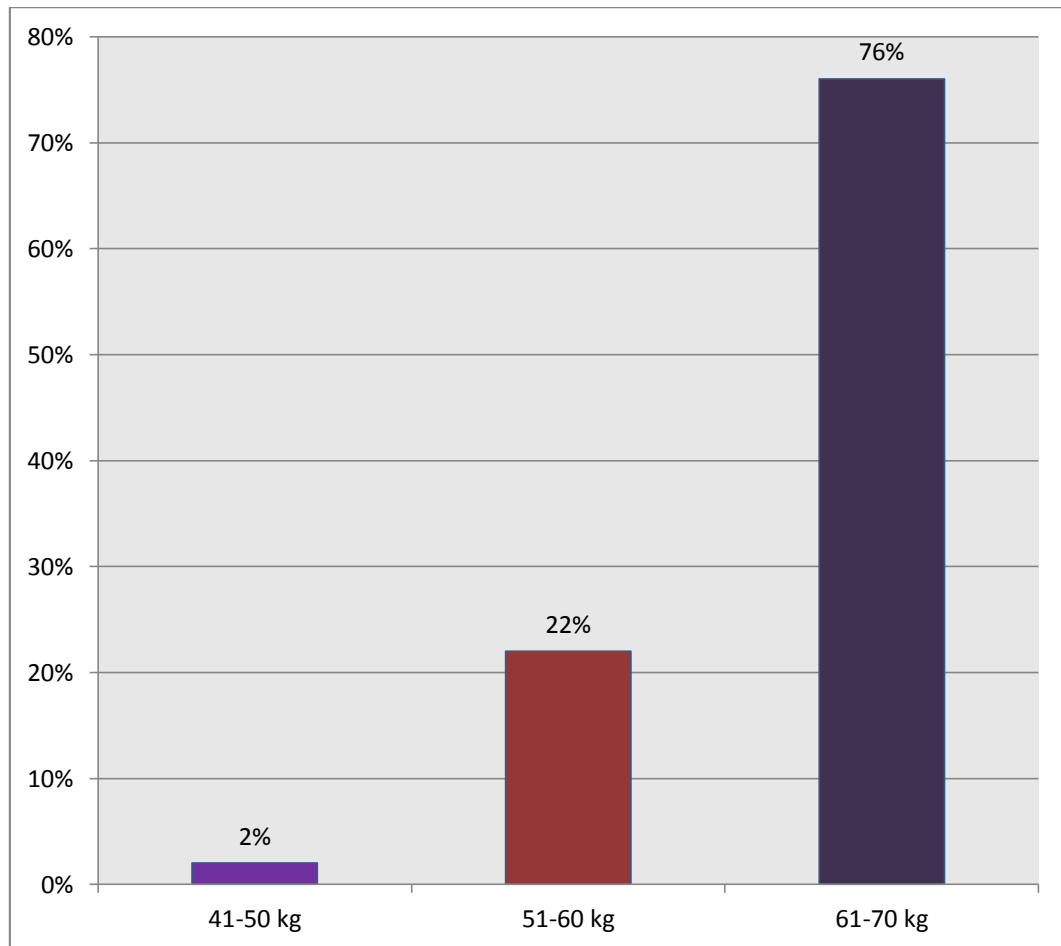


Figure-2: Weight of the participants

Educational status

Among the 50 participants, 8% (n=4) participants had primary education, 34% (n=17) participants had pre-secondary education, 48% (n=24) participants had S.S.C. Among the 50 participants who had suffered from WRMD in this study, 10% (n=5) participants were H.S.C education (Figure - 3).

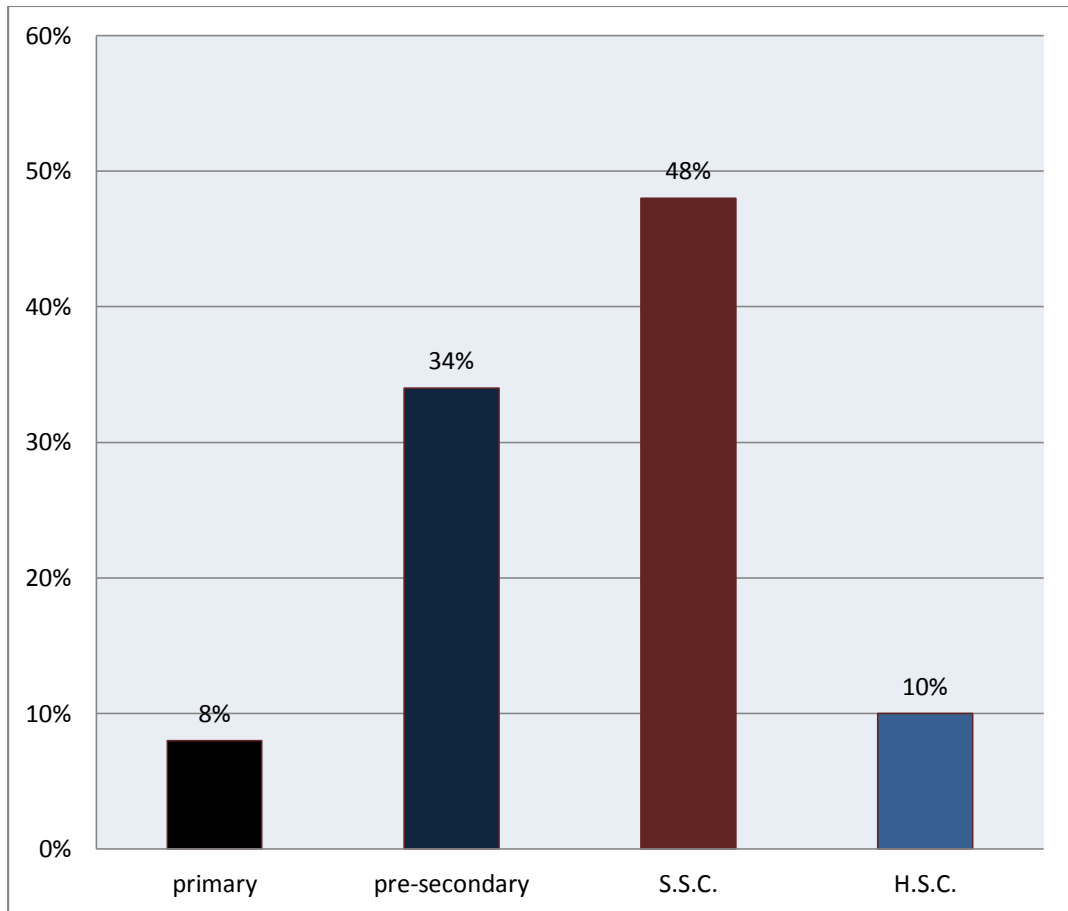


Figure – 3: Educational status of the participants

Job experience and WRMDs

Outcome reveals that among the 50 participants, 4% (n=2) participants had job experience 0-1 year, 24% (n=12) participants had 1-5 years, 54% (n=27) participants 5-15 years, 18% (n=9) were more than 15 years of experience (Figure – 4).

