“Self-reported musculoskeletal symptoms (MSS) and its physical and psychological risk factors of arm, neck and shoulder among computer office workers”

By

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This thesis is submitted in total fulfillment of the requirements for the subject RESEARCH and partial fulfillment of the requirements for the degree

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Statement of Authorship

Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part a thesis presented by me for any other degree or diploma or seminar.

No other person's work has been used without due acknowledgement in the main text of thesis.

This thesis has not been submitted for the award of any other degree of diploma in any other tertiary institution.

The ethical issues of the study has been strictly considered and protected. In case of dissemination of the findings of this project for future publication, it will be duly acknowledged undergraduates thesis.

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Dedication

My beloved parents
(Who supporting me since the beginning of my study)

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List of Abbreviations

ADL: Activities of daily living

BHPI: Bangladesh Health Professions Institute

CANS: Complaints of arm neck and shoulder

CTD: Cumulative trauma disorder

MUEQ: The Masstricht Upper Extremity Questionnaire

MSS: Musculoskeletal symptoms

MSD: Musculoskeletal disorder

NIOSH: National institute for occupational safety and health (NIOSH),

NMQ: Nordic Musculoskeletal questionnaire

VDT: Video display terminal

WRMDS: Work Related Musculoskeletal Disorders

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Abstract

Background: Many scientific literature and layout press have recommended that computer office workers are at increased risk of developing musculoskeletal disorder (MSD) or musculoskeletal symptoms (MSS). Early study often found that computer office workers performance decreasing day by due to MSS. In this study self-reported musculoskeletal symptoms and associated risk factors of arm, neck and shoulder was identified.

Method: There are 100 computer office workers participate in this study. The standardized Nordic musculoskeletal questionnaire and Maastricht Upper extremity questionnaire are used for identifying the one year prevalence of self-reported musculoskeletal symptoms and associated physical and psychological risk factors.

Result: The mean age was 40.61 ± 7.67 years, 81% were male and 19% were female. The 1 year prevalence of musculoskeletal symptoms was 91.1% and 47.5% reported causing disruption in activities of daily living (ADL). There was a strong association between ages with MSS. The participants have a good workstation but most of them have no height adjustable chair which may lead MSS. Most of the participants reported that they maintain good work posture but did repetitive work. In addition some other risk factors also identified such as work with extensive pressure, awkward posture, lack of taking short break for them.

Conclusion: The prevalence of MSS is very high among computer users in Bangladesh as a developing country in compare with another country of developed country. Lack of awareness, lack of ergonomics practices, lack of research and lack of government contribution were the most influencing factors to increase the prevalence of MSS. This problem can be effectively prevented through solving this problem.

Keyword: Computer office workers, Ergonomics, Risk factors, musculoskeletal symptoms.

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Chapter 1 Introduction

1.1. Background

In the past 30 years work-related musculoskeletal disorders (MSDs) have become a growing concern in industrialized countries (El-bestar, El-Mitwalli and Khashaba 2011, p.195). In the early seventies Complaints of arm neck shoulder and back were recognized as an important work disability (Bergquist et al. 2001). According to the National Institute for Occupational Safety and Health (NIOSH) (cited in Bjornerem, 2009) work related musculoskeletal disorders are the most widespread medical problem that affects 7% of population without back pain (Kothiyal & Bjornerem, 2009). The use of computer is increasing not only in developed country but also in developing country such as Bangladesh, Srilanka, Sudan etc. It is a consequence of rapid industrialization which has increased the complaints of arm, neck, shoulder (CANS) and back pain (Priyanga et al, 2011; Wahlstrom et al. 2005). CANS is defined as complaints of arm, neck and shoulder without any 'systemic disease' or 'acute trauma'. Complaints of arm, neck and shoulder and back are known as 'occupational cramps' or 'occupational myalgia' (Bergquest et al. 2001). This is a big issue which affects occupational performance.

Every year the overall medical expenditure due to complaints of arm, neck, shoulder related absenteeism is 45$ to 54$ in USA. Similarly 2.1 billion euro spend in Netherland (Eltayeb et al. 2008; Bongers et al. 2002). In a study of Srilanka prevalence of CANS is observed among 56.9% computer users. 22.7% of these have taken treatment from health professionals and 9.3% remain absent from work, with an additional 15.4% experiencing disruption normal activity due to complaints of arm, neck, shoulder (Ranasinghe et al. 2011).

