PREVALENCE OF SELF-REPORTED MUSCULOSKELETAL SYMPTOMS AND ASSOCIATED RISK FACTORS AMONG THE BANK WORKERS IN SOME SELECTED BANKS IN BANGLADESH

By

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Statement of Authorship

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ABSTRACT

Background: Work-related musculoskeletal symptoms are one of the most common causes of illness all over the world. Many scientific studies have recommended that the bank workers who use computers are at increased risk of developing musculoskeletal symptoms. However, there is no study about the prevalence of musculoskeletal symptoms and associated risk factors among the bank workers in Bangladesh.

Aim: To estimate the 12-month prevalence of self-reported musculoskeletal symptoms and associated risk factors among the bank workers in some selected banks in Bangladesh.

Method: There were 106 bank workers participating in this study. The Dutch Musculoskeletal Questionnaire was used for identifying the one year prevalence of self-reported musculoskeletal symptoms and associated risk factors.

Result: In this study it was found that in the last 12 months the prevalence of musculoskeletal symptoms in nine body regions were neck 58.4%, upper back 30.2%, lower back 60.4%, shoulders 56.6%, elbows 6.6%, wrist 17.9%, hip 3.8%, knee 16% and ankle 5.7%.

Conclusion: Bangladesh is a developing country. The prevalence of musculoskeletal symptoms are very high among bank workers here in comparison with a developed country. Lack of awareness, lack of ergonomic practices, lack of research and government funding are the factors which mostly contribute to the increase in the prevalence of musculoskeletal symptoms. This study can be helpful to solve these problems.

Key words: Musculoskeletal symptoms, Risk factors, Ergonomics, Bank workers.

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List of Abbreviations

BHPI: Bangladesh Health Professions Institute

CRP: Centre for the Rehabilitation of the Paralysed

DMQ: Dutch Musculoskeletal Questionnaire

MSD: Musculoskeletal Disorder

MSS: Musculoskeletal Symptom

WRMSD: Work Related Musculoskeletal Disorder

VDU: Video Display Unit

VDT: Video Display Terminal

CHAPTER 1
INTRODUCTION

Work-related musculoskeletal disorders are the most deleterious inflammatory and degenerative conditions that affect the joints, soft tissues, peripheral nerves and supporting blood vessels. Musculoskeletal injuries resulting from a work-related event is called work-related musculoskeletal disorder (Akrouf et al. 2010; Maduagwu et al. 2014). It can cause consequent pain and disability in the functions of neck, shoulders, elbow, arms, wrists and hands (Abledu and Abledu, 2012; Sadeghian, Raei and Amiri, 2012). These disorders occur when there is a mismatch between the physical requirements of the job and the physical capacity of the human body (Korhan, 2010). It affects all persons regardless of age and sex (Abledu and Abledu, 2012) especially those who do repetitive movement or forceful activity in poor or awkward working posture for long periods of time (Maduagwu et al. 2014; Tella, Akadu and Fasuba, 2013). Tenderness, aches and pains, tingling, swelling, stiffness, muscle spasms etc. are some signs of musculoskeletal disorders (Janwantanakul et al. 2008). These symptoms may arise in all body parts and the shoulders, arms, elbows, wrists, hands, backs, legs and feet are the most affected areas (Facts, 2000).

In the twenty-first century, computers have become almost as ubiquitous as the humble pen and paper in many people's daily life (Talwar et al. 2009; Eltayeb et al. 2007; Gerr et al. 2002). It has become one of the most important and useful visual displays that are used in almost all offices and workplaces (Aydenz, 2008; Giahi et al. 2013). For keeping pace with the modern life, different sectors including banks, government offices, private institutes etc have computerized data system for easier and faster flow of information (Akrouf et al. 2010; Giahi et al. 2013). Bank working is one of the major occupations with potential musculoskeletal hazard (Giahi et al. 2013). In banks, workers use computer or other visual display units for data collection, processing and programming. Their job requires frequent movement of arms, hands and fingers with inadequate resting time (Maduagwu et al. 2014). Such kind of work patterns of the bank workers predispose them in musculoskeletal problems, eye strain and overuse injuries of hand and wrists (Abledu and Abledu, 2012; Eltayeb et al. 2009; Guo et al. 2004).

Although many studies have dealt all over the about musculoskeletal disorders among computer users, only a few of these focused on banking sector (Maduagwu et al. 2014). In Bangladesh, there were no study about the prevalence of self-reported musculoskeletal symptoms and associated risk factors among the bank workers. So,

this will be the first study and it will formulate to fill the gap of knowledge in this area.

1.1. Background

Musculoskeletal disorders have become the most familiar and significant causes of illness and work absence all over the world especially in the European Union (Facts, 2000). Almost 1.1 million people in the United Kingdom suffer from musculoskeletal disorders, and 11.6 million working days are lost (Akrouf et al. 2010; Facts, 2000). About 1.7% of the Gross National Product in the Netherlands is lost and approximately 93% of the cost of this caused by absenteeism (Abledu and Abledu, 2012). In 1990 around 41.2 million adults in the United States became disabled due to musculoskeletal disorders (Akrouf et al. 2010). Millions of workers are at risk of musculoskeletal disorders as they perform computer based activity by using monitor, keyboard or mouse repeatedly in prolonged sitting or awkward posture without having adequate resting time (Lacerda et al. 2005; Waersted et al. 2010).

A cross-sectional study was conducted in Kuwait among 750 bank office workers where 80% suffered from musculoskeletal symptoms. The most affected body parts were the neck 53.5%, lower back 51.1%, shoulders 49.2% and upper back 38.4% (Akrouf et al. 2010).

In a cross-sectional survey of bank employees in Saudi Arabia, it was found that the prevalence of neck pain 71.1%, wrist pain 50.0%, shoulder pain 63.2% and low back pain 78.1% (Abul-Qasim et al. 2014).

In a Iranian study of bank workers reported that the most prevalence of musculoskeletal symptoms were in the neck 37.4%, low back 36.6%, elbows 8.3% and thighs 12.3% (Giahi et al. 2013).

A study was held in Kenya among bank workers where the prevalence rates of discomforts were neck 55.6%, shoulder 49.5%, upper back 45.8%, hands/wrists 27.1% and elbows 16.8% (Samuel, Mailutha and Mukundi, 2014).

In a study in Ghana among 230 bank workers, reported that 83.5% of the workers suffered at least one musculoskeletal symptom resulting in 15.7% disability rate and the most commonly reported symptoms were lower back pain 64.8%, upper back pain 61.7%, neck pain 47.4% and shoulder pain 37.4% (Abledul and Abledu, 2012).

A cross sectional study was conducted with 395 bank workers in Brazil about the prevalence and associations of symptoms of upper extremities repetitive strain

injuries, and 'RSI-like conditions and the result was a prevalence rate of 56% for symptoms of the upper limbs and 30% for 'RSI-like conditions (Lacerda et al. 2005).

In a Nigerian study among 178 bank workers on the prevalence of musculoskeletal symptoms reported that the most affected body parts were the neck 66.8%, shoulder 60.1%, hand 32.6%, upper arm 32% and elbow 22.5% (Tella, Akodu and Fasuba, 2013).

1.2.   Significance

Bank working has become one of the major professions with potential musculoskeletal disorder's hazard (Giahi et al. 2013). Now a days, musculoskeletal symptoms are a common complaint of office workers especially bank workers. To keep pace with the modern world, most of the bank workers need to use computers or other visual display units for performing their job. The workers are frequently exposed to do repetitive movement by using their wrist and hands in awkward postures without sufficient breaks. Such kind of working condition may put them at risk of developing musculoskeletal disorders. There is not a single study in Bangladesh about the prevalence of musculoskeletal symptoms and associated risk factors among bank workers. A study of this topic will be helpful to establish ergonomic guidelines for the computer based bank workers. The impact of Occupational Therapy can be shown in this sector if the study is successful, because we know that Ergonomics is a part of Occupational Therapy. After finishing the study, the investigator will achieve a result & this result will be used as a basis to conduct further study.

1.3.   Aim

To estimate the 12-months prevalence of self-reported musculoskeletal symptoms and associated risk factors among the bank workers in some selected banks in Bangladesh.

1.4.   Objectives

> To identify the prevalence of musculoskeletal symptoms in different body regions of bank workers, over the last 7 days, and over the previous 12 months
> To find out the most affected body parts
> To find out the associated physical risk factors of musculoskeletal symptoms among bank workers in Bangladesh

- To identify the association between risk factors and musculoskeletal symptoms

2.1. Musculoskeletal disorder

Musculoskeletal disorders are a term that refers to soft tissue injuries that occur gradually over time and can affect muscles, tendons, ligaments, joints and nerves. These injuries can develop when the same muscles are used over long periods without adequate rest (Lowa State University, 2013).

Musculoskeletal disorders consist of minor physical disabilities. This term is used to describe a variety of conditions that affect the muscles, bones, and (Lowa State University, 2013; Canadian Centre for Occupational Health & Safety, 2014).

2.2. Work related Musculoskeletal Disorders

Work-related musculoskeletal disorders are a group of painful disorders of muscles, tendons, and nerves (Canadian Centre for Occupational Health & Safety, 2014). Work-related musculoskeletal disorders are impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves, bones and the localized blood circulation system, that are caused or aggravated primarily by work and by the effects of the immediate environment in which work is carried out (Facts, 2000).

According to world health organization, work related musculoskeletal disorders arise when exposed to work activity and work condition that significantly contribute to their development or exacerbation but not acting as the side determinant of causation (Facts, 2000). Common musculoskeletal disorders are Carpal Tunnel Syndrome, Muscle/Tendon strain, Ligament Sprain, Tendonitis, Thoracic Outlet Compression, Tension Neck Syndrome, Rotator Cuff Tendonitis, Epicondylitis, Radial Tunnel Syndrome, Digital Neuritis, Trigger Finger/Thumb, De-Quervain's Syndrome, Mechanical Back Syndrome, Degenerative Disc Disease, Ruptured / Herniated Disc, repetitive motion injury, repetitive stress injury, overuse injury (Canadian Centre for Occupational Health & Safety, 2014; National Institute of Neurological Disorders and Stroke, 2013; Middles worth, 2014).

Musculoskeletal disorders can affect all major areas of the body, including the neck, shoulders, wrists, back, hips, legs, knees and feet (Sanders, 2004; Canadian Centre for Occupational Health & Safety, 2014)

2.3. Burden of musculoskeletal disorders

A cross sectional study was done in China among 720 office workers who use computers as a main working tool. They used Dutch Musculoskeletal Questionnaire as data collection tool. The result showed that the 12 month prevalence of musculoskeletal disorders of neck, shoulder, wrist/hand, upper back and lower back among participants were 55.5, 50.7, 31.5, 26.2 and 6.6% respectively (Shanshan et al. 2012).