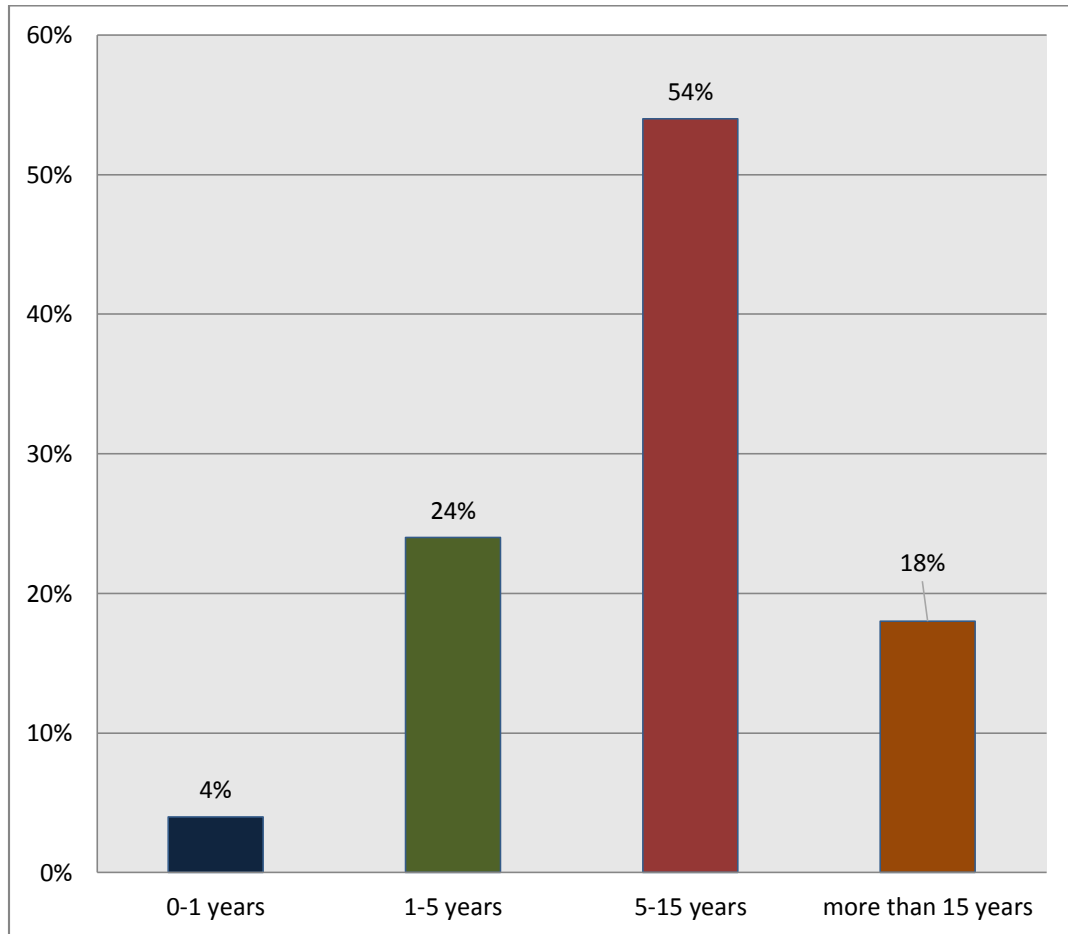


Figure - 4: Job experience of the participants

Symptoms and Risk indicator

Number of episode of WRMDs

Analysis showed that among 50 participants who had suffered from WRMD, 18% (n=9) participants suffered from 1 episode of WRMD, 14% (n=7) participants suffered from 2 episodes of WRMD, 32% (n=16) participants suffered from 3 episode of WRMD, 8% (n=4) participants suffered from 4 episode of WRMD. Among the participants 12% (n=6) had suffered for five episode and 16% (n=8) suffered more than five episode (Figure – 5).

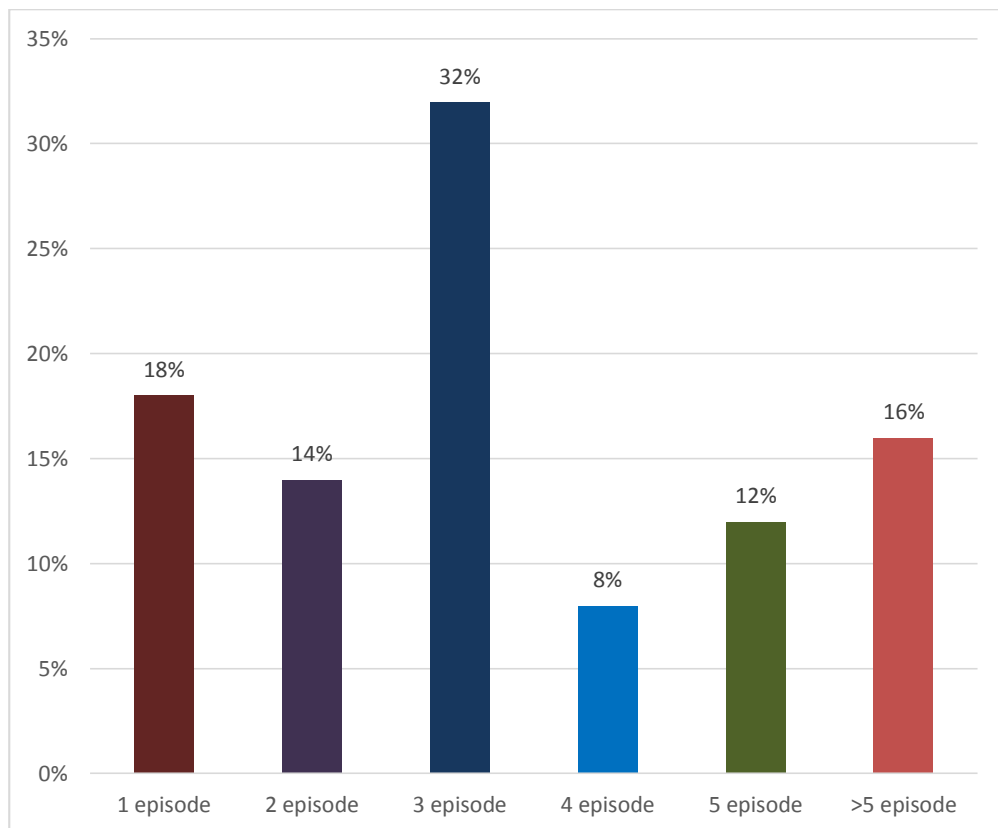


Figure – 5: Number of episode of the participants

Symptoms

Analysis demonstrated that 50 participants who suffered from WRMD 86% (n=43) participants suffered from pain, 10% (n=5) participants had paresthesia, 4% (n=2) had numbness. Analysis showed that, most shopkeepers suffered from WRMD, the most common symptom was pain (Figure - 6).

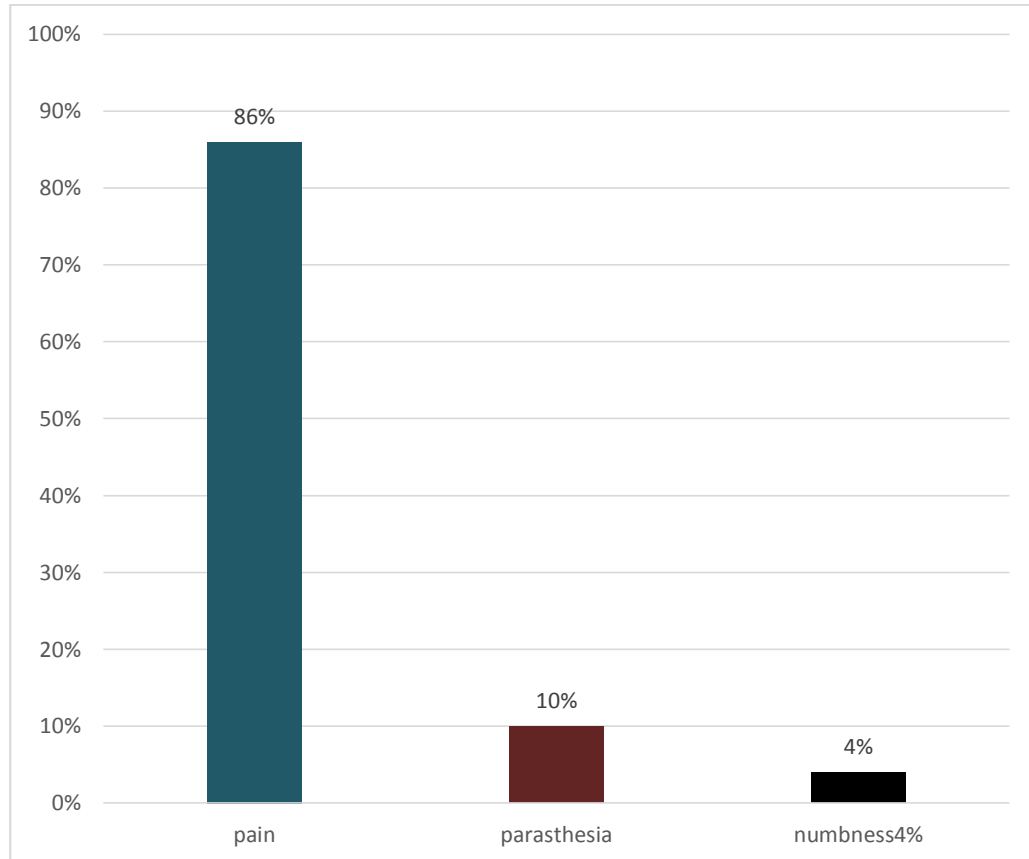


Figure – 6: Symptoms of WRMD of the participants

Affected body part

After analysis researcher found that among 50 participants who suffered from WRMD most affected body parts were hip in 40% (n=20) participants, spine in 30% (n=15) participants, shoulder in 18% (n=9) participants, elbow in 2% (n=1) participants, neck in 4% (n=2) participants, knee in 6% (n=3) participants (Figure 7).