In Bangladesh one study found the most common areas of pain experienced. These are eye (56%), neck (61%), hand/wrist (73%), lower back (63%) and knee (74%) among computer graphics designers. For typist most common pain positions are eye (60%), neck (62%), hand/wrist (71%), shoulder (85%), upper back (57%), lower back (87%) and foot (71%). Similarly for computer office users most common pain

positions are upper back (62%), lower back (30 %), hand/wrist (29%) and feet (32%) (Iqbal, Akhter and Azem, 2010).

Now-a-days computer has an essential role in our life including education, work and games. Though computer has a great contribution to make our life easiest it also has some disadvantages. Long duration of computer usage in incorrect posture causes fatigue of eyes, pain in shoulder, wrist and back (Iqbal, Akhter and Azem, 2010).
One study found that psychological and sleep related symptoms were associated with daily computer use. (Nakazawa et al. 2002).Many authors stated in their article that self-reported complaints of pain or ache are often seen among continuous computer users (Kothiyal & Bjornerem, 2009). Further research has shown evidence of using a computer mouse with wrist extension more than 20 degree can cause of carpal tunnel syndrome. Neck flexion of more than 20 degree is recognized as a risk factor for developing musculoskeletal disorder (Wahlstrom, 2005a).

Also some literature has shown a significant association of pain in neck and wrist where there are 30 hours of mouse use per week & 15 hours of typing per week (Waersted, 2010). Similarly mouse use $\geq$3 to 4 hours lead to fatigue of forearm muscle (Wahlstrom, 2005b). One community based case control study found significant influence between daily computer usage more than 4 hours per day and shoulder neck diagnosis (58% subjects are affected by the tension neck syndrome) among women (Waersted, 2010).

Literature stated that people with severe musculoskeletal disorder apply more force for keyboarding. A Swedish cross sectional study indicated that women complain of pain in various body parts over men (Wahlstrom, 2005a). Different cross sectional studies documented subjective pain and identified an influence of workstation design with neck and shoulder symptoms (Waersted, 2010).

Aspects of workstation design, data equipment & work technique (such as forearm support for neck symptoms, mouse position, and mouse design & neck flexion angle) have a significant influence on neck/shoulder symptoms. Some studies documented that there is an association between mechanical forces with psychosocial risk factors. Different studies investigated many risk factors which is associated with cumulative

trauma disorder such as repetitive motion, excessive force, maintaining awkward posture, constraint posture for long time, mechanical stress via direct pressure, extreme temperature for computer users. One prospective study found that non neutral position causes musculoskeletal disorder in different body parts (Waersted, 2010). Repetitive work is associated with increased risk of developing MSD (Wahlstrom, 2005b). Duration of computer usage per day, body weight and poor neck posture is considered as risk factors in Bangladesh (Iqbal, Akhter and Azem, 2010).

Working style, mechanical stress and psychological factors have a significant influence on MSD (Waersted, 2010). Psychological factors refers to high job demands, time pressure, low dicision latitude, mental stress, job dissatisfaction , high workload, lack of social support from the collegues & superiors. Several of the models recommended adverse psychosocial factors cause mental stress. This is assumed to increse the risk of musculoskeletal symptoms (Wahlstrom, 2005a).

1.2. Significance

Within the last two decades the number of people using computers has increased. Literature shows that computer users have risen from 30% in 1989 to 65% in 2001 (Wahlstrom, 2005b). Wahlstrom (2005a) also documented that the intensive use of computer in day to day activity brought many new and unexpected occupational problem. Different studies reported the intensity of computer use is increasing day by day and the intensity of musculoskeletal disorder or musculoskeletal symptoms are increasing in the same manner. Some author shows that continuous computer users have complaints of pain or ache (Bjornerem, 2009).

The evidence base surrounding this topic area is limited therefore suggesting there is a gap in the literature for a study such this. Ergonomics in the office environment is a prominent area in which occupational therapists work, this study may assist the therapist in running or setting up future programs. This study also focuses on the disruption in activities of daily living due to musculoskeletal symptoms. So, this will be helpful in future intervention strategy & further research.