A study was done in Netherlands among 264 computer office workers. They used Maastricht Upper extremity Questionnaire as data collection tools. The two years follow-up prevalence rates with 95% confidence interval for neck, shoulder and hands were 31%, 33% and 21% (Eltayeb et al. 2009).

In Iraq, a cross sectional study was done among 120 office workers who use VDT for their job. The 12 month prevalence of musculoskeletal complaints were neck 30%, back 28.3%, shoulder 18.3%, wrist 8.3%, forearm 6.6%, elbow 5.8% and fingers 2.5% (Alazawi, 2012).

A study was done in Malaysia among 630 computer based office workers. The findings of the study showed that the height prevalence rate of musculoskeletal complaints were in shoulder 51.4%, followed by neck 49.4% and back 38.9% (Mahmud et al. 2014).

In India a study was done among 723 computer users aged between 21 to 30 years and they found that the prevalence of self-reported work related musculoskeletal disorders of wrist and hand was 58% (Srilata et al. 2011)

2.4. Types of MSDs

Work related musculoskeletal disorders are of 3 types. They are

1. **Muscle injury**

When muscles contracts for a long time it reduces blood flow. Gradually they produce different chemical substances which are accumulated in muscles. This accumulation of substance causes muscle irritation and pain (Canadian Centre for Occupational Health & Safety, 2014; Middles worth, 2014).

2. **Tendon injury.**

Tendon disorders related to repetitive or frequent work activities and awkward postures occur in two major categories. They are tendons with sheaths and tendons without sheaths. Tendons with sheaths found mainly in the hand and wrist and tendon without sheaths generally found around the shoulder, elbow, and forearm (Canadian Centre for Occupational Health & Safety, 2014).

3. **Nerve injury**

Nerves carry signals from the brain to control activities of muscles. They also carry information about temperature, pain and touch from the body to the brain. The tissues surrounding nerves become swollen, and squeeze or compress nerves due to repetitive motions and awkward postures (Canadian Centre for Occupational Health & Safety, 2014).

2.5. Sign symptoms of work related musculoskeletal disorders

It is important to report signs and symptoms as early as possible to prevent serious injury or permanent damage. Users at risk for MSDs associated with computer use may experience some of the following signs or symptoms:

- Numbness or a burning sensation in the hand
- Reduced grip strength in the hand
- Swelling or stiffness in the joints
- Pain in wrists, forearms, elbows, neck, or back
- Reduced range of motion in the shoulder, neck, or back
- Dry, itchy, or sore eyes
- Blurred or double vision
- Aching or tingling
- Cramping
- Weakness (Canadian Centre for Occupational Health & Safety, 2014).

2.6. Duration to develop musculoskeletal disorder

Work-related musculoskeletal disorders may progress in the following stages-

Early stage: In this stage aching and tiredness of the affected limb occur during the work shift. But it disappears at night and during days off work but no difficulties in the of work performance are felt (Canadian Centre for Occupational Health & Safety, 2014).

Intermediate stage: Aching and tiredness occur early in the work shift and persist at night. It decreased the capacity for repetitive work (Canadian Centre for Occupational Health & Safety, 2014).

Late stage: Aching, fatigue, and weakness persist at rest inability to sleep and to perform light duties (Canadian Centre for Occupational Health & Safety, 2014).

Not everyone goes through these stages in the same way. In fact, it may be difficult to say exactly when one stage ends and the next begins. The first pain is a signal that the muscles and tendons should rest and recover. Otherwise, an injury can become longstanding, and sometimes, irreversible. The earlier people recognize symptoms, the quicker they should respond to them ((Lowa State University, 2013); Canadian Centre for Occupational Health & Safety, 2014).

2.7. Causes of work related musculoskeletal disorders

Develop gradually as a result of repeated trauma- excessive stretching of muscles and tendons can cause injuries that only last a short time (Canadian Centre for Occupational Health & Safety, 2014). But repeated episodes of stretching causing tissue inflammation can lead to long lasting injuries or work related musculoskeletal disorders (Canadian Centre for Occupational Health & Safety, 2014). When worker begin fatigue, it outruns their body's recovery system and develop a musculoskeletal imbalance (Middles worth, 2014). If fatigue help to outrun recovery and the musculoskeletal imbalance persists, it will cause to develop musculoskeletal disorder (Middles worth, 2014).

2.8. Risk factors of work related musculoskeletal disorders

According to the world health organization (WHO) there are 150 million computer users worldwide. For doing computer based activity a person needs to be more deskbound and required more mental attention than non-computerized service holders (johnstone et al. 2010)

Work related musculoskeletal disorders are associated with many factors many factors that are mentioned below-

- Improper working posture and movement
- Forceful exertion
- Repetitive work
- Imbalaced temperature
- Inadequate breaks

(Facts, 2000; Canadian Centre for Occupational Health & Safety, 2014; Sanders, 2004; Lowa State University, 2013)

2.8.1. Physical or biomechanical risk factors

According to the National institute for occupational safety and health, American conference of governmental industrial Hygienists and most researchers recognizes the following factors as physical risk factors like repetition, force, awkward posture, static posture, dynamic factors such as velocity of movement, mechanical compression, vibration and cool temperature etc. (Jacob, 2008). The risk of developing musculoskeletal symptoms depends on which risk factor is working along with some characteristics such as excessive intensity, long duration and extreme temperature (Sanders, 2004). When more than one risk factors work the risk of developing MSD increased at a vast amount (Sanders, 2004).

2.8.2 Forceful exertion

Force is the mechanical effort required to carry out a movement or to prevent movement. Force may be exerted against a work piece or tool, or against gravity, to stabilize body segments (Sanders, 2004). The force that a worker exerts on an object is a primary risk factor. Muscles and tendons can be overloaded when a strong (high) force is applied against the object load (Lowa State University, 2013).

The dynamic act of lifting a work piece and the static act holding that piece in position both require force, generated by muscles, transmitted through tendons and exerted by body segments on the work piece (Sanders, 2004) workers need force for

doing their activity and excessive force can cause muscle fiber damage (Middlesworth, 2014).

Performing job by doing forceful exertions of muscles will make them fatigue rapidly. The more force is applied, the more frequently the muscle will be fatigue or strained. Overuse of muscles through forceful exertions lead to strain or damage muscles, irritate tendons, joints and disks. The final result of excessive force leads to creat inflammation, fluid build-up, and constriction of blood vessels and nerves in the area (Lowa State University, 2013). Disorders of nervous system such as carpal tunnel syndrome and other nerve entrapment disorders can occur through increased compression on nerves (Lowa State University, 2013).

More force equals more muscular effort, and consequently, a longer time is needed to recover between tasks. Since in repetitive work, as a rule, there is not sufficient time for recovery, the more forceful movements develop fatigue much faster (Canadian Centre for Occupational Health & Safety, 2014). A risk can also occur when a weaker (low) force is applied repeatedly (repetition) or continuously over a long period of time (Lowa State University, 2013). The combined effect of excessive force and repetitive movement has been suggested to be considerably more injurious than either factor alone. Studies have demonstrated that high repetition of negligible force applied to the same muscle group, joint or tendon causes inflammation of soft tissues (Jacobs, 2008)

Lifting and carrying are not the only task that requir high force but there are some jobs such as computer typing needs high force (Canadian Centre for Occupational Health & Safety, 2014). Different jobs that require employees to apply pinch forces with their fingers (picking up or placing small items on an assembly line with the fingers), static forces (applying a lot of physical effort to put the last turn on a screw, pulling hard on a 30-inch wrench to loosen a bolt), and dynamic forces (tossing objects into containers) (Lowa State University, 2013).

The musculoskeletal problems associated with repetitive work have become a concern to certain occupational groups such as computer users (Sanders, 2004). Keyboard operators exert peak forces in the range of 2 to 3 N, approximately three to nine times more than the force required to activate the key. The use of this amount of force means that keyboard keys are moved downward to their limit (Jacobs, 2008). Long duration of keyboard and mouse use may result in repetitive motion & high force

(Johnston et al. 2008). Office workers with greater frequent and severity exerted higher levels of key force while typing than those who reported fewer and less severe symptoms (Jacobs, 2008).

Although no one really knows when WMSDs will develop, workers performing forceful movements are at risk. Work involving forceful movements is very tiring again because there is not time for a full recovery between movements. Eventually it takes effort to perform the same task. When the work activity continues in spite of the developing fatigue, injuries occur (Canadian Centre for Occupational Health & Safety, 2014).

2.8.3. Repetition

Repetition refers to the performance of the same motions over and over with in a given period of time (Sanders, 2004). Repetition is reported as a risk factor in itself or as an exposure. A moderate level of repetition may be seen as proactive, since it can increase muscle strength and flexibility. It can also assist blood flow through muscles, thus relieving the stressful nature of static muscle contractions (Sanders, 2004)Studies have demonstrated that high repetition of negligible force applied to the same muscle group, joint or tendon causes inflammation of soft tissues (Jacobs, 2008)

Many jobs that involve repetition of the same job again and again are apparent even upon cursory observation: assembly line jobs where motions are repeated every few seconds, data processing jobs, directory assistant operators, court reporting, letter and package sorting (Lowa State University, 2013). Tasks requiring highly repetitive movements with the combination of force and fixed body position are extreme risk factors for work-related musculoskeletal disorders (Sanders, 2004; Canadian Centre for Occupational Health & Safety, 2014). It is difficult to judge movements as either it is high or low in repetation. If the cycle time of an activity is 30 seconds or less then it will be recognized as repetitive work (Middles worth, 2014; Canadian Centre for Occupational Health & Safety, 2014).

Evidence in the Health Effects section shows a strong association between the occurrence of MSDs and jobs involving exposure to repetitive motions. The joints are most susceptible to repetitive motion injuries, especially the wrists, fingers, shoulders, and elbows. Repetitive work that is done with the foot (operating foot activated controls) or knees (climbing ladders or using a carpet kicker) may also result in an MSD (Lowa State University, 2013).

Performing motions constantly without short pauses or breaks

Jobs that do not provide short pauses or breaks between motions or task cycles are often a problem because there may not be adequate time for muscles to recover from the effects of the exertion before the motion must be repeated (Lowa State University, 2013). If there are no pauses between motions or the pauses are too short, the muscles cannot recover to the rested condition. Thus, the effects of the forces on the muscles accumulate and the muscles become fatigued and strained (Lowa State University, 2013). The lack of adequate recovery time often occurs in jobs involving highly repetitive tasks. This happens when task cycle lengths are very short, which also means that the job involves a high number of cycle repetitions per minute (Dul and Weerdmeester, 1993). For example, some research shows that tendons and muscles in the wrists may not be able to recover where repeated task cycles are less than 5 seconds in length, that is, they are repeated more than 12 times per minute (Lowa State University, 2013; Dul and Weerdmeester, 1993).