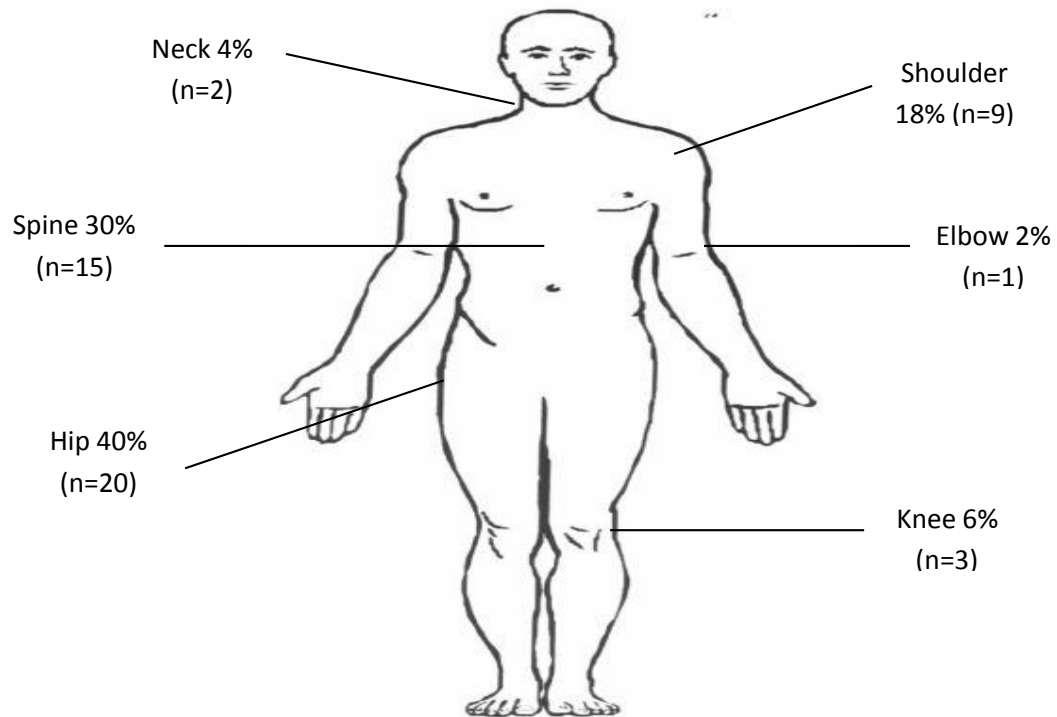


Figure – 7: Affected body parts of the participants

Severity of the symptoms

Analysis demonstrated that 26% (n=13) participants had mild symptoms, 64% (n=32) participants had moderate symptoms and 10% (n=5) participants had moderate symptoms out of 50 participants (Figure - 8).

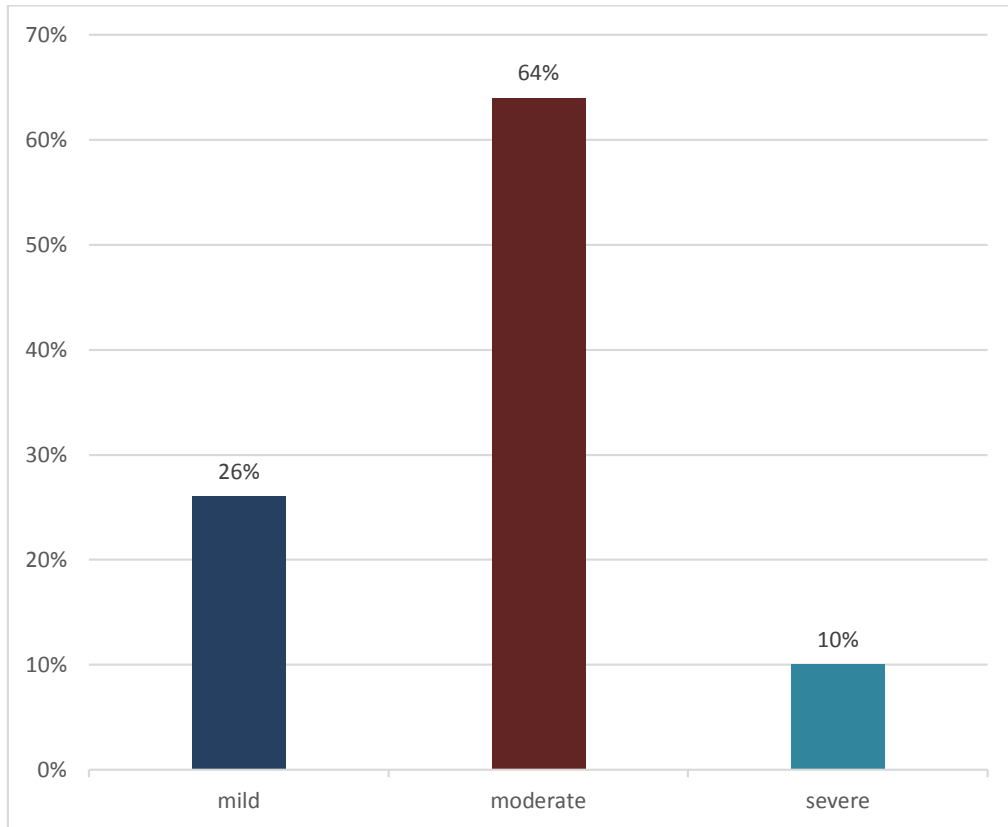


Figure – 8: Severity of the symptoms of the participants

Work interruption

Analysis showed that 72% (n=36) participants out of 50 participants had work interruption due to WRMD and 28% (n=14) participants out of 50 participants had not work interruption due to WRMD (Figure - 9).

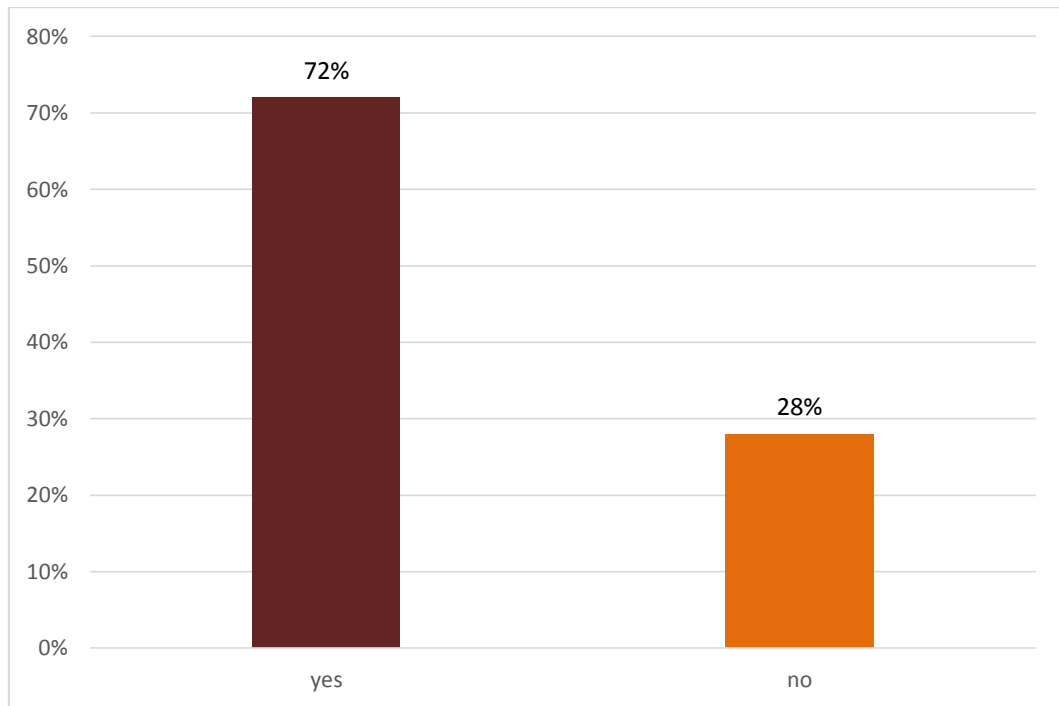


Figure – 9: work interruption of the participants

Reduce work performance

Outcome reveals that 72% (n=36) participants out of 50 participant's working performance had reduced due to work related musculoskeletal disorders and 28% (n=14) participant's working performance had not reduced due to work related musculoskeletal disorders (Figure 10).