1.3. Aim of the study

To identify the prevalence & associated physical & psychological risk factors of complaints of arm, neck, shoulder pain among office computer users in Bangladesh.

1.4. Objective of the study

- To determine the prevalence of musculoskeletal symptoms among computer users in last 12 months.
- To determine the association between socio-demographic factors & musculoskeletal symptoms.
- To know the disruptions in carrying out normal activities (eg: job, house work) due to musculoskeletal symptoms in different body parts.
- To determine most affected body region by MSS.
- To determine ergonomic physical & psychological risk factors.

Chapter 2 Literature review

2.1. Ergonomics

Ergonomics is derived from "ergon" & "nomos". "Ergon" means work &"nomos" means laws which represent the science of work. 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, p.494). 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 (MSD) (Sanders, 2004, p.494). 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 employees' physical capabilities and limitations (Centers for Disease Control and Prevention, 2004 cited in Sanders, 2004, p. 496).

Ergonomist apply ergonomics in a broad aspect such as organisational, environmental, social, cognitive, and physical and other relevant factors humans and other elements of a system, and the profession that applies theoretical principles, data and methods to design in order to optimize human wellbeing and overall system performance. Ergonomics studies have often examined the muscle load in healthy pain free subjects and assumed that higher levels of muscle activity during work represented higher risks for developing musculoskeletal discomfort (Szeto, Straker and O'Sullivan, 2005, p.271).

Implementation of a worksite ergonomics programs are known to be effective in reducing work related complaints in the workforce. Awareness programs are also known to be cost effective investment for employers, as it reduces the occurrences of symptoms, improve productivity & reduce medical expenses (Fagarasanu, 2006).

2.2. Musculoskeletal symptoms (MSS)

Musculoskeletal symptoms in different body parts can be defined as aches, pain, or discomfort (Devereux et al. 2002). Any feelings of muscle have been pulled, burn or twitched. Symptoms may vary from person to person. Musculoskeletal symptoms are the sign of the trauma that causes the musculoskeletal disorder. Injuries often start as minor aches and pains but can develop into disabling injuries that affect our activities of daily living such as laundry, hobbies and even the ability to pick up our children (Saravanan, 2011).

2.3. Risk factors for developing musculoskeletal symptoms (MSS) or musculoskeletal disorder (MSD)

According to the world health organization (WHO) there are 150 million computers used worldwide. For doing computerized job a person needs to be more deskbound and require more cognitive processing and mental attention than non-computerized or blue collar jobs (Johnston et al. 2010).

Risk factors for developing musculoskeletal symptoms or musculoskeletal disorder refers to any factors that are not directly caused by MSD or MSS. There are many risk factors for developing MSS or MSD.

The actual causes of developing MSD or MSS among computer users are unknown. But there are many risk factors that have been identified for developing MSS/ MSD for computer users. Different literatures define different types of risk factors for computer users. Mainly there are three types of risk factors- physical, psychosocial, environmental risk factors (Johnston et al. 2010). The following physical, psychosocial as well as organizational factors all affect the workers musculoskeletal health characterizes computer work (Sanders, 2004). Additionally there are some individual factors such as age, gender, smoking, strength, anthropometry, presence of systemic illness (Diabetes Mellitus, Rheumatoid Arthritis, kidney problem, high blood pressure, gout, Reynaud's phenomenon etc.) (European Agency for Safety and Health at work, 1993 and Bruce and Bernard 1997 cited in Sanders, 2004, p. 278).

Literature suggest that the following occupational risk may contribute to MSD: Shoulder load, static tension of the neck, shoulder and arm muscles, and highly repetitive contraction in the muscle, work at or above shoulder level, repetitive grasping, extreme deviations of the wrists and repetitive lifting loads (Sanders, 2004).

2.3.1. Physical or biomechanical risk factors

According to the National institute for occupational safety and health (NIOSH), American conference of governmental industrial Hygienists (ACGIH) and most researchers (cited in Jacob, 2008, p.221) 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. The risk of developing MSS depends on which risk factor is working along with some characteristics such as excessive intensity, long duration and extreme temperature.