Jobs involving constant muscle activity also may not provide adequate recovery time. These types of jobs may involve continuously holding hand tools (knife, paint brush, staple gun), which means that employees have constant exposure to static postures and low contraction forces (Sanders, 2004; Dul and Weerdmeester, 1993; Lowa State University, 2013).

The longer motions or job tasks are performed, the less likely that there will be adequate recovery time. Any part of the musculoskeletal system involved in moving the body is subject to injury where there is inadequate recovery time, and the recovery times needed vary by body part. For example, although employees may not be at high risk for forearm injury if task cycles are 25 seconds long or not repeated more than 3 times per minute, they may be at high risk of shoulder injury under this regimen (Lowa State University, 2013).

2.8.4. Posture

Posture is one of the most frequent risk factor for developing musculoskeletal disorders (Sanders, 2004; Dul and Weerdmeester, 1993). It is the position of the body including arms and legs while working. Bad or awkward postures mean that joints must be held beyond their comfortable, neutral position, and close to the extreme end of their maximum range of movement. Remaining in the same posture for too long is also inadvisable (Facts, 2000).

1. Awkward Posture

Awkward posture is the primary ergonomic risk factor to which employees are exposed when the height of working surfaces is not correct. Awkward postures involve working in a position that is deviated from neutral position (Lowa State University, 2013). It brings the body out of alignment and is less efficient and effective positon than neutral posture (Sanders, 2004). All joints move through a special range of motion. Postures in the middle of the range of motion are generally considered as neutral postures whereas postures at the end of the range can be considered as awkward posture (Sanders, 2004).

When performing any work by doing long reaching, it may significantly alter the positions of shoulders, elbows and backs from the neural position (Sanders, 2004; (Lowa State University, 2013). Bent shoulder, neck, wrist, raised arm, bent and twisted trunk are some examples of poor posture (Dul and Weerdmeester, 1993). This kind of awkward posture places excessive force on joints and overload the muscle and tendon around the joint which may lead to occur work-related musculoskeletal disorders (Middles worth, 2014).

In an awkward posture, muscles and tendons cannot work appropriately and thus they need much more force to complete tasks (Lowa State University, 2013). This additional force increase stress on muscles and tendons, increase pressure on nerves and blood vessels and reduce blood pressure to the affected area (Lowa State University, 2013; Dul and Weerdmeester, 1993).

2. Working surfaces are too high or too low

A work station that is too high or low will involve the workers to work in an awkward posture. In different offices or banks, most of the employees work in the surfaces that are not adjustable. Employees who have average height may be able to work comfortably but others having different height have to face many difficulties ((Lowa State University, 2013). Working surfaces that are too high usually affects the muscles of the upper limb specially muscles around the shoulder and elbow joint. On the other hand working surfaces that are too low usually affect the lower back and the neck (Lowa State University, 2013; Dul and Weerdmeester, 1993).

3. Maintaining same work positions or posture for a long period

Working for long time in the same position will make the workers feel "stiff, sore and tired (Lowa State University, 2013). Static postures are those postures that are held over a long period of time that resist the force of gravity or stabilize a work piece or body part (Sanders, 2004). It involves a prolonged state of contraction during which no movements is being performed. During static contractions, the internal pressure of muscle tissue compresses blood vessels and reduces blood flow to the muscle so that the oxygen and energy supply to the exertion and duration of forces (Sanders, 2004; Dul and Weerdmeester, 1993).

Working with computer in static posture has been identified as major occupational risk factor. Prolonged sitting requires the muscles to hold the trunk, neck and shoulders in a fixed position (Jacobs, 2008; Lowa State University, 2013). This squeezes the blood vessels in the muscles, reducing the blood supply. An insufficient blood supply accelerates fatigue and makes the muscles prone to injury (Jacobs, 2008).

4. Bending or twisting

Bending or twisting while manual handling creates an awkward posture and changes the way forces are distributed in the (Lowa State University, 2013). When the spine is in its natural position, forces are directed along the bony structure and distributed into the tissue as the spine curves. However, bending and twisting redirects the forces, placing more compressive and shear forces on the discs (Dul and Weerdmeester, 1993; (Lowa State University, 2013).

2.8.5. Individual risk Factors

1. Poor work practices

Workers using poor work practices, body mechanics and lifting techniques are highly in risk of developing musculoskeletal disorders (Middlesworth, 2014). Such inappropriate practices cause unnecessary stress, increases fatigue and decreases body's ability to properly recover (Middle worth, 2014).

2. Poor overall health habits

Smoking, drink excessive alcohol or other poor health habits put the workers at risk for developing musculoskeletal disorders (Middles worth, 2014; Facts, 2000).

3. Poor rest and recovery

There are many workers who need to many hours at streth and become fatigue. they donot get adequate rest time for the recovery of fatigue muccles which fall them in higher risk of occuring musculoskeletal disorders (Middles worth, 2014; Dul and Weerdmeester, 1993).

4. Poor nutrition, fitness and hydration

Workers who do not take care of their bodies, who are malnourished, dehydrated and poor level of physical fitness are putting themselves at a higher risk of developing musculoskeletal and chronic health problems (Middles worth, 2014; FACTS, 2000).

5. Age

Musculoskeletal impairments are among the most prevalent and symptomatic health problems of middle and old age. Another problem is that advancing age and increasing number of years on the job are usually highly correlated (Facts, 2000). Age is a true confounder with years of employment, so that these factors must be adjusted for when determining relationship to work. MSD problems are even more common among older workers (Silva et al. 2013; Das and Ghosh, 2010)

6. Gender

Some studies have found a higher prevalence of musculoskeleta symptoms in women than men (Silva et al. 2013; Facts, 2000). Women are exposed to repetitive biomechanical stresses on the upper limb more frequently than men. (Facts, 2000). In Taiwan female workers 39.5% had a significantly higher overall prevalence than male workers 35.2% (Gou et al. 2004).

7. Smoking

Several papers have presented evidence that a positive smoking history is associated with low back pain, sciatica, or intervertebral herniated disc whereas in others, the relationship was negative. One study found a relationship between smoking and back pain only in those occupations that required physical exertion (Middles worth, 2014; FACTS, 2000).

2.8.6. Environmental risk factors

The environmental risk factors refers to temperature, enough lighting, good work environment, type of ventilation (dry, cold, unwanted or fresh air), type of environment of work (noisy, too bright) inside the office, location of screen or screen reflects the office light etc.(Eltayeb et al. 2007).

A very essential environmental factor is Temperature. Workers become tired quickly in an office that is too warm. An increase in temperature may create excessive sweating, reduce efficiency in both physical and mental tasks, rise in heart rate and blood pressure, and reduce digestive organ activity (Sanders, 2004; Canadian Centre for Occupational Health & Safety, 2014). Performance of the workers is also depended on cold temperature. In a cold environment blood vessels contract and posture becomes stiff. Workers may feel restless and become easily distracted in an office that is too cold (Sanders, 2004). When there is significant change in temperature, workers become tired quickly which fall then in risk to injuries (Canadian Centre for Occupational Health & Safety, 2014).

Job design such as workloads & hours of work, overtime, duration of time spent using the keyboard and mouse, workplace design such as desktop & chair height, legroom, keyboard & mouse surface, monitor height etc. have significant association with musculoskeletal disorders if it have any miasmas with the appropriate dimensions (Jacobs, 2008; Dul and Weerdmeester, 1993).

2.9. Ergonomics

Ergonomics is the science of work. Ergonomics derives from two Greek words''ergon'' meaning work and "nomos'' meaning laws. Ergonomics is the scientific study of people at work and their workplace. The working definition of ergonomics used by occupational health practitioners is simple: it is the study of how to fit work to the workers more generally, in everyday practice (Sanders, 2004).

The science of studying people at work and then designing tasks, jobs, information, tools, equipment, facilities and the working environment so people can be safe and healthy, effective, productive and comfortable (Office Ergonomics, 2010).

Ergonomics has come to mean the design of tool and equipment in both working and nonworking settings, to reduce the risk factors for musculoskeletal disorder (Sanders, 2004). The goal of ergonomics is to reduce stress and eliminate injuries and disorders

associated with the overuse of muscles, bad posture, and repeated tasks. This is accomplished by designing tasks, work spaces, controls, displays, tools, lighting, and equipment to fit the employee's physical capabilities and limitations (Adams, 2015).

Computers and related products, such as computer desks and chairs, are frequently the focus of ergonomic design. A great number of people use these products for extended periods of time such as the typical work day. If these products are poorly designed or improperly adjusted for human use, the person using them may suffer unnecessary fatigue, stress, and even injury (Sanders, 2004; Office Ergonomics, 2010).

2.10. Bank workers especially at risk because:

Bank workers may have a higher risk at developing MSDs because:

- Their job often involves prolonged sitting and working in awkward postures.
- Much of their work is physically demanding, stressful and involves long working hours.
- A lot of seasonal workers are employed in this field that does not have time to adapt to the job.
- Most of them have to work repetitively in front of computers without having adequate rest and recovery time.
- Poor work place design and lack of knowledge about ergonomic intervention.
- A lot of young workers are employed, who are not work hardened and have not yet developed the skills required (Facts, 2000; Lowa State University, 2013).

3.1. Study design

The researcher used the quantitative research design because in this way investigator collected data objectively by using a large number of participants. A cross sectional survey design will be used to meet the aims of the study to collect data as an effect way. Cross-sectional study is a "snapshot" of the frequency and characteristics of a disease in a population at a particular point in time (EHIB, 2013; Levin, 2006). The aim of the study was to find out "the prevalence self-reported musculoskeletal symptoms and associated risk factors among the bank workers''. For this reason a quantitative research model in the form of a cross sectional design was used in this study as the investigator thought that it was more appropriate to find out the aim and objectives of this study in this short period of time (Bailey, 1997).

3.2. Study setting

The study was conducted from four selected banks in Dhaka. The participants were bank workers who use computer frequently for their job. There were 106 computer based bank workers responded to this study. There are a lot of Government and-non Government banks in Bangladesh.

3.3. Participant selection

The study participants were bank workers from four different Government and-non Government banks in Dhaka. Among them 106 participants were selected for this study that does computer based activity. Naturally bank workers need to work about 6-8 hours in a day. Sometimes they have to work more than 10 hours. So the workers who had at least one year working experience and usually work 8 hours or more were the study participants.