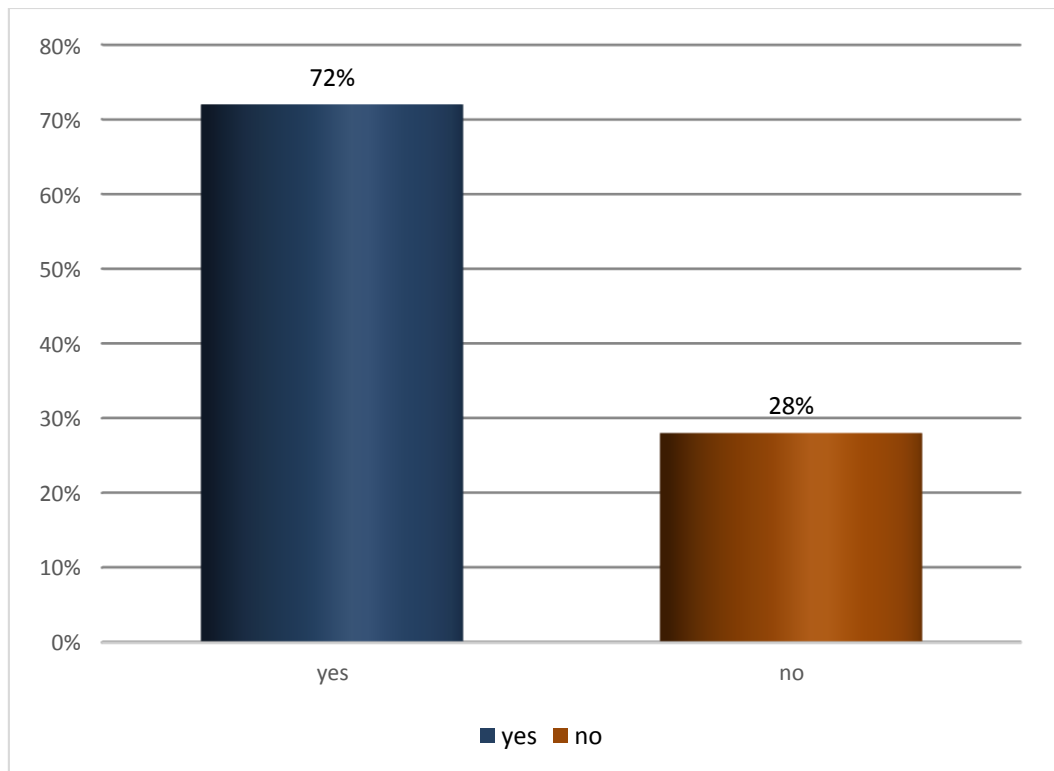


Figure – 10: Reduce work performance of the participants

Safety equipment use

Analysis demonstrated that 92% (n=46) participants out of 50 participants had not use Safety equipment, only 8% (n=4) participants use safety equipment tool (Figure - 11).

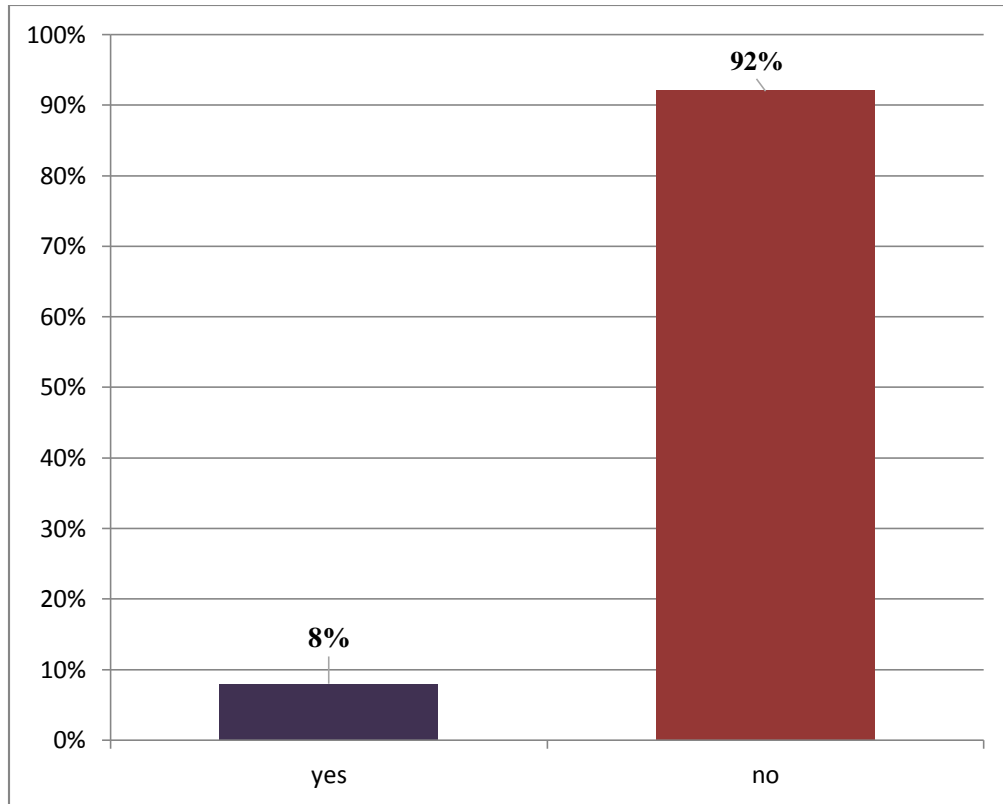


Figure – 11: Use of safety equipment of the participants

Stressful positions

Analysis showed that among the 50 participants who had suffered from WRMD, stressful position were working in same position for long periods for 58% (n=29) participants, performing same task over and over for 30% (n=15) participants, bending for 4% (n=2) participants, repetitive movement of upper limb for 4%(n=2) participants, carry heavy load for 4% (n=2) participants. So, most common risk factors were working in same position for: (58%) and, performing same task over and over (30%) (Figure – 12).

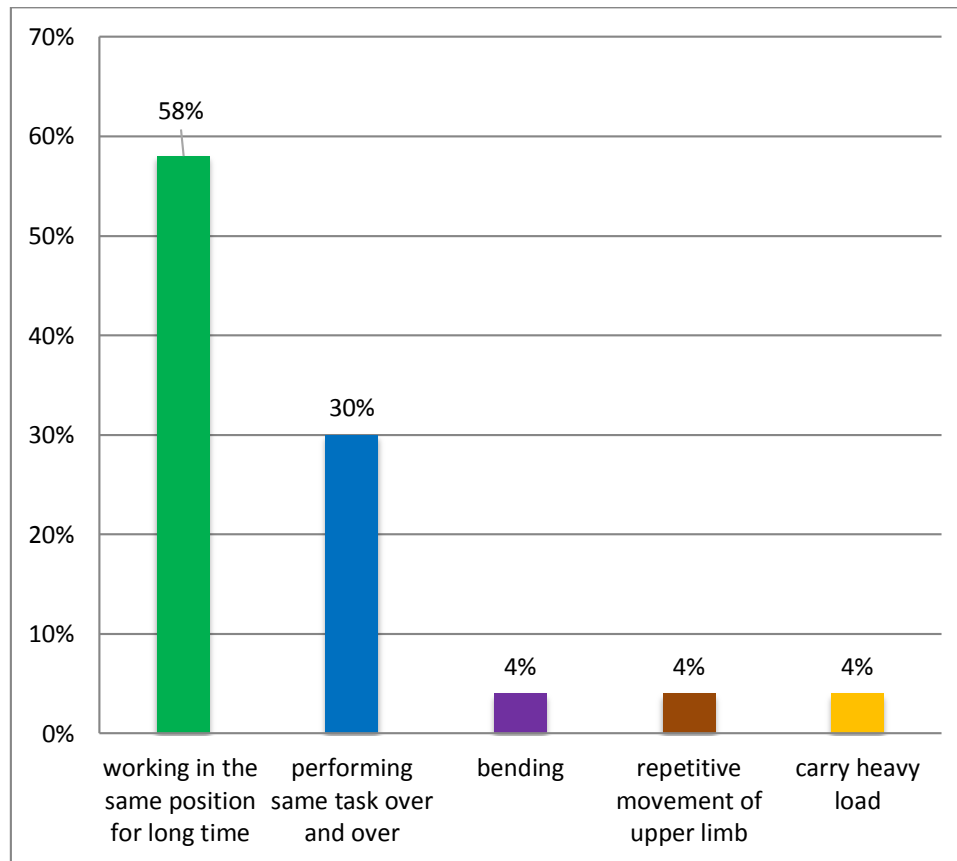


Figure – 12: Stressful position of the participants

Receiving treatment

Analysis showed that among 50 participants who suffered from WRMD only 18% (n=9) participants had taken physiotherapy treatment for their condition and 80% (n=40) participants had taken medication (Figure - 13) and 1% (n=2) had taken other treatment.