When more than one risk factors work the risk of developing MSD increased at a vast amount (Sanders, 2004). Research suggests that the following occupational risks may contribute to MSD in case of computer users: shoulder load, static tension of the neck, shoulder, and arm muscle, highly repetitive contractions in shoulder muscles, work at or above shoulder level, repetitive grasping, repetitive lifting of loads and extreme deviations of the wrist (Lehman, Psihogios & Meulenbroek 2001; Croon et al. 2005).

2.3.2. Repetitive motion and force

Repetition refers to the performance of the same motions over and over within a given time period. Repetition is reported as a risk factor in itself or as an exposure. A moderate level of repetition may be seen as protective, since it can increase muscle strength and flexibility (this is the concept behind exercise). It can also assist blood flow through muscles, thus relieving the stressful nature of static muscle contractions (Sanders, 2004).

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. Force does not necessarily imply motion. 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. Excessive force can cause muscle fibre damage. Forceful muscle contraction also raises intramuscular pressure (IMP), which may compress nerves and blood vessels within the active muscle (Sanders, 2004). According to the NIOSH summary of upper-extremity MSD found evidence of a causal relationship between exposure to force and disorders of the neck and elbow, as well as carpal tunnel syndrome (CTS) and hand-wrist tendonitis (Bernard, 1997)

For any task performance overextended periods, the task usually involves the simultaneous presence of two or more risk factors that further increase the risk of developing MSS. The combined effect of excessive force and repetitive movement has been suggested to be considerably more injurious than either factor alone. The path physiology is not completely known. 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).

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).

2.3.3. Awkward posture

Awkward postures involve working in a position that is deviated from neutral. The rules of good body mechanics suggest that neutral body postures are most efficient and effective. Awkward postures bring the body out of alignment and are less efficient and effective. All joints move through a special range of motion. Postures in the middle of the range of motion are generally considered neutral postures. Postures at the end of the range can be considered awkward (Sanders, 2004). Prolonged awkward postures of the head, neck and upper extremities can contribute to complaints of pain, parathesias and numbness, having following three major

consequences. Awkward posture leads increasing pressure and tension on interrupted nerve. It also shortens muscle. Over time, muscles will adaptively shorten. When the shortened muscle is stretched, local discomfort can occur. A shortened muscle also compresses the nerve. Creating muscle imbalance that results in musculoskeletal misalignment. An anatomic, biomechanical and physiologic change in the muscles causes muscle weakness (Sanders, 2004).

Sauter and co-workers analysed self-reported data from several hundred computer users and found a number of posture related factors associated with the presence of musculoskeletal discomfort. Low and soft seat surfaces were associated with leg discomfort, and keyboards placed above elbow level were associated with arm discomfort as well as high levels of neck and shoulder girdle discomfort (Jacobs, 2008). Common awkward postures observed in the office environment involve the neck, back, shoulders, and wrists. For example back flexion is observed as the computer operator leans forward away from the back of the chair. Neck extension occurs when the monitor is too high and the operator must look up to the screen. Wrist extension occurs when the keyboard is too low and the wrist rests on the work surface or the edge of the keyboard. Wrist flexion occurs when the keyboard is too high. Ulnar deviation of the wrist in excess of 20 degrees has frequently been observed and has been associated with elevated pressure in the carpal tunnel (Waersted, Hanvold & Veiersted, 2010). When the keyboard is too far away, shoulder flexion allows the operator to reach the keys. Awkward postures include asymmetrical posture (Sanders, 2004). There are number of postures used by keyboard operators who suffered from serious upper extremity symptoms. These postures included the “alienated thumb” and the hyper extended fifth digit, both of which induce to access the keyboard at potentially injurious joint angels and muscle lengths. Faucet and Rempel (cited in Jacobs, 2008) showed that keyboard height was significantly related to severe pain and stiffness in the shoulders, neck and upper back in a group of 150 computer operators working in a news room. Research shows that significant increases in muscle activity levels and amount of perceived effort are related to the position of the arm and forearm during manipulation of the mouse and to users anthropometric characteristics. It is also seen that less than optimal placement of the mouse was associated with a prevalence of upper limb symptoms (Jacobs, 2008).