The formula of sample size determination was Z^2PQ/r^2, where z = constant value depends on CI (Confidence Interval), P = prevalence, Q = (1-P) and r = sampling errors. As there was no published research of musculoskeletal symptoms among bank workers in Bangladesh, the investigator used p = 50% prevalence If 95% confidence interval Z =1.96 (Confidence Intervals, no date), Q = (1-0.5) = 0.5, and r = 5%,

According to standard formula, sample size will be-

$Z^2PQ/r^2 =$ [(1.96)^2×0.5×0.5] ÷ (0.5)^2 = 384.16

For this study purpose, investigator collected data from 106 participants due to lack of time for data collection.

The study sample was selected in convenient way. Convenient sampling is a process in which a sample is draw from the subjects conveniently available (Bailey, 1997; Crossman, 2014). It is the quickest and easy type of sampling to collect data (Convenience sampling, 2014).

Firstly investigator chose the banks in a convenient way. The four banks were the National bank, Uttara bank, Islamic bank and krishi bank. The workers who were willingly responded to the study and fulfill the inclusion criteria were selected for data collection.

3.3.1. Inclusion criteria

Both male and female bank workers who were performing their job for at least one year and do computer based activity was included in this study. Both Government and non-Government bank workers were the participants.

3.3.2. Exclusion criteria

The participants who had recent surgery or accident, affected by osteoarthritis, rheumatoid arthritis, ankylosing spondilities or other arthritic conditions and also pregnant female bank workers and workers aged more than 60 years were excluded at the time of data collection.

3.4 Data collection instrument/tools

Consent form, information sheet, paper, pen, pencil, Dutch Musculoskeletal Questionnaire; tape for measuring height, weight machine for measuring weight

- **Information sheet and Consent form**

For conducting this study, it was important to inform the participant about this study and making sure if they were interested to give information or not. An Information sheet was included to make sense about study. A details information study such as identity of investigator, institute affiliation, study aim and objectives, study design, study duration, participants rights and responsibilities, potential risk, benefit and participant's confidentiality were included in this information sheet which was provided to participants to take informed consent.

A written consent form was also prepared for participants to verify the level of understanding of the information sheet, awareness about the potential benefits and risks as participant of the study. Participants were given permission by signing as volunteer participation.

- **The Dutch Musculoskeletal Questionnaire**

The Dutch Musculoskeletal Questionnaire is using world-wide to find the prevalence of musculoskeletal symptoms of different part of the body among different working population (Hildebrandt, 2004). The validity of the questionnaire was analyzed in different studies so The Dutch Musculoskeletal Questionnaire is called a valid questionnaire & global assessment for measuring prevalence and ergonomic risk factors. Investigator used standard version of the Dutch Musculoskeletal Questionnaire. The standard version of the Dutch Musculoskeletal Questionnaire comprised pages 1-9 (Hildedrandt, 2004). There were different parts of questionnaire. Part 1 had some general question, part 2 was defined as health-1in which health behavior (smoking, drinking tea or coffee), physical fitness, body weight & height are included. Part 3 was defined as health-2 in which were included the prevalence of musculoskeletal symptoms (pain, discomfort) partly or entirety on body parts (neck, shoulder, back, wrist, hip, knee, feet etc) at the point of 12 months and 7 days perspective. Part 4 was defined as work-1 in which list of tasks and levels of exertion were included. Others parts were defined as work-2, work-3, work-4 in which work characteristics were included. In this study, Investigator collected data by modified standard Dutch Musculoskeletal Questionnaire which was translated into Bangla.

3.5. Procedure of translation and field test of the questionnaire

This was the first step of translation in which two translators translated original Dutch Musculoskeletal Questionnaire set A and set B. They had enough knowledge about English but their primary language was Bangla and both of them were health professionals. The translators used conceptual equivalent of a word or phrase rather than word-for-word translation to convert original questionnaire. They strived to be simple, clear and concise in formulating a question and used most common word for the audiences which were easy to understand.

After receiving independent forward set A & set B translation, investigator combined the questionnaire to produce a conceptually equivalent translation named Bangla version DMQ-1 of the original questionnaire. Then a linguistic expert who was experienced in instrument development and translation reviewed and checked translation of the questionnaire. He identified, resolved and questioned some word or expressions and suggests alternatives.

Back translation is important to identify the appropriateness of translation. Using the same approach as that outlined in the first step the questionnaire would then be

translated back to English by an independent translator. Investigator sent the questionnaire to bilingual expert who did not have any access to the original English version of the both questionnaire to produce a backward translation into English.

After completing backward translation of questionnaire, it helped to find out discrepancies, mistakes, mistranslations, inaccuracies, and misunderstanding in the DMQ-1. Finally DMQ-1 was prepared for the field test in the study setting to conduct a comprehension test through face to face interview.

Three participants were participated in field test. Investigator took information and recorded it for checking how many times this questionnaire took and how participants responded to questionnaire. It helped to prove the validity of the questioner in this study. After the field test, the study was conducted by this questionnaire finally.

3.6 Data collection procedure

The study will be conducted in cross sectional design to find out the current situation. The Institutional Review Committee of the Bangladesh Health Professions Institute approved the study protocol. Different bank will be selected in convenient way for data collection. Those participants were taken who fulfilled the inclusion criteria. Investigator also took permission from the bank authority. The participants were informed about the aim of the study and they filled up consent form by signing willingly. They had right to skip from this study any time. Investigator used modified standard Dutch Musculoskeletal Questionnaire in Bangle for data collection. This questionnaire addressed bank worker's work and health. Most questions were simply answered by yes or no. participant could not consult with their colleagues. They only marked one answer and were chosen the answer that in opinion is best.

3.7. Ethical consideration

Investigator will be received approval of: proposal from the faculties of BHPI. To conduct the study, getting the permission from the regarding authority is the first step of ethical consideration. The participants of the study would be clearly informed about the aims and objectives of the study and subsequently necessary permission. The written consent will be taken from the participants of the study. Permission will be taken from the bank authority and the authority of Dutch Musculoskeletal Questionnaire (DMQ). Confidentiality will be maintained strictly about any personal information of the participants.

CHAPTER 4
DATA ANALYSIS & RESULT

4.1. Data analysis process

Statistical test was performed by using the Statistical Package for social science (SPSS) Inc. version 17. For doing data analysis, all Information was collected and gathered. First of all, every variables of the questionnaire was defined in the means of variables name, type, width, decimals, label, values, missing, and column, align and measure in variable view of SPSS spread sheet. Then it was ready to input raw data in the data view of spread sheet. After that the data of every participant were input in data view and it was checked for missing values.

The prevalence of musculoskeletal symptoms among bank workers in past 12 months was calculated by percentage through the first row of section B of Dutch musculoskeletal questionnaire (DMQ). The demographic data were calculated by frequencies of section A (general factor) of DMQ. The investigator used the raw data in SPSS to find out the percentage of socio-demographic factors, prevalence of musculoskeletal symptoms in nine body regions & associated physical risk factors.

For finding the percentage of socio-demographic factors & prevalence of musculoskeletal symptoms the investigator used frequencies in SPSS in nine body regions.

The chi-square test for making association is used to discover categorical variables to find out if there is any relationship between two categorical variables (chi-square test for association using SPSS statistics, 2013). Chi-square test (x2) was used to find out the statistic significant association between risk factors and musculoskeletal symptoms among bank workers. Chi-square test was conducted at with $p < .05$, to find out the association between the prevalence of musculoskeletal symptoms and risk factors.

4.2. Result

4.2.1. Characteristics of the study participants involved in banking profession

Selected demographic factors N= 106	Frequency (N)	Percentage (%)
Age		
21-40	70	66
41-60	36	34
Gender		
Male	69	65.1
Female	37	34.9
Educational status		
BA	8	7.5
BCOM	1	0.9
BSC	4	3.8
BSS	9	8.5
HSC	10	9.4
MA	40	37.7
MBA	22	20.8
M COM	4	3.8
MSC	5	4.7
MSS	3	2.8
Height		
5ft- 5ft 6"	83	78.3
5ft 7"- 6ft	23	21.7
Weight		
(41-50) kg	3	2.8
(51-60) kg	34	32.1
(61-70) kg	49	46.2
(71-80) kg	20	18.9
BMI		
<18.5	3	2.8
18.5-24.9	76	71.7
25-29.9	21	19.8
>30	6	5.7
Working experience		
1-5	26	24.5
6-10	45	42.5
11-15	18	17.0
16-20	11	10.4
>20	6	5.7
Working hour		
8	20	18.9
9	10	9.4
10	66	62.3
11	1	0.9
12	8	7.5
14	1	0.9

Health condition

good	31	29.2
not too bad	70	66.0
bad	5	4.7
Physical tiredness		
not tired	10	9.4
little tired	38	35.8
medium tired	43	40.6
very tired	15	14.2
Habit of smoking		
yes	32	30.2
sometimes	3	2.8
no	71	67

Table 1: Characteristics of the study participants involved in banking profession

N= number of banker, **%**= percentage of banker

The investigator has selected 106 participants for this study. In (table 1), it is showed that the characteristics of selected demographic factors (N=106) of the study participants are involved in banking profession. The investigator has categorized age in two different range and they are (21-40) and (41-60). In this study 66% participants are 21-40 and 34% of them are between 41-50 age ranges. Among them 65.1% are male and 34.9% were female.

The investigator also categorizes educational status of the bank workers where 7.5% passed BA, 0.9% passed BCom, 3.8% passed B.Sc, 8.5% BSS, 9.4 passed HSC, 37.7% passed MA, 20.8% passed MBA, 3.8% passed MCom, 4.7% MSC and 2.8% passed MSS. The investigator categorizes employers height in (5ft- 5ft 6"), (5ft 7"-6ft) and the percentage were 78.3% and 21.7%.

Their weights are categorized and the percentages are 2.8% of (41-50) kg, 32.1% of (51-60) kg, 46.2% of (61-70) kg and 18.9% of (71-80) kg range. The BMI are calculated where <18.5 means underweight, (18.5-24.9) means normal weight, (25-29.9) means overweight and >30 means obesity. Among them 2.8% participants are underweight, 71.7% are normal, 19.8% have overweight and 5.7% have obesity. The working experience of the bank workers are categorized in different range and they are (1-5), (6-10), (11-15), (16-20) and >20 years. In this study 24.5% participants are between 1-5, 42.5% of 5-10, 17% of 11-15, 10.4% of 16-20 and 5.7% of >20 years range. The study participants have different working hour. Among them 18.9% work

8 hours, 9.4% work 9 hours, 62.3% work 10 hours, 0.9% work 11 hours, 7.5% work 12 hours and 0.9% work 14 hours.