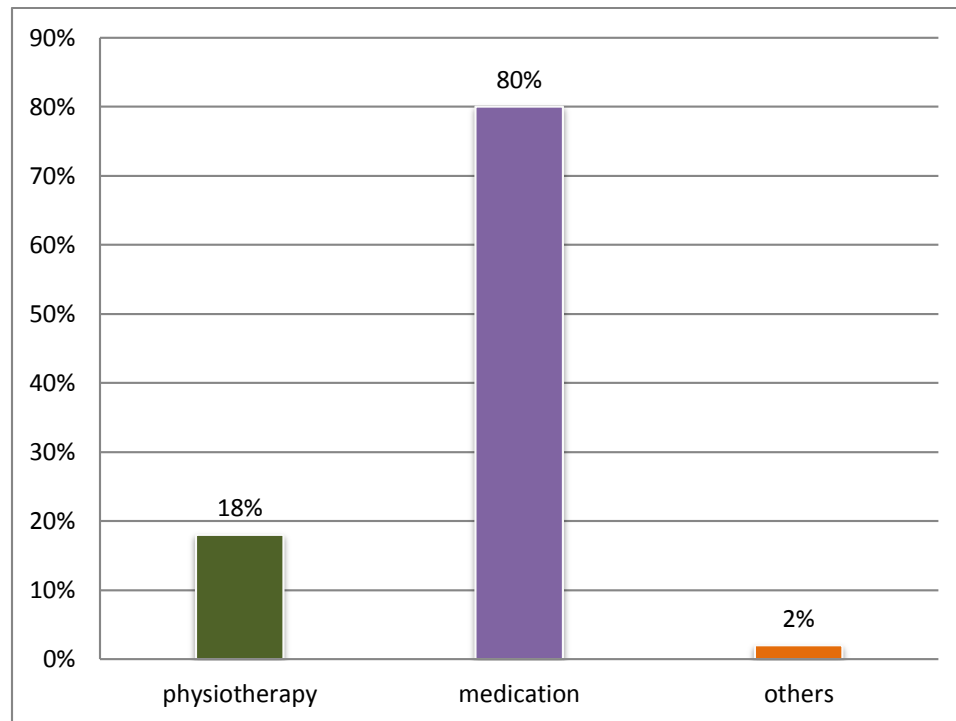


Figure – 13: Treatment received by the participants

Treatment Consequences

Among the 50 participants, who had taken physiotherapy and medication for their condition all of the participants had a good prognosis. The percentages of prognosis were in 60% (n=30), unchanged 38% (n=19) participants and 2% (n=1) worse in the participants (Figure 14).

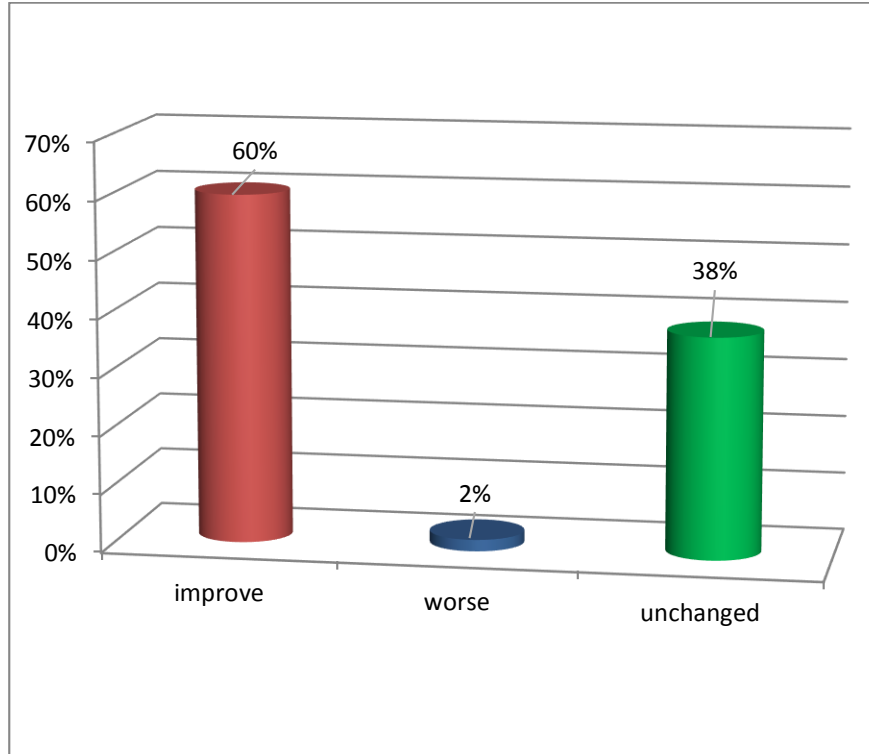


Figure – 14: Treatment Consequences of the participants

This study examined the prevalence of work related musculoskeletal disorder (WRMD) among the shopkeepers. In India musculoskeletal problems were reported by 76.5% (Talwar et al., 2009). The European Agency for Safety and Health at Work (2007) found that 84% WRMD reported in Europe countries. Priya et al. (2010) found that With MSD 76.25 % and Without MSD 23.75 %. In Iran 87.1% experienced some form of MDS symptoms (Choobineh and Tabatabaee, 2009). In America Work-related pain was experienced by 75% (Scherzer et al., 2005).

The higher number of age ranges of participants 50% had suffered from WRMDs between 41-50 years. European Agency for Safety and Health at Work (2009) the higher number of age ranges suffered from WRMDs between 55-64 years and lower number of age ranges suffered from WRMDs 25-34 years. The mean age was 35.05(SD \pm 8.135) years. Chyuan et al. (2012) the mean Age was 33.3 \pm (SD \pm 11.3) years.

Analysis showed that among the 50 participants 2% (1) participant's weight in between the range 41-50 kg, 22% (11) participant's weight in between 51-60 kg, and 76% (38) participant's weight in between 61-70 kg.

Analysis demonstrated that 50 participants who suffered from WRMD 86% (43) participants suffered from pain, 10% (5) participants had paresthesia, 4% (n=2) had numbness. Analysis showed that, most shopkeepers suffered from WRMD, the most common symptoms were pain. Chyuan et al. (2012) 84% participants reported experience of WRMD related pain. Scherzer et al. (2005) 75% was experienced Work-related pain.

The study demonstrated that among 50 participants who had suffered from WRMD, 18% (9) participants suffered from 1 episode of WRMD, 14% (7) participants suffered from 2 episodes of WRMD, 32% (16) participants suffered from 3 episode of WRMD, 8% (4) participants suffered from 4 episode of WRMD. Among the participants 12% (6) had suffered for five episodes and 16% (8) suffered more than five episodes. The most

affected body parts were spine in 30% (15) participants, shoulder in 18% (9) participants, hip in 40% (20) participants, elbow in 2%(1) participants, neck in 4%(2) participants, knee in 6%(3) participants. In India most of the workers were affected body parts were neck (80%), shoulder (20%), wrist (45%), and low back (75%) (Ghoshal et al., 2010). Gangopadhyay et al. (2010) found that prevalence of affected body parts were head/neck (42%), low back (34%), upper back (28%), wrists/hands (20%), shoulders (16%), ankles/feet (13%), knees (12%), hips (6%) and elbows (5%). Work-related musculoskeletal disorders mostly affecting the lower back (97%), knees (85%) and shoulders (77%).

Analysis showed that, 72% participants out of 50 participants had work interruption due to WRMD and 28% (n=14) participants out of 50 participants had not work interruption due to WRMD. In Germany work interruption due to WRMD in 28.7% (Prins et al., 2007). Scherzer et al. (2005) found in his research at Riyadh that only 21.62% missed work due to neck pain and only 24.66% due to back pain. (57.7%) 45 of the participants had work performance reduce due to WRMDs. According to European Agency for Safety and Health at Work (2009) 61% of work performance reduces due to WRMDs.

Analysis demonstrated that 92% (46) participants out of 50 participants had not use Safety equipment, only 8% (4) participants use safety equipment tool. Analysis demonstrated that 26% (13) participants had mild symptoms, 64% (32) participants had moderate symptoms and 10% (5) participants had moderate symptoms out of 50 participants.

Most of the common risk factors were working in same position for (58%) participants and carry heavy load for (4%) participants, performing same task over and over for 30% participants, bending for 4% participants, and repetitive movement of upper limb for 4% participants. Working in same position for long period (71.3%), bending or twisting back or neck in an awkward way (62.6%), performing same task over and over (52.2%). Palmer (2007) claimed that repetitive work, static loading are responsible for most of the WRMDs.

In this study 18% participants had taken physiotherapy treatment for their condition. 80% participants had taken medical treatment for their condition. Krause et al. (2009) found that 73% taken medical treatment for WRMDs.

Limitations of the study

Though the expected sample size was 263 for this study but due to resource constrain researcher could manage just 50 samples which is very small to generalize the result for the wider population of the shopkeepers. There was no literature about work related musculoskeletal disorders among the shopkeepers in the perspective of Bangladesh. So, it was difficult to compare the study with the other research. The research was able to collect data from 1 selected area for a short period of time which had affected the result of the study to generalize for wider population. The questionnaire was developed only through searching sufficient literature but considering the context of the demography of the population a pilot study would substantial before developing questionnaire.