Several cross sectional studies recording subjective pain symptoms only have association between neck and shoulder symptoms with computer work (Etayeb et al. 2007)**.**

2.3.4. Static posture

Static postures are those postures held over a period of time that resist the force of gravity or stabilize a work piece or body part. Static posture requires isometric muscle force (exertion without accompanying movement) (Sanders, 2004). Static work can be particularly stressful to the musculoskeletal system. Static work 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 (Kromer & Grandjean, 2001; Sanders, 2004). Laboratory studies provide plausible hypotheses for the mechanism that may explain the mechanism through which chronic reduction of blood flow from static contractions may lead to MSDs. Reduced blood flow, disruption of the transportation of nutrients and oxygen can produce intramuscular oedema. The effect can be compounded in situations in which recovery time between static contractions is insufficient. Different epidemiology studies demonstrate an association between static contractions or prolonged static load and work-related MSDs (Sanders, 2004). Static posture those held over a period of time that resist the force of gravity or stabilize a work piece or body part.

Static posture associated with computer work has been identified as major occupational risk factor (Szeto, Straker and O'Sullivan 2005). Generally the literature discourages a static work posture (either standing or sitting) and states that changes in work posture are important in reducing fatigue (Lindegard et al. 2012). Prolonged sitting requires the muscles to hold the trunk, neck and shoulders in a fixed position. 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 (Szeto, Straker and O'Sullivan, 2005).

2.3.5 Prolong work without adequate breaks

Nowadays it has become a trend for people to work with computers for a prolonged time daily, due to an increase in computer based task at work as well as increased computer based leisure activity (Szeto, Straker and O'Sullivan, 2005). Prolonged sitting requires the muscles to hold the trunk, neck and shoulders in a fixed position.

Working at least 5.6 hours a week with a computer mouse increased the risk of musculoskeletal symptoms in the shoulder joint, upper arm, elbow, wrist and hand or fingers (Karlqvist et al. 1996). An increased risk for wrist/ hand and neck/shoulder discomfort among persons working with a computer ≥ 7 hours per day, as compared with working ≤ 3 hours (Sillanpss et al. 2003; Demure et al, 2000). Working with a computer mouse for more than 15-20 hours per week has increased risk of developing tension neck syndrome (Waersted, Hanvold & Veiersted, 2010). A community based case control study found a significant association between shoulder – neck diagnosis (58% of affected subjects had tension neck syndrome) and computer work ≥ 4 hours per day for women.

There is an association between tension neck syndrome and the subjects with limited rest break opportunity (Waersted, Hanvold & Veiersted, 2010). Using a computer for more than three hours a day is hazardous and more than eight hours is per day leads to the development of musculoskeletal discomfort or pain (Eltayeb et al. 2007).

2.3.6. Psychosocial risk factors

In case of computer users psychosocial risk factors play an important role for developing MSD or MSS. Psychosocial risk factors refers to job control (how to perform the job task, participation in decision taking with other, participants independence about changing his own task, the time & speed of job task, solution of work problems by himself, his creativity, learning new things, developing abilities & undertaking different task in his work), Social support (smoothness of the work flow, opportunity of ask or inquire his work, depending on other colleges for his work task, atmosphere of the work, finding support from colleagues & supervisor for any mistake & friendly relationship with supervisor & colleagues), mental stress, Break time etc. (Eltayeb, 2007).

Researchers found that more hours per day of computer use and less freedom on the job were significant risk factors for the development of MSDs. They postulates that greater psychological workload may contribute to musculoskeletal symptoms by increasing background muscle activity, muscle strain and fatigue, intolerance of physical discomfort and anxiety. Work stress, especially time pressure, may increase the speed and force of keying and may compound the effects of a workstation that is not ergonomically adjusted to fit the individual employee. In contrast, control over job decision may act to buffer the effects of a maladjusted workstation. Greater work stress raises general symptoms awareness and may make symptoms less tolerable. There is an association between musculoskeletal symptoms and the relationship with the supervisor. When the supervisory relationship is good, better workstation ergonomics is associated with less severe symptoms. When the supervisory relationship is not good, better workstation ergonomics is associated with more severe symptoms (Sanders, 2004).