In generally the health status of study participant are good for 29.2%, not too bad for 66% and poor for 4.7%. The percentage of tiredness are, 9.4% for not tired, 35.8% for a bit tired and 40.6% moderate tired and 14.2% very tired. In this study, 30.2% participants smokes, 2.8% smoked in the past and 67% never smoked.

4.2.3 The prevalence of developing musculoskeletal symptoms at least 1 body regions at ever, 7 days and 12 months prior to data collection

Musculoskeletal symptoms at least 1 regoin
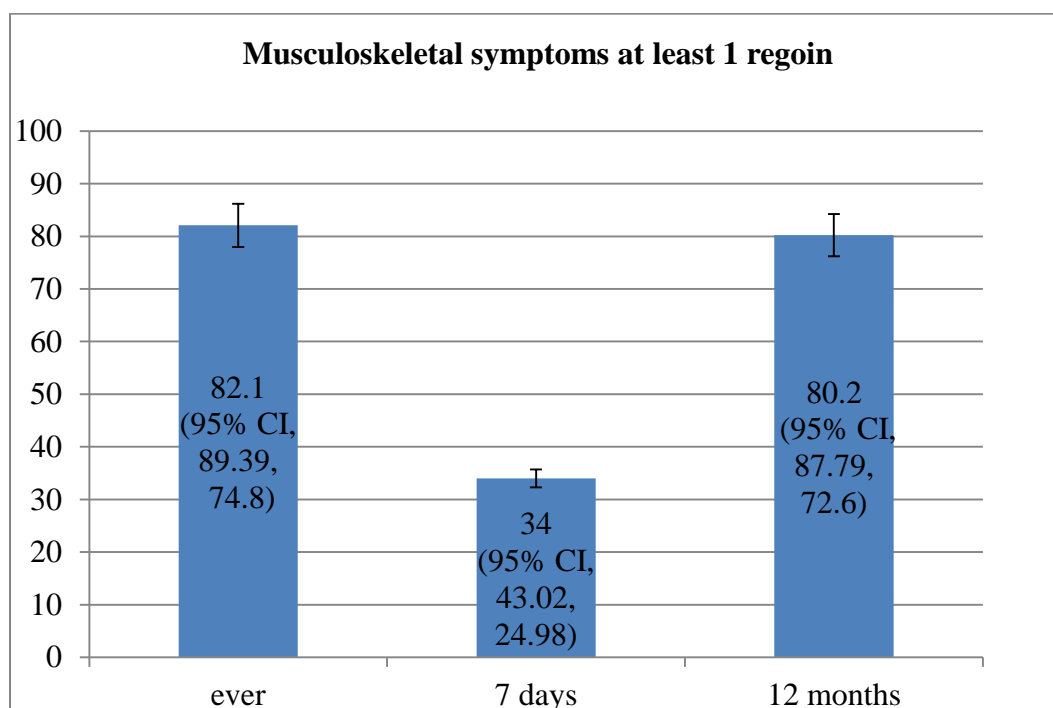
Figure-1: The prevalence of developing musculoskeletal symptoms at least 1 body regions at ever, 7 days and 12 months**.**

In this study, figure-1 is presented that study participant have been developing musculoskeletal symptoms at least 1 body regions at ever 82.1% (95% CI, 89.39, 74.8), during 7 days 34% (95% CI, 43.02, 24.98) and 80.2% (95% CI, 87.79, 72.6) in the past 12 months.
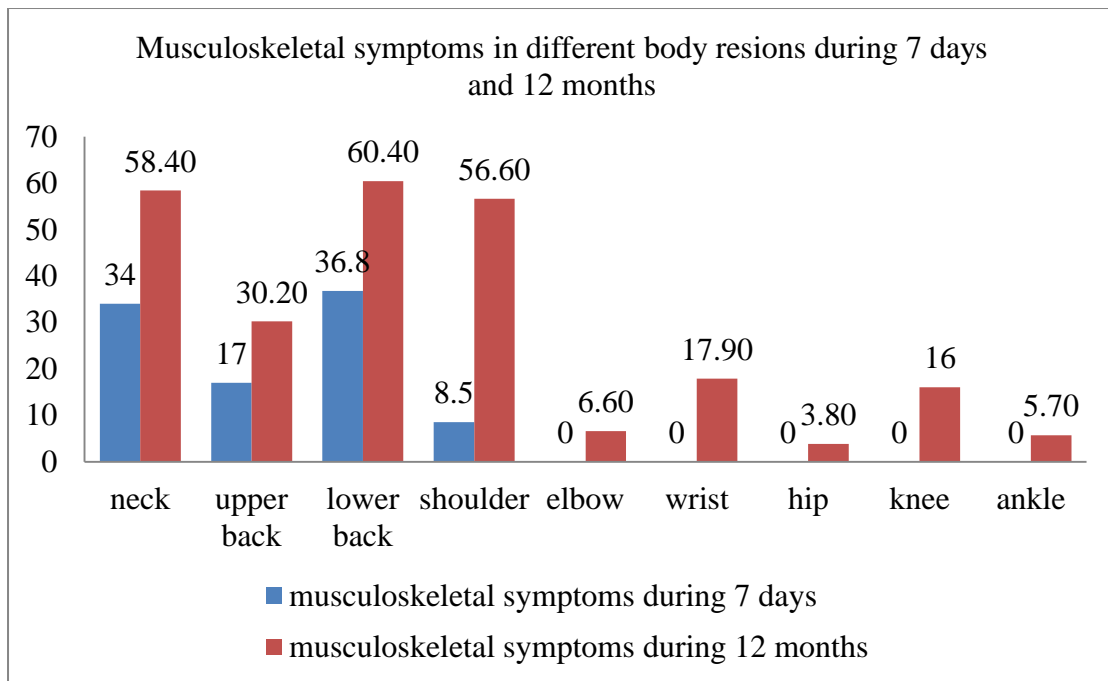
Figure 2: Prevalence of musculoskeletal symptoms in different body regions during 7 days and 12 months prior to data collection

Figure 2 is presented that the prevalence of musculoskeletal symptoms in nine body regions during 7 days preceding data collection. In this study, the investigator has found the prevalence of musculoskeletal symptoms in four body region during 7 days. They were neck 34.9% (95% CI, 43.97, 25.82), upper back 17% (95% CI, 24.15, 9.85), lower back 36.8% (95% CI, 45.98, 27.62) and shoulders 8.5% (95% CI, 13.81, 3.19).

In figure 2 it is found that the prevalence of musculoskeletal symptoms in nine body regions in the past preceding data collection. In this study, the investigator has found that musculoskeletal symptoms are in neck 58.4% (95% CI, 67.78, 49.02), upper back 30.2% (95% CI, 38.94, 21.46), lower back 60.4% (95% CI, 69.71, 51.09), shoulders 56.6% (95% CI, 66.04, 50.97), elbows 6.6% (95% CI, 11.33, 1.83), wrist 17.9% (95% CI, 25.19, 10.6), hip 3.8% (95% CI, 7.43, 0.16), knee 16% (95% CI, 22.98, 9.03) and ankle 5.7% (95% CI, 10.11, 1.29) in the last 12 months.

Reported general factor		Musculoskeletal symptoms in past 12 months		Chi-square value	P- value
		Yes (%)	No (%)		
Age	21-40	53 (75.7)	17 (24.3)	3.484	0.323
	41-60	32 (88.9)	4 (11.1)		
Gender	Male	51 (73.9)	18 (26.1)	4.901	0.027
	Female	34 (91.9)	3 (8.1)		
Educational status	BA	8 (100)	0	11.235	0.340
	BCom	1 (100)	0		
	B.Sc	2 (50)	2 (50)		
	BSS	8 (88.9)	1 (11.1)		
	HSC	9 (90)	1 (10)		
	MA	29 (72.5)	11 (27.5)		
	MBA	19 (86.4)	3 (13.6)		
	MCom	3 (75)	1 (25)		
	MSC	3 (60)	2 (40)		
	MSS	3 (100)	0		
Height (f)	5- 5.6	70 (84.3)	13 (15.7)	15.323	0.002
	5.7- 6	15 (65.2)	8 (34.8)		
Weight (kg)	41-50	3 (100)	0	6.914	0.075
	51-60	28 (82.4)	6 (17.6)		
	61-70	42 (85.7)	7 (14.3)		
	71-80	12 (60)	8 (40)		
BMI	<18.5	2 (66.7)	1 (33.3)	6.165	0.104
	18.5-24.9	65 (85.5)	11 (14.5)		
	25-29.9	15 (71.4)	6 (28.6)		
	>30	3(50)	3(50)		
Working experience (y)	1-5	16 (61.5)	10 (38.5)	9.073	0.059
	6-10	38 (84.4)	7 (15.6)		
	11-15	15 (83.3)	3 (16.7)		
	16-20	11 (100)	0		
	>20	5 (83.3)	1 (16.7)		
Working hour	8	18 (90)	2 (10)	6.601	0.252
	9	9 (90)	1 (10)		
	10	51 (77.3)	15 (22.7)		
	11	1 (100)	0		
	12	6 (75)	2 (25)		
	14	0	1 (100)		
Health condition	Good	18 (58.1)	13 (41.9)	13.793	0.001
	Not too bad	63 (90)	7 (10)		
	Bad	4 (80)	1 (20)		
Physically tired	Not tired	6 (60)	4 (40)	6.670	0.083
	A bit tired	29 (76.3)	9 (23.7)		
	Medium tired	35 (81.4)	8 (18.6)		
	Very tired	15 (100)	0		

Smoking	Yes, regularly	26 (81.3)	6 (18.8)	0.368	0.832
	Sometimes	2 (66.7)	1 (33.30		
	No	57 (80.3)	14 (19.7)		

Table 2: Association between socio-demographic factors and reported musculoskeletal symptoms in the past 12 months

4.2.5 Association between socio-demographic factors and reported musculoskeletal symptoms in the past 12 months at least 1 body region prior of data collection. (n=106)

The socio-demographic factors such as age, educational status, working hour and smoking did not have any significant association on the presence of in last musculoskeletal symptoms in the 12 months (table-2). In this study there is significant association between gender, height, working experience, health condition with musculoskeletal symptoms in last 12 months and p-value are gender (0.027) height (0.002), working experience (0.059), and health condition (0.001) (See table-2).