6.1 Conclusion

This study aims to identify the WMSDs among the shopkeepers by identifying the body regions with significant discomfort and risk factors of WRMDs. A comprehensive literature review was given. This study was aimed to find out the common work related musculoskeletal disorders among the shopkeepers. For the fulfillment of the study the researcher has designed a quantitative study design (cross-sectional study) and collected 50 data from the samples through a standard questionnaire. From the data base, it was found that, participants with WRMDs in age range between 51-60 (78%) years are more vulnerable. Most of the education level was S.S.C. (48%). The duration of job experience 5-15 years (54%) most commonly suffered by the WRMDs. The result indicates that most discomfort of the body regions was in the hip (40%), spine (30%) and shoulder (18%). Most common symptom of WRMDs was pain (86%). The maximum severity of symptom was moderate (64%). The most common risk factors were working in same position for (58%) and carry heavy load for (30%) participants. Only (18%) participants had taken physiotherapy treatment for their condition. The percentages of prognosis were improved in (60%). In conclusion, work related musculoskeletal disorders represent a significant burden for shopkeepers. The study was represents the strong evidence that WRMDs was common among shopkeepers. In order to reduce musculoskeletal problems, correct postural practices, proper design of tools and equipment significantly can prevent MSDs.

6.2 Recommendations

A recommendation evolves out of the context in which the study was conducted. The purpose of the study was to estimate the work related musculoskeletal disorders among shopkeepers. Though, the research had some limitations but some further step that might help for the better accomplishment of further research. For the ensuring of the generalization of the research it is recommended to investigate a large sample. In this study only investigate the shopkeepers from 1 selected area. But due to time limitation there was not able to gather huge amount of participants and for this result cannot be generalized in all over the Bangladesh. So, for further study it is strongly recommended to increase sample size to generalize the result in all of the shopkeepers in Bangladesh.

REFERENCES

Answers, (2015), shopkeeper, Available: <http://www.answers.com/topic/shopkeeper> [accessed on 28th August 2015].

Balint, G.P., Korda J., Hangody L. and Balint P.V., (2013). Regional musculoskeletal conditions: foot and ankle disorders. *Best Practice & Research Clinical Rheumatology*, 17(1):87-111.

Bellamy, C., (2008). The status of world's children -2008. USA: United Nations Children's Fund. Available at [https://www.google.com.bd/webhp?sourceid=chromeinstant&ion=1&espv=2&ie=UTF8#q=Bellamy%2C+C.%2C+\(2008\).+The+status+of+world%E2%80%99s+children+-2008.+United+nation+children+funds%2C+UNICEF](https://www.google.com.bd/webhp?sourceid=chromeinstant&ion=1&espv=2&ie=UTF8#q=Bellamy%2C+C.%2C+(2008).+The+status+of+world%E2%80%99s+children+-2008.+United+nation+children+funds%2C+UNICEF) [accessed on 25th August 2015].

Burdorf, A., and Sorock, G., (2007). Positive and negative evidence for risk factors of work-related back disorders. *Scandinavian Journal of Work, Environment & Health*, 23: 243-256.

Bruce, P. and Bernard M., (2007). *Musculoskeletal Disorders and Workplace Factors*, U.S: Department of Health and Human Services, Available: <http://www.cdc.gov/niosh/docs/97-141/pdfs/97-141.pdf>, [accessed on 27th August 2015].

Choobineh, A., Tabatabaei, S.H., Tozihian, M. and Ghadami, F., (2007). Musculoskeletal problems among workers of an Iranian communication company, *Indian Journal of Occupational and Environmental Medicine*, 11(1): 32-36.

Choobineh, A., Tabatabaei, S.H. and Behzadi, M., (2009). Musculoskeletal problems among workers of an Iranian sugar-producing factory. *International journal of occupational safety and ergonomics*, 15(4):419-424.

Chyuan, J., Du, C., Yeh, W. and Li, C., (2012). Musculoskeletal disorders in hotel restaurant workers. *Occupational Medicine*, 54: 55-57.

Chan, Y.O. and Ho, S.F., (2008). Study on musculoskeletal complaints involving the back, neck and upper limbs. *Singapore medical journal*, 39(8):363-367.

Choobineh, A. and Tabatabaee, S. H., (2009). Musculoskeletal Problems Among Workers of an Iranian Sugar-Producing Factory. *International Journal of Occupational Safety and Ergonomics*, 15(4): 419-424.

Department of Labor Statistics, (2012). Workplace injuries and ill-nesses & Musculoskeletal Disorders and Workplace Factors, [online]. US: Bureau of Labor Statistics. Available: <http://www.cdc.gov/niosh/97-141> [accessed on 29th August 2015].

Department of labor and industries, (2007). Department of labor and industrial relations, Hawaii Administrative Rules. Available at <http://hawaii.gov/labor/legal/rule/12-45.1.pdf> [accessed on 29th August 2015].

Ebnezer, J., (2008). *Essentials of Orthopedics for Physiotherapists*. 2nd ed., India: Jaypee Brothers Medical Publishers.

Ghoshal, G., Gangopadhyay, S., Das., Das, T. and Ghos, T., (2010). An Ergonomics Study on Posture-Related Discomfort and Occupational-Related Disorders Among Stonecutters of West Bengal, India. *International Journal of Occupational Safety and Ergonomics*, 16(1):69-79.

Guo, H., Chang, Y., Yeh, W., Chen, C. and Guo, Y., (2009). Prevalence of musculoskeletal disorder among workers in Taiwan: A nationwide study. *Journal of Occupational Health*, 46:26-36.

Aweto, H.A., Tella, B.A. and Johnson, O.Y., (2015). Prevalence of work-related musculoskeletal disorders among hairdressers, *International Journal of Occupational Medicine and Environmental Health*, 28(3):545-555.

Hicks, C.M., (2006). *Practical Research Method for Physiotherapists*. 9th ed., New York: Churchill Livingstone.

Johnos, W.M.S., (2011). Prevalence of Upper Extremity Musculoskeletal Disorders. *Musculoskeletal Disorders*, 5(2):187-190.

Jafry, T. and Neill, D.H., (2006). The application of ergonomics in rural development: a review. *Application of Ergonomics*, 31:263–268.

Krause, N., Dasinger, L.K., Deegan, L.J., Brand, R.J. and Rudolph, L., (2009). Alternative approaches for measuring duration of work disability after low back injury based on administrative worker's compensation. *American Journal of Medicine*, 35:604-618.

Kumar, S., Patel, S., Gohel, N. and Patani, V., (2011). *Musculoskeletal Disorders Bibliography*. National Institute of Occupational Health, 1: 3-43.

Kim, K.H., Kim, K.S., Kim, D.S., Jang, S.J., Hong, K.H. and Yoo, S.W., (2010). Characteristics of work-related musculoskeletal disorders in Korea and their work-relatedness evaluation. *Journal of Korean medical science*, 25:77-86.

Linton, S.J. and Kamwendo, K., (2006). Risk factors in the psychosocial work environment for neck and shoulder pain in secretaries. *Journal of Occupational Medicine*, 31(7): 609-613.

Luttmann, A., Jager, M., Griefahn, B., Caffier, G., Liebers, F. and Steinberg, U., (2008). *Preventing musculoskeletal disorders in the workplace*. Geneva: WHO.

Meligsted, E. and Westgaard, R., (2005). Generation of muscle tension additional to posture muscle load. *Ergonomics* 30: 911-923.

Maier, M. and Ross-Motta, J., (2007). *Work-related Musculoskeletal Disorders*, Ecology research group, University of Oregon [assessed on 28th August 2015].

Moore, J.S. and Garg, A., (2012), Determination of the operational characteristics of ergonomic exposure assessments for prediction of disorders of the upper extremities and back. In Proceedings of the 11th Congress of the International Ergonomics Association. London, England: Taylor & Francis: 144-146.

Marras, W.S., Lavender, S.A., Leurgans, S.E., Fathallah, F.A, Ferguson, S.A. and Allread, W.G., (2005). Biomechanical risk factors for occupationally-related low back disorders, Available <http://www.cdc.gov/niosh/docs/97-141/default.html> [accessed on 15th August 2015].

Nathan, P.A., Keniston, R.C., Myers, L.D. and Meadows, K.D., (2010). Longitudinal study of median nerve sensory conduction in industry: relationship to age, gender, hand dominance, occupational hand use and clinical diagnosis. Available <http://www.cdc.gov/niosh/docs/97-141/default.html> [accessed on 20th August 2015].

Ostgaard, H.C., Andersson, G.B. and Karlsson, K., (2011), Prevalence of back pain in pregnancy, Available: <http://www.ncbi.nlm.nih.gov/pubmed/1828912> [accessed on 28th August 2015].

Part, R., (2009), Musculoskeletal disorders of the knee of workers. Available <http://www.ncbi.nlm.nih.gov/pubmed/19961084> [accessed on 20th August 2015].

Prins, R., Jensen, P.L., Lord, T., Delang, E., Lezcano, M., Kuhn, K., Polanen, V., Bjurstrom, K., Haeckel, M., Castriotta, M., Bakkum, H., Blandin, M.C., Beek, R. and Vehier, R.M., (2007). Inventory of socio-economic information about work-related musculoskeletal disorders in the Member States of the European Union, [online]. Europe: European Agency for Safety and Health at Work. Available: <http://osha.eu.int/ew2000/> [accessed on 28th August 2015].