Reported physical risk factor	Musculoskeletal symptoms in past 12 months		Chi square value	P-value
	Yes	No		
Type of work	Yes	64 (80)	16 (20)	0.007	0.932
	No	21 (80.8)	5 (19.2)		
Break time	10	7 (77.8)	2 (22.2)	3.761	0.288
	15	49 (75.4)	16 (24.6)		
	20	21 (87.5)	3 (12.5)		
	30	8 (100)	0		
Break satisfaction	Yes	9 (90)	1 (10)	0.669	0.413
	No	76 (79.2)	20 (20.8)		
Sitting for long periods	Sometimes	3 (100)	0	2.162	0.339
	Often	43 (75.4)	14 (24.6)		
	Always	39 (84.8)	7 (15.2)		
VDU work for long periods	Sometimes	8 (88.9)	1 (11.1)	0.530	0.767
	Often	37 (80.4)	9 (19.6)		
	Always	40 (78.4)	11 (21.6)		
Extension of arms/hands	Sometimes	26 (83.9)	5 (16.1)	8.034	0.018
	Often	58 (81.7)	13 (18.3)		
	Always	1 (25)	3 (75)		
Working in uncomfortable Posture	Sometimes	30 (85.7)	5 (14.3)	1.209	0.546
	Often	44 (78.6)	12 (21.4)		
	Always	11 (73.3)	4 (26.7)		
Working in same postures for long periods	Sometimes	20 (87)	3 (13)	1.970	0.373
	Often	62 (79.5)	16 (20.5)		
	Always	3 (60)	2 (40)		
Doing repetitive tasks	Sometimes	5 (71.4)	2 (28.6)	1.583	0.453
	Often	75 (79.8)	19 (20.2)		
	Always	5 (100)	0		
Work slight bending	Yes	39 (83)	8 (17)	0.725	0.696
	No	45 (77.6)	13 (22.4)		
Work heavily bending	Yes	37 (78.7)	10 (21.3)	0.114	0.736
	No	48 (81.4)	11 (18.6)		
Work slight twisting	Yes	39 (88.6)	5 (11.4)	3.379	0.066
	No	46 (74.2)	16 (25.8)		
Work heavily twisting	Yes	26 (83.9)	5 (16.1)	0.374	0.541
	No	59 (78.7)	16 (21.3)		
Bent and twist simultaneously with trunk	Yes	30 (88.2)	4 (11.8)	2.040	0.153
	No	55 (76.4)	17 (23.6)		
Working slightly bent posture for long periods	Yes	43 (82.7)	9 (17.3)	0.403	0.526
	No	42 (77.8)	12 (22.2)		
In a heavily bent posture for long periods	Yes	36 (83.7)	7 (16.3)	0.568	0.451
	No	49 (77.8)	14 (22.2)		
In a slightly twisted posture for	Yes	39 (83)	8 (17)	0.414	0.520
	No	46 (78)	13 (22)		

long periods					
In a heavily	Yes	27 (90)	3 (10)	2.535	0.111
twisted posture for	No	58 (76.3)	18 (23.7)		
long period					
In a bent and	Yes	32 (84.2)	6 (15.8)	0.603	0.437
twisted posture for	No	53 (77.9)	15 (22.1)		
long periods					
Working wrist	Yes	37 (84.1)	7 (15.9)	0.721	0.396
bending	No	48 (77.4)	14 (22.6)		
Working wrist	Yes	20 (80)	5 (20)	0.001	0.978
twisting	No	65 (80.2)	16 (19.8)		
Working	Yes	61 (83.6)	12 (16.4)	1.679	0.195
arms/hands	No	24 (72.7)	9 (27.3)		
bending, twisting					
Working trunk	Yes	56 (83.6)	11 (16.4)	1.320	0.251
bending, twisting	No	29 (74.4)	10 (25.6)		
Working head	Yes	33 (80.5)	8 (19.5)	0.004	0.951
bending, twisting	No	52 (80)	13 (20)		

Table 3: Association between reported physical risk factors and musculoskeletal symptoms in the past 12 months

4.2.6 Association between reported physical risk factors and musculoskeletal symptoms in the past 12 months at least 1 body region prior to data collection. (n=106)

The physical factors such as type of work, break time, break satisfaction, sitting for long periods, computer work for long periods, extension of arms/hands, working in uncomfortable Postures, working in same postures for long periods, doing repetitive tasks, work slight or heavy bending, work heavy twisting, working bending and twisting together and working with the movement (bending and twisting) of arms/hands, wrist, trunk and head don't not have any significant association on the presence of last musculoskeletal symptoms 12 months (table-3).

In this study, there is a significant association between working in extension of arms/hands and working in slight twisting position trunk for long time and p-value; working in extension of arms/hands (.018) and working in slight twisting position trunk for long time (.068) (See table-3)

With the revolution in modern information technology, computers have become the most popular visual displays that are used in almost all working sectors. This special item is considered as a necessity and many sectors such as banks, Government offices, autonomous institutions etc. can't survive a day without the assistance of this electronic appliance (Giahi et al. 2013). The rapid use of mouse, keyboard, screen, poor work station and repetitive computer work in awkward posture are associated with developing musculoskeletal disorders (Akrouf et al. 2010).

The study aimed to find out the prevalence and associated risk factors of developing musculoskeletal symptoms among bank workers. To achieve such an aim cross-sectional study was carried out in four of the major banks in Bangladesh.

In this study, it presented that the study participants have been developing musculoskeletal symptoms in at least 1 body region at ever 82.1%, during 7 days 34% and 80.2% in the past 12 months. A study was done in Kuwait with 750 bank workers, their result showed that 57% of workers suffered from MSD in the previous week and 80% of them had at least 1 attack during the previous year (Akrouf et al. 2010). In another study in Nigeria, it was found that 57.52% suffered from WMSDs in at least one region of the body in the last 7 days and 71.68% of bankers reported MSD during the previous year (Maduagwu et al. 2014). The results of these two studies are very close with the present study of bank workers in Bangladesh.

One of the objectives of this study was to estimate the prevalence of MSS in the last 12 months among bank workers in Bangladesh. This study had found that the prevalence of musculoskeletal symptoms in nine body regions was, neck 58.4%, upper back 30.2%, lower back 60.4%, shoulders 56.6%, elbows 6.6%, wrist 17.9%, hip 3.8%, knee 16% and ankle 5.7%.

A study was done in Kuwait with 750 bank workers by using the Nordic musculoskeletal questionnaire and 12-item general health questionnaire (GHQ12). The most affected body parts were the neck 53.5%, lower back 51.1%, shoulders 49.2% and upper back 38.4% (Akrouf et al. 2010) which was close to the result of this present study.

In a cross-sectional survey of bank employees of both genders in Saudi Arabia, it was found that the prevalence of joint pain was neck pain 71.1%, wrist pain 50.0%,

shoulder pain 63.2% and low back pain 78.1%, with a significant difference between men and women (Abul-Qasim et al. 2014). This study is dissimilar to the present one.

In a study of bank workers in Iran, it reported that the most prevalence of musculoskeletal symptoms were in the neck 37.4%, low back 36.6%, elbows 8.3% and thighs 12.3% (Giahi etal. 2013).

A study was held in Kenya among bank workers where the prevalence rates of discomforts were neck 55.6%, shoulder 49.5%, upper back 45.8%, hands/wrists 27.1% and elbows 16.8% (Samuel, Mailutha and Mukundi, 2014).

A survey of musculoskeletal problems among visual display unit users was carried out in a bank of Hong Kong by using a self-administered questionnaire. The prevalence of complaints in various body parts were neck 31.4%, back 30.6%, shoulder 16.5%, hand and wrist 14.9% and arm 6.6%. Frequent users of VDU had significantly more musculoskeletal problems in the neck and shoulder regions than infrequent users (Yu and Wong, 1996).

A cross-sectional study among 230 bank workers in Kumasi, Ghana, most (83.5%) of the workers suffered at least one MSD resulting in 15.7% disability rate the 12-month period. The most common reported symptoms were lower back pain 64.8% upper back pain 61.7%, neck pain 47.4% and shoulder pain 37.4% (Abledu and Abledu, 2012). This prevalence rate is totally different from the study of Bangladesh. Through this study, we can see that the mostly affected body parts were neck 58.4%, lower back 60.4%, shoulders 56.6%.

The bankers in the age range of 41-50 years had the height prevalence of WRMSDs (90%) whereas 21-30 years had the lowest 66.66%. In a study with Nigerian bankers aged range of 20-29 years had the highest prevalence of WMSDs 87.12% while those in the oldest age group (40 years and above) had the least 37.50% (Maduagwu et al., 2014). Although the sample size was similar but the prevalence rate of musculoskeletal symptoms was totally different. In the present study it is published that the prevalence rate of musculoskeletal symptoms are increasing gradually from younger to older age group.

The total participants were 106 where 65.1% were male and 34.9% were female. Among them 73.9% male and 91.89% female complained musculoskeletal symptoms in at least one resign of the body in the last 12 months. In another study in Kuwait

showed that 74.2% of male and 84.8% of female complained musculoskeletal symptoms in the previous year (Akrouf et al. 2010). Both of these study showed that women are more likely to suffer from MSD than male (Akrouf et al. 2010; (Abledu and Abledu, 2012).

In many studies, it was reported that light computer users complain less musculoskeletal symptoms than heavy users (Yu and Wong, 1996). The current study showed that 62.3% participants work 10 hours and 7.5% work for 12 hours. Among them 90.56% bank workers do not satisfied at their break time as most of get 10-15 min break time which were not sufficient. Many investigators suggested that limiting the number of daily computer work to less than 4 hours will protect the body to occur musculoskeletal symptoms (Yu and Wong, 1996).

In this study, there is a significant association between working in extension of arms/hands and working in slight twisting position trunk for long time and p-value; working in extension of arms/hands (.018<0.05) the p-value of working in slight twisting position trunk for long time is (.068) which is nearly associated with reported musculoskeletal complains in different body resigns. The physical factors such as type of work, break time, break satisfaction, sitting for long periods, computer work for long periods, extension of arms/hands, working in uncomfortable Postures, working in same postures for long periods, doing repetitive tasks, work slight or heavy bending, work heavy twisting, working bending and twisting together and working with the movement (bending and twisting) of arms/hands, wrist, trunk and head did not have any significant association on the presence of last musculoskeletal symptoms 12 months.

In a study of bank workers in Hong Kong, it was found that frequent bending at work, fixed keyboard height and distance, fixed screen height, unfavourable and static posture for long time were the most contributing risk factor of having masculoskeletal symptoms (Yu and Wong, 1996).

In another study of bank workers in Nigeria, it identified that over work, insufficient rest time during whole working day, moving heavy objects, working in same position are the most prevalent risk factors (Maduagwu et al. 2014).

It is also reported that working in same posture and work demand are the most prevalent risk factors among their respondents (Maduagwu et al. 2014).

Individual musculoskeletal complaints were associated with various risk factors including personal attributes, working posture, repetitive movements and work station design. Back, neck and shoulder problems were more related to unfavorable working postures, while arm, hand and wrist problems were more affected by repetitive movements. Some risk factors for musculoskeletal problems were specifically related to the nature or design of VDU work. Modification of the workstation design and improvement in work organization should be able to reduce the prevalence of these disorders (Yu and Wong, 1996).

CHAPTER 6
LIMITATION & RECOMMENDATION

Limitations

- There are only one hundred and six participants in this study. So this research gives a snapshot of the problem but it cannot be generalized.
- The banks were selected by the convenient method & samples were chosen in only four areas of Dhaka, Bangladesh and also the sample size was small due to time constrain.
- Limited contextual study in Bangladesh

Recommendation

- Further study could be conducted in a larger number of sample groups as in this study it is clear that bank workers need ergonomic intervention to prevent musculoskeletal symptoms.
- This study only considered the prevalence of musculoskeletal symptoms and associated risk factors among bank workers. Further study could consider the physical risk factors, and psychological aspects.
- This may have an association between musculoskeletal symptoms and bank workers. In addition, further studies can include prevention strategies for musculoskeletal symptoms.

CHAPTER 7
CONCLUSION

In Bangladesh this is the first study to find out the prevalence of musculoskeletal symptoms and associated risk factors among the bank workers. The aim of the study was to discover the prevalence of musculoskeletal symptoms and associated risk factors among the bank workers in last 12 months. In addition this also to determines to find out association between socio-demographic factors and reported musculoskeletal symptoms in the past year.

This study found high prevalence of musculoskeletal symptoms in the nine body parts especially in the lower back, neck and the shoulders. The result of this study shows that there is a significant association of developing musculoskeletal symptoms between working in extension of arms/hands and working in slight twisting position of trunk for long time. In this modern age it is difficult to perform job without the assistance of computer in office settings. Musculoskeletal symptoms are very common among workers who use computer in the long period of time. If they become sick it will have a significant effect on their performance and production. Some small ergonomic changes, modifications and education can reduce the rate of developing MSS. Our government can include occupational therapist in this setting. As occupational therapist work with the employees as well as employers such as designing etc. So it can be comparatively more helpful to reduce MSS among bank workers.

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Appendix- 1

Date: 29.09.2014
Head of the Department,
Department of Occupational Therapy,
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343.
Subject: Prayer for seeking permission to conduct the research project.

Sir,

With due respect and humble submission to state that I am student of 4th year B.Sc in Occupational Therapy of Bangladesh Health Professions Institute, the academic institute of Centre for the Rehabilitation of the Paralysed (CRP). In 4th year, there has a requirement to conduct a research project. The title of my research is "Prevalence of musculoskeletal symptoms and associated risk factors among the Bank workers in some selected banks of Bangladesh". The aim of the study is "To identify Prevalence of musculoskeletal symptoms and associated risk factors among the Bank workers". I need seeking ethical permission to conduct my research project as a part of requirement to fulfill the degree of B.Sc in Occupational therapy.

So, I therefore hope that you would be kind enough to grant me the permission for conducting the research and will help to me complete a successful study as a part my course.

Sincerely,

Nazmus Sakib

Nazmus Sakib
4th year, B.Sc in Occupational Therapy,
Bangladesh Health Professions Institute,
Centre for the Rehabilitation of the Paralysed (CRP).

Approved by	Signature
Head of the Department Nazmun Nahar Assistant professor & Head of the department, Department of Occupational Therapy, Bangladesh Health Professions Institute, CRP, Savar, Dhaka.	As per supervisor's recommendation it may allow him to conduct this study.
Research supervisor Shamima Akter Lecturer in Occupational Therapy, Department of Occupational Therapy, Bangladesh Health Professions Institute, CRP, Savar, Dhaka.	Proposal can be approved for carryon. Good Luck 15.10.14

Appendix- 2

বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)
CRP-Chapain, Savar, Dhaka, Tel: 7745464-5, 7741404 , Fax: 7745069
BHPI-Mirpur Campus, Plot-A/5, Block-A, Section-14, Mirpur, Dhaka-1206. Tel: 8020178,8053662-3, Fax: 8053661

তারিখঃ ২৬.১১.২০১৪

প্রতি

ম্যানেজার

উত্তরা ব্যাংক লিঃ

সাভার, ঢাকা।

বিষয়ঃ রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র-সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন অকুপেশনাল থেরাপি কোর্স পরিচালনা করে আসছে।

উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্র নাজমুস সাকিব তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী।

তাই তাকে আপনার প্রতিষ্ঠান সফরে সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

২৬/১১/২০১৪
শেখ মনিরুজ্জামান
সহকারী অধ্যাপক ও বিভাগীয় প্রধান (ভারপ্রাপ্ত)
অকুপেশনাল থেরাপি বিভাগ
বিএইচপিআই।

Received

Mohammad Abdul Alim Miah
Senior Principal Officer & Manager
Uttara Bank Limited
Savar Branch, Dhaka.

বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)

BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)

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তারিখ ঃ ২৬.১১.২০১৪

প্রতি

ম্যানেজার

ন্যাশনাল ব্যাংক লিঃ

সাভার, ঢাকা।

বিষয় ঃ রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর প্রসঙ্গে।

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উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্র নাজমুস সাকিব তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী।

তাই তাকে আপনার প্রতিষ্ঠান সফরে সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

২৬/১১/২০১৪

শেখ মনিরুজ্জামান
সহকারী অধ্যাপক ও বিভাগীয় প্রধান (ভারপ্রাপ্ত)
অকুপেশনাল থেরাপি বিভাগ
বিএইচপিআই।

তারিখ ঃ ২৬.১১.২০১৪

প্রতি

ম্যানেজার

ইসলামী ব্যাংক বাংলাদেশ লিঃ

বাইপাইল, ঢাকা।

বিষয় ঃ রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পঙ্গাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র-সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেল্থ প্রফেশনস্ ইনস্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন অকুপেশনাল থেরাপি কোর্স পরিচালনা করে আসছে।

উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্র নাজমুস সাকিব তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী।

তাই তাকে আপনার প্রতিষ্ঠান সফরে সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

২৬/১১/২০১৪

শেখ মনিরুজ্জামান
সহকারী অধ্যাপক ও বিভাগীয় প্রধান (ভারপ্রাপ্ত)
অকুপেশনাল থেরাপি বিভাগ
বিএইচপিআই।

Received

০৪.১২.১৪

তারিখ ঃ ২৬.১১.২০১৪

প্রতি

ম্যানেজার

বাংলাদেশ কৃষি ব্যাংক

ধামরাই, ঢাকা।

বিষয় ঃ রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর প্রসঙ্গে।

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উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামুলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্র নাজমুস সাকিব তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী।

তাই তাকে আপনার প্রতিষ্ঠান সফরে সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

২৬/১১/২০১৪

শেখ মনিরুজ্জামান

সহকারী অধ্যাপক ও বিভাগীয় প্রধান (ভারপ্রাপ্ত)

অকুপেশনাল থেরাপি বিভাগ

বিএইচপিআই।

Information Sheet

The title of the study is-, "prevalence of self-reported musculoskeletal symptoms and associated risk factors among the bank workers in different banks in Bangladesh".

I am Nazmus Sakib student of 4th year, Department of Occupational Therapy, Bangladesh Health Professions Institute (BHPI), the academic institute of Centre for the Rehabilitation of the Paralyzed (CRP). As a part of my academic issues, I have to conduct a research in this academic year.

Information's of this study:

➢ The participants will be asked some question and data will be collected through interview and it will be completed within 12 minutes.

➢ Participation will be voluntary and it will never be beneficial or harmful to them.

➢ All the information collected from the interview that is used in the study will be kept in safety and confidentiality will be maintained strongly.

➢ Participant must have the right to refuse himself in taking part any time at any stage of the study. That's why he will not be bound to answer anybody.

➢ Participant can consult with the investigator and the investigator's supervisor about the research process or anything about research project.

Consent form

In this study I am _____ a participant and have been clearly informed about the purpose of the study. Here I read the information sheet and understand that it will not harmful for me. That's why I am willing participating in the study with giving consent.

Signature of the participant	Date:
Signature of the investigator	Date:

তথ্য পত্র

গবেষনার বিষয় হল - বাংলাদেশের ব্যাংক কর্মীদের পেশি ও অস্থি সম্বন্ধীয় সমস্যার হার নির্ধারণ এবং আনুষাঙ্গিক ঝুকি খুজে বের করা।আমি নাজমুছ সাকিব, চতুর্থ বর্ষে অধ্যায়নরত, অকুপেশনাল থেরাপি বিভাগ বাংলাদেশ হেল্থ প্রফেশনস ইনস্টিটিউট (সিআরপি শিক্ষা প্রতিষ্ঠান) এর একজন ছাত্র। প্রাতিষ্ঠানিক কাজের অংশ হিসেবে আমাকে এই বছরে একটি গবেষনামূলক কাজ কাজ করতে হবে। গবেষনার তথ্যসমূহ –

➢ অংশগ্রহনকারীকে কিছু প্রশ্ন করার মাধ্যমে তথ্য সংগ্রহ করা হবে এবং সাক্ষাৎকার ১২ মিনিটের মধ্যে শেষ হবে

➢ ঐচ্ছিকভাবে অংশগ্রহন করতে হবে এবং গবেষণাটি ফলে আপনাদের কোন ক্ষতি হবে না এবং কোন সুবিধা পাবেন না

➢ সাক্ষাৎকার থেকে সংগৃহীত সব তথ্য নিরাপত্তার মধ্যে রাখা হবে এবং গোপনীয়তা দৃঢ়ভাবে বজায় রাখা হবে

➢ অংশগ্রহনকারী গবেষনা থেকে যে কোন সময় নিজেকে প্রত্যাহার করার অধিকার রাখে এবং এক্ষেত্রে সে কারো কাছে জবাব দিতে বাধ্য নয়

➢ অংশগ্রহনকারী গবেষণা প্রক্রিয়া বা গবেষণা প্রকল্প সম্পর্কে যেকোনো বিষয়ে গবেষক ও গবেষক সুপারভাইজার সাথে পরামর্শ করতে পারবে