Pinder, A., Yeomans, L., Heuvel, S., Blatter, B., Verjans, M., Muylaert, K., Broeck, V.D., Buffet, M.A. and Nevala, N., (2007). Work-related musculoskeletal disorders: Back to work report. European Agency for Safety and Health at Work.

Palmer, K.T. and Smedley, J., (2007). Work relatedness of chronic neck pain with physical findings- a systematic review, [online]. UK: National Institute of Health. Available: <http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=Search&Term=%22Smedley%20J%22%5BAuthor%5D&itool> [accessed on 28 October 2015].

Priya, D.V.S., Johnson, P., Padmavathi, R., Subhashini, A.S., Ayyappan, R. and Ayyappan, M., (2010). Evaluation of the Relationship between Workload and Work Capacity in Petrochemical and Tannery Workers-A Pilot Study. *Life Sciences and Medicine Research*, 19: 2-12.

Putz-Anderson, V., Bernard, B., Burt, S., Cole, L., Fairfield Estill, C., Grant, K., Gjessing, C., Jenkins, L., Hurrell, J., Nelson, N. and Tanakan, S., (2007). Musculoskeletal disorders (MSDs) and workplace factors: a critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back, [online]. U.S: Department of Health and Human Services. Available: <http://www.cdc.gov/niosh/docs/97-141/pdfs/97-141.pdf> [accessed on 27th August 2015].

Podniece, Z., (2008), Work-related musculoskeletal disorders: Prevention report, Available: http://osha.europa.eu/en/publications/reports/en_TE8107132ENC.pdf. [accessed on 27th August 2015]

Rima, R.H., Hamdan, M., Nuwayhid, I. and Odaymat, F., (2005). Musculoskeletal Disorders Among Full-Time Homemakers in Poor Communities. *Journal of Women health*, 42 (2): 1-14.

Safe computing tips, (2011). Musculoskeletal Disorders. Available: <http://www.Safecomputingtips.com/musculoskeletal-disorders-wmsd.html> [accessed on 29th September 2015].

Safety & Health Assessment & Research for Prevention, 2011, Available: <http://www.lni.wa.gov/Safety/Research/OccHealth/Reports/CtsBurden/default.asp> [accessed on 27th August 2015].

Shahnavaz, H., (2007). Workplace injuries in the developing countries. *Ergonomics*, 30(2): 397-404.

Scherzer, T., Rugulies, R. and Rause, N., (2005). Work-Related Pain and Injury and Barriers to Worker's Compensation Cleaners. *American Journal of Public Health*, 95(3): 483-488.

Talwar, R., Kapoor, R., Puri, K., Bansal, K. and Singh, S., (2009). A study of visual and musculoskeletal health disorders among computer professionals in NCR Delhi. *Indian journal of Community Medicine*, 34(4): 326-328.

Simoneau, S., St-vincent, M. and chicoine, D., (2006). Work-Related Musculoskeletal Disorders (WMSDs). Available: [http://www.irsst.qc.ca/media/documents /PubIRSST/RG-126-ang.pdf](http://www.irsst.qc.ca/media/documents/PubIRSST/RG-126-ang.pdf) [accessed on 18th August 2015].

Tissot, F., Messing, K. and Stock, S., (2009). Studying the relationship between low back pain and working postures among those who stand and those who sit most of the working day. *Ergonomics*, 52(11): 1402–1418.

APPENDIX-A

Consent Form

Assalamualaikum / Namashker,

I am A.T.M. Hafizur Rahman, 4th Professional B.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Bachelor degree, I have to conduct a research project and it is a part of my study. The participants are requested to participate in the study after a brief the following. My research title is **“Common work related musculoskeletal disorders among the Shopkeepers”**. To fulfill my research project, I need to collect data. I would like to know about some personal and other related information about musculoskeletal problems. With great kindness you are requested to answer some questions of that are mentioned in this form. This will take approximately 20-30 minutes. I would like to inform you that this is a purely academic study and woun”be used for any other purposes. I assure that all data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw consent and discontinue participation at any time of the experiment. You also have the rights to answer a particular question that you don’t like.

If you have any query about the study or right as a participant, you may contact with researcher A.T.M. Hafizur Rahman or, Md. Sohrab Hossain, Associate Professor, Department of Physiotherapy, BHPI, CPR, Savar, Dhaka-1343.

Do you have any questions before I start?

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

Yes No

Signature of the participant and Date.....

Signature of the researcher and Date.....

Signature of the witness and Date.....

APPENDIX-B

Questionnaire (English)

This questionnaire is developed for “**Common work related musculoskeletal disorders among the Shopkeepers**” this study and this section will be filled (V) mark in the left of point by shopkeeper, but in special consideration researcher using a black or blue pen.

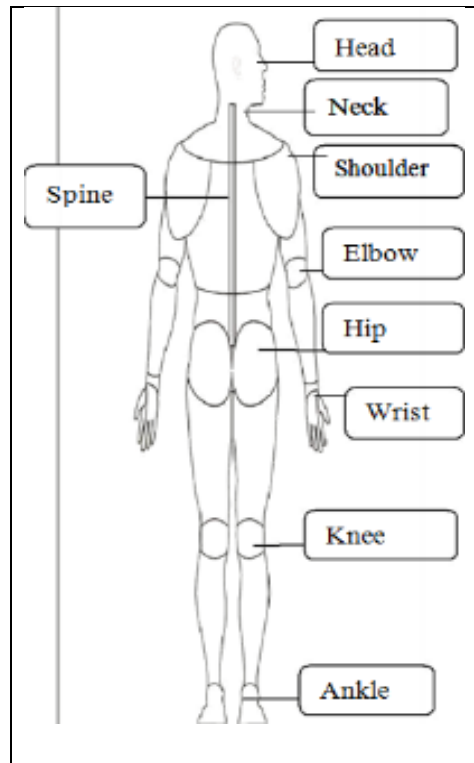
SECTION-A: Socio-demographic Information

1. Participant's name:
2. Age:
3. Weight (kg):
4. Sex:
 - I. Male
 - II. Female
5. Address:

Village:	Post office:
Police station:	District:
Mobile number:	E-mail:
6. Education level:
 - I. Primary (Class V)
 - II. Pre-secondary (Class VIII)
 - III. S.S.C
 - IV. H.S.C
 - V. Graduate
 - VI. Other (Specify)
7. Work Experience:
 - I. 0-1 Years
 - II. 1-5 years
 - III. 5-15 years
 - IV. More than 15 years

SECTION-B: Symptoms and Risk indicator related questions

1. Have you ever experienced work related musculoskeletal disorders in any part of your body?
 - I. Yes
 - II. No
2. If yes, what number of episode you suffer due to work-related musculoskeletal disorder?
 - I. 1 episode
 - II. 2 episode
 - III. 3 episode
 - IV. 4 episode
 - V. 5 episode
 - VI. > 5 episode
3. Please fulfill the body part where the symptoms arise?
 - I. Pain
 - II. Paresthesia
 - III. Cramp
 - IV. Numbness
 - V. Tingling
 - VI. Swelling
 - VII. Stiffness
 - VIII. Weakness
4. What is the severity of your pain?
 - I. Mild
 - II. Moderate
 - III. Severe
5. Did you stay away from work due to pain?
 - I. Yes
 - II. No
6. Had your working performance reduced due to pain?
 - I. Yes
 - II. No



7. Do you use any adequate safety equipment during work?
 - I. Yes
 - II. No
8. What types of factor at work could contribute to work related musculoskeletal disorder?
 - I. Working in the same position for long time (Standing, bend over, sitting etc.)
 - II. Performing the same task over and over
 - III. Bending
 - IV. Repetitive movement of upper limb
 - V. Carry heavy load
9. Did you go to physician or physiotherapist due to any musculoskeletal problem?
 - I. Yes
 - II. No
10. What kind of treatment did you receive?
 - I. Physiotherapy
 - II. Medication
 - III. Others
11. If yes, then what was the result?
 - I. Improve
 - II. Worse
 - III. Unchanged

Thank you for completing the survey

APPENDIX-C

মৌখিক সম্মতিপত্র

(অংশগ্রহণকারীকে পড়ে শোনাতে হবে)

আসসালামুআলাইকুম/নমস্কার,

আমার নাম এ টি এম হাফিজুর রহমান, আমি এই গবেষণা প্রকল্পটি বাংলাদেশ হেলথ প্রফেশনস ইন্সটিটিউট (বিএইচপিআই), ঢাকা বিশ্ববিদ্যালয় – এ পরিচালনা করছি যা আমার ৪র্থ বর্ষ বি এস সি ফিজিওথেরাপি কোর্সের অধিভুক্ত। আমার গবেষণার শিরোনাম হল “দোকানদারদের কাজ জনিত পেশি-অস্থির ব্যাধি”। আমি আপনাকে ব্যক্তিগত এবং অস্থি পেশীয় অভিযোগ সম্পর্কে কিছু প্রশ্ন করতে চাই। এতে আনুমানিক ২০-৩০ মিনিট সময় লাগবে।

আমি আপনাকে অবগত করছি যে, এটা আমার অধ্যয়নের অংশ এবং অন্যকোন উদ্দেশ্যে ব্যবহৃত হবে না। এই গবেষণা আপনার বর্তমান এবং ভবিষ্যত চিকিৎসায় কোন প্রকার প্রভাব ফেলবে না। আপনি যেসব তথ্য প্রদান করবেন তার গোপনীয়তা বজায় থাকবে এবং আপনার প্রতিবেদনের ঘটনা প্রবাহে এটা নিশ্চিত করা হবে যে এই তথ্যের উৎস অপ্রকাশিত থাকবে। এই অধ্যয়নে আপনার অংশগ্রহণ স্বেচ্ছাপ্রণোদিত 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 সাক্ষাৎকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকারও আপনার আছে।

এই অধ্যয়নে অংশগ্রহণকারী হিসেবে যদি আপনার কোন প্রশ্ন থাকে তাহলে আপনি আমাকে অথবা/ এবং মোহাম্মাদ সোহরাব হোসেন, সহযোগী অধ্যাপক, ফিজিওথেরাপি বিভাগ, বিএইচপিআই, সিআরপি, সাভার, ধাকা-১৩৪৩ তে যোগাযোগ করতে পারেন।

এটা শুরু করার পূর্বে আপনার কি কোন প্রশ্ন আছে ?

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে যাচ্ছি।

হ্যাঁ

না

১। অংশগ্রহণকারীর স্বাক্ষর ও তারিখঃ

২। সাক্ষাতকারগ্রহণকারীর স্বাক্ষর ও তারিখঃ

৩। সাক্ষীর স্বাক্ষর ও তারিখঃ

APPENDIX-D

প্রশ্নপত্র (বাংলা)

এই প্রশ্নপত্রটি “দোকানদারদের কাজ জনিত পেশি-অস্থির ব্যাধি” চিহ্নিত করার জন্য তৈরি করা হয়েছে এবং এই প্রশ্নপত্রটি গবেষণায় অংশগ্রহণকারী ব্যক্তি সঠিক উত্তরের বাম পাশে (V) চিহ্ন দিয়ে পূরণ করবেন, এবং বিশেষ ক্ষেত্রে গবেষক কালো অথবা নীল কালি ব্যবহার করবেন।

অংশ -ক : আর্থ-সামাজিক তথ্য সম্পর্কিত প্রশ্ন

১। অংশগ্রহণকারীর নাম :

২। বয়স :

৩। ওজন :

৪। লিঙ্গ :

ক) পুরুষ

খ) মহিলা

৫। ঠিকানা :

৬। শিক্ষাগত যোগ্যতা :

ক) প্রাথমিক (৫ ম শ্রেণী)

খ) অষ্টম শ্রেণী

গ) এস এস সি

ঘ) এইচ এস সি

ঙ) ডিগ্রী অথবা অন্যান্য

৭। কাজের (দোকানদারীর) অভিজ্ঞতা :

ক) ০-১ বৎসর

খ) ১-৫ বৎসর

গ) ৫-১৫ বৎসর

ঘ) ১৫ বৎসর এর বেশি

অংশ -খ : উপসর্গ ও ঝুঁকি সম্পর্কিত প্রশ্ন

১) আপনার কি শরীরের কোন অংশে কাজ সম্পর্কিত পেশি-অস্থির ব্যাধির অভিজ্ঞতা আছে ?

ক) হ্যাঁ

খ) না

২) যদি হয়ে থাকে, তাহলে কতবার আপনি পেশি-অস্থির ব্যাধিতে ভুগেছেন ?

ক) ১ বার

খ) ২ বার

গ) ৩ বার

ঘ) ৪ বার

ঙ) ৫ বার

চ) ৫ এর বেশি

৩) আপনার দেহের কোন অংশে পীড়া আছে সেই অংশটি নিচের ছবিটিতে কালো কালিতে পূরণ করুন এবং পীড়ার ধরণ কেমন, তার পাশে (V) চিহ্ন দিন।

ক) ব্যাথা

খ) যন্ত্রণা

গ) শিরটান

ঘ) অবশতা

ঙ) জড়তা

চ) খিঁচুনি

ছ) রণন

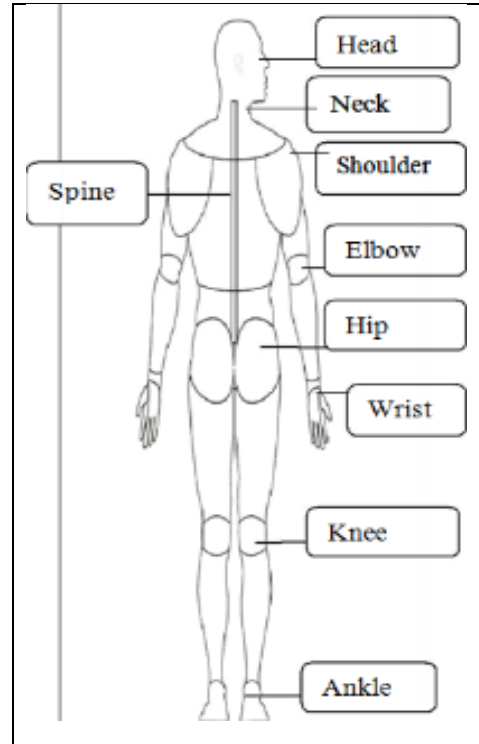
জ) ফুলে যাওয়া

৪) আপনার ব্যথার তীব্রতা কি রকম ?

ক) হালকা ব্যাথা

খ) মাঝারি ব্যাথা

গ) তীব্র ব্যাথা



৫। আপনি কি কখনও পেশি-অস্থির ব্যাধির জন্য আপনার কাজ বন্ধ রেখেছেন ?

ক) হ্যাঁ

খ) না

৬। ব্যাথার কারণে আপনার কাজে কি ব্যাঘাত ঘটে ?

ক) হ্যাঁ

খ) না

৭। আপনি কি কাজের সময় কোনও প্রকার নিরাপত্তা সরঞ্জাম ব্যবহার করেন ?

ক) হ্যাঁ

খ) না

৮। কি ধরনের কাজে আপনার পেশি-অস্থির ব্যাধির লক্ষণ প্রকাশ পায় ?

ক) একই অবস্থায় দীর্ঘ সময় কাজ করলে (দাঁড়িয়ে, বসে)

খ) একই কাজ বারবার করলে

গ) হাঁটু গেড়ে বসে কাজ করলে

ঘ) দুই হাতে খুব বেশী কাজ করলে

ঙ) বেশী ভার বহন করলে

৯। আপনি কি কখনও চিকিৎসকের কাছে চিকিৎসার জন্য গিয়েছিলেন ?

ক) হ্যাঁ

খ) না

১০। আপনি কি ধরনের চিকিৎসা নিয়েছিলেন ?

ক) ফিজিওথেরাপি

খ) ঔষধ

গ) অন্যান্য

১১। যদি নিয়ে থাকেন, তাহলে ফলাফল কি ?

ক) উন্নত

খ) খারাপ

গ) অপরিবর্তিত

জরিপটি সম্পূর্ণ করার জন্য আপনাকে ধন্যবাদ

APPENDIX-E: Permission letter

17th September, 2015

Head

Department of Physiotherapy

BHPI, CRP-Chapain, Savar, Dhaka-1343.

Subject: Seeking permission to collect data for research project.

Dear Sir,

With due respect and humble submission I beg to state that, I am A.T.M. Hafizur Rahman, student of 4th professional B.Sc. in Physiotherapy at Bangladesh Health Profession Institute (BHPI). As per approval of ethical review committee of BHPI, I would like to conduct a research project on **“Common work related musculoskeletal disorders among the Shopkeepers”**. In order to accomplish this study, Md. Sohrab Hossain, Associate Professor of Physiotherapy has been supervising me. In addition, this research project is the partial requirement for the degree of B.Sc. in Physiotherapy. I want to collect necessary data from selected market in Savar bazar. Therefore I need your kind written permission to start data collection. I would like to assure that ethical principles would be followed as per guidelines of this institution/department.

I therefore, pray and hope that you would be kind enough to grant my application and permit me to collect required data to accomplish the research project.

Sincerely Yours,

A.T.M. Hafizur Rahman

A.T.M. Hafizur Rahman

Student of 4th Professional B.Sc. in Physiotherapy

Roll-12; Session: 2010-2011

Bangladesh Health Professions Institute (BHPI)

CRP-Chapain, Savar, Dhaka-1343.

HOP 26.12.15

Allowed for data collection

9/26/15
Md. Obaidul Haque
Associate Professor & Head of the Department
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343