সম্মতি পত্র

এ গবেষনায় আমি _____
একজন অংশগ্রহনকারী এবং এ গবেষনার উদ্দেশ্য আমি পরিক্ষার ভাবে জানি। আমি তথ্য পত্রটি পড়েছি এবং বুঝতে পেরেছি যে এটা আমার জন্য ক্ষতিকর নয়। এই কারনে আমি সম্মতির সাথে জানাছি যে, আমি স্বেচ্ছায় এ গবেষনায় অংশগ্রহন করতে ইচ্ছুক।

অংশগ্রহনকারীর সাক্ষর	তারিখঃ
গবেষকের সাক্ষর	তারিখঃ

Participant Code no:

Research Questionnaire:

1. What is your age?	Years:
2. What is your gender?	Male 1 Female 2
3. What is your educational status?	
4. What is your height?	about cm
5. What is your weight?	about kg
6. How many years have you been working in this bank?	Years
7. How many hours do you work normally every day?	Hours per day
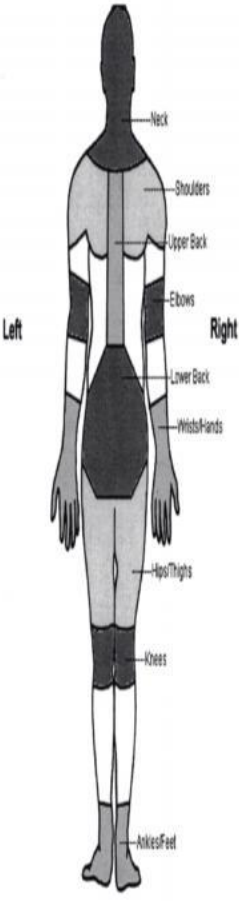
General questions:

Health (1)

1. How is your health status in general?	Good 1
	Not too bad 2
	Poor 3
2. How tired are you normally at the end of a working day physically?	Not tired 1
	A bit tired 2
	Rather tired 3
	Very tired 4
3. Do you smoke or did you smoke in past?	Yes I'm smoking nowadays 1
	Yes, I did smoke in the past 2
	No, I never smoke 3

Health (2)

1. Have you had during the past 7 day's trouble (pain, discomfort) from you?

Body part	Yes	No
neck		
upper back		
lower back		
Shoulders		
Elbows		
wrists/hands		
hips/thighs		
Knees		
ankles/feet		

Back View

1. Have you had in the past 12 month's trouble (pain, discomfort) from you?

Body part	Yes/ Sometimes	Yes/regularly	Yes/chronically	No/never
Neck				
upper back				
lower back				
left shoulder				
right shoulder				
left elbow				
right elbow				
left wrist/hand				
Right wrist/hand				
left hip/thigh				
Right hip/thigh				
left knee				
Right knee				
left ankle/feet				
Right ankle/feet				

Work (1)

1. Do you carry out the same work almost the whole day?   yes 1   no 2
2. How many breaks do you have during a normal working day?
   breaks per day
3. How many minutes resting time do you have normally?
   minutes per day
4. Are your normal breaks sufficient?
5. Which kind of work do you perform in your job?

Work pattern	Seldom or never	sometimes	Often	almost/always
Sitting for long period				
VDU work for long period				
Jobs which require extension of arms/hands				
Working in uncomfortable Postures				
Working in same postures for long period				
doing repetitive tasks				

Work (2)

	yes	No
1. Do you in your work often have to bent		
Bent slightly with your trunk?		
Bent heavily with your trunk?		
Twist slightly with your trunk?		
Twist heavily with your trunk?		
Bent and twist simultaneously with your trunk?		
2. Do you in your work often have to work:		
-in a slightly bent posture for long period?		
-in a heavily bent posture for long period?		
-in a slightly twisted posture for long period?		
-in a heavily twisted posture for long period?		
-in a bent and twisted for long period?		
3. Do you in your work often have to:		
-bent your wrist or hold your wrist bent for long period?		
-twist your wrist or hold your wrist twisted for long period?		
4. Do you in your work often have to make:		

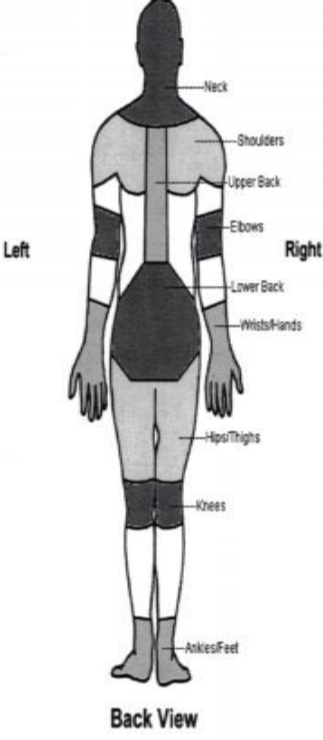|		
-the same movements with your arms, hands of fingers many times per minute?		
-the same movements (bending, twisting) with your trunk many times per minute?		
-the same movements (bending, twisting) with your head many times per minute?		

Appendix 4

অংশ গ্রহন কারীর কোড নম্বরঃ

সাধারণ প্রশ্ন

১। আপনার বয়স কত?	বছর
২। আপনার লিঙ্গ কি?	পুরুষ ১ মহিলা ২
৩। আপনার শিক্ষাগত যোগ্যতা কি?	
৪। আপনার উচ্চাতা কত ?	সে. মি.
৫। আপনার ওজন কত ?	কেজি
৬। কত বছর যাবৎ আপনি ব্যাংকে কাজটি করছেন?	বছর
৭। সাধারণত আপনি দিনে কত ঘন্টা কাজ করেন?	ঘন্টা

স্বাস্থ্য (১)

১। সর্বোপরি আপনার স্বাস্থ্যের অবস্থা কি?	ভাল	১
	এত খারাপ না	২
	খারাপ	৩
২। সারাদিনের কাজ শেষে আপনি শারীরিক ভাবে কতটুকু ক্লান্ত হন?	ক্লান্ত না	১
	সামান্য ক্লান্ত	২
	মোটামুটি ক্লান্ত	৩
	খুব ক্লান্ত	৪
৩। আপনি কি ধূমপান করেন অথবা আগে ধূমপান করতেন?	হ্যাঁ, আমি ধূমপান করি	১
	হ্যাঁ, আমি আগে ধূমপান করতাম	২
	না, আমি কখন ধূমপান করি নাই	৩

১। বিগত ৭ দিনে, কখন কি আপনি নিম্ন উল্লেখিত শরীরের অংশ সুমহে কোন ধরণের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করছেন।

শরীরের অঙ্গ	হ্যাঁ	না
ঘাড়		
পিঠের ওপরের অংশ		
পিঠের নিচের অংশ		
কাঁধ		
কনুই		
কজ্জি / হাত		
নিতম্বের সংযোগ বা উরু		
হাঁটু		
গোড়ালি বা পায়ের পাতা		

১। বিগত ১২ মাসে, কখন কি আপনি নিম্ন উল্লেখিত শরীরের অংশ সুমহে কোন ধরণের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করছেন।

শরীরের অঙ্গ	মাঝেমাঝে	নিয়মিত	দীর্ঘকাল ব্যাপী	কখনোই না
ঘাড়				
পিঠের ওপরের অংশ				
পিঠের নিচের অংশ				
বাম কাঁধ				
ডান কাঁধ				
বাম কনুই				

ডান কনুই				
বাম কজ্জি / হাত				
ডান কজ্জি / হাত				
বাম নিতম্বের সংযোগ বা উরু				
ডান নিতম্বের সংযোগ বা উরু				
বাম হাঁটু				
ডান হাঁটু				
বাম গোড়ালি বা পায়ের পাতা				
ডান গোড়ালি বা পায়ের পাতা				

কাজ- ১

১। সারাদিন কি আপনি একই ধরণের কাজ করেন? হ্যাঁ ১ না ২

২। স্বাভাবিক কাজের দিনে আপনি কতবার বিরতি পেয়ে থাকেন? দিনের বিরতি

৩। সাধারনত বিরতিতে আপনি কত মিনিট সময় পান? মিনিট

৪। এই বিরতি কি আপনার জন্য যতেষ্ট? হ্যাঁ ১ না ২

৫। চাকুরীতে আপনি কি কি ধরনের কাজ করেন?

কাজের ধরন	কদাচিৎ অথবা কখনই না	মাঝেমাঝে	প্রায়ই	সবসময়
অনেকক্ষন বসে থাকতে হয়				
অনেকক্ষণ ধরে কম্পিউটারে কাজ করতে হয়				
বাহু বা হাত প্রসারিত করে করতে হয় এমন কাজ				
স্বাচ্ছন্দ হীন অবস্থায় করা কাজ				
অনেকক্ষন একই অবস্থায় কাজ করতে হয়				
বারবার করতে হয় এমন কাজ				

কাজ - ২

১।কাজের ক্ষেত্রে আপনাকে প্রায়ই ঝুকতে হয়?	হ্যাঁ	না
কোমর একটু ঝুকে		
কোমর একটু বেশি ঝুকে		
কোমর একটু মোচড় দিয়ে		
কোমর একটু বেশি মোচড় দিয়ে		
একসাথে ঝুকে এবং মোচড় দিয়ে		
২।প্রায়ই কি আপনার নিন্মলিখিত ভাবে কাজ করতে হয়ঃ		
-অনেকক্ষণ ধরে কিছুটা ঝুকে?		
-অনেকক্ষণ ধরে অনেক বেশি ঝুকে?		
-অনেকক্ষণ কিছুটা মোচড় দিয়ে বসে?		
-অনেকক্ষণ বেশি মোচড় দিয়ে ধরে?		

-অনেকক্ষণ একসাথে ঝুকে এবং মোচড় দিয়ে?		
৩। প্রায়ই কি আপনার নিম্নলিখিত ভাবে কাজ করতে হয়ঃ		
-অনেকক্ষণ কজ্জি নত করে বা নত অবস্থায় স্থির রাখতে হয়?		
-অনেকক্ষণ কজ্জি মোচড় দিয়ে বা মোচড় অবস্থায় স্থির রাখতে হয়?		
৪।প্রায়ই কি আপনার নিম্নলিখিত ভাবে কাজ করতে হয়ঃ		
-প্রতি মিনিটে অনেকবার বাহু, হাতের আঙ্গুল একইভাবে নাড়াচাড়া করতে হয়?		
-প্রতি মিনিটে অনেকবার কোমর একইভাবে নাড়াচাড়া করতে হয় (ঝৌকে, মোচড় দিয়ে)		

Appendix- 5

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Dear Nazmus Sakib,
You have permission to use the DMQ for your study. Succes!

Kind regards,
Vincent Hildebrandt

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