2.3.7. 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, 2007).

Temperature is a very important environmental factor. Workers may feel lethargic or tire quickly in an office that is too warm. An increase in ambient temperature may produce the following physiologic effects, increased fatigue, with reduced efficiency in both physical and mental tasks, rise in heart rate and blood pressure, reduced digestive organ activity, slight increase in core temperature and sharp rise in temperature of the skin, increase sweating. 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).

Results of a study also indicated that workplace design (eg- desktop & chair height, legroom, keyboard & mouse surface, monitor height etc.), job design (eg- workloads & hours of work, overtime, duration of time spent using the keyboard and mouse,

hours of computer operation per day) (Jacobs, 2008) distance, position and ability to rest forearms on the desktop (Johnston, 2010).

2.4. Office worker

The term office worker means a salaried professional or an educated worker who perform semi-professional office (eg. Reading, writing, computing, accounting etc.) Sales coordination task, work is manual labor. Usually office workers work in a table chair. "White – collar" is an informal term, defined in contrast of "blue-collar work". Nowadays most of the office workers use computers in their office.

2.5. Office concept

Office concept may affect office workers health as well as office workers performance. Conventional and innovative office concept can be described according to three dimensions. Those three dimensions refer to the office location, the office lay-out and the office use.

Office location is a place at which the office worker carries out his or her activities. The office worker may work in the conventional office or he/she may work in the telework office. One study found that, compared to working in the conventional office, teleworking at home slowed down adrenaline recovery after work.

The office lay out refers to the arrangement of workplaces and type of boundaries in an office (Oldham et al, 1995). Two core features of the office lay-out are included in the conceptual model, namely the workplace openness and the distance between workstations (Croon et al. 2010). Several studies say that work related load of the neck in computer work is influenced by the computer workstation lay-out (including use of specific devices) and individual working technique (Waersted, Hanvold & Veiersted, 2010). There is strong evidence that working in open workplaces reduces the office workers psychological privacy and there is limited evidence that working in open workplaces intensifies cognitive workload and worsens interpersonal relations. Working in open workplaces reduces job satisfaction. Workplace openness and distance between work stations have an effect on performance and health of staff.

The office use refers to the manner in which workplaces are assigned to office workers. One single workplace may be assigned to one single office worker. Or one workplace may be assigned to a range of office workers, here after termed desk-sharing. Desk-sharing has a high prevalence of stress-related health complaints such as fatigue and musculoskeletal complaints among office worker. However some studies found that desk shearing improves communication (Croon et al. 2010).

2.6. Bangladesh

Bangladesh is one of the smallest countries in the world and it is also a South-Asian isolated country. Its total area is about 1, 47,570 sq. kilometer. Three sides of Bangladesh border with India and the South-East side is covered with Myanmar. Bay of Bengal is situated in the South side of Bangladesh. The total population in Bangladesh was last recorded at 151.6 million people in 2012 (Legislatures, 2013). The male ratio is 50.06% and female ratio is 49.94%.The literacy rate is 53% in Bangladesh in 2013 (World Development Indicators, 2013).The male literacy rate is 54.1% and female literacy rate is 49.4%. The National Unemployment Rate is 7.6% in Bangladesh, 2013. In Bangladesh Major religions are Muslim 89%, Hindu 10 % (BBS, 2012).

Chapter3 Methodology

3.1. Study design

The study design was cross sectional design. The focus of this study was to identifying the prevalence and associated risk factors. It was conducted at one time point to estimate the prevalence of the participants self-reported musculoskeletal symptoms identifying & associating risk factors also identified which is informative to planning. This study gave a snapshot of the prevalence & associated risk factors of self-reported musculoskeletal symptoms. Cross sectional study is about the prevalence & associated risk factors of musculoskeletal symptoms (MSS), (Levin, 2006). According to the following definition the study design was a cross sectional study under quantitative methods of research.

Cross sectional studies are *carried out at one time point or over a short period. They are usually conducted to estimate the prevalence of the outcome of interest for a given population, commonly for the purposes of public health planning. Data can also be collected on individual characteristics, including exposure to risk factors, alongside information about the outcome. In this way cross sectional studies provide a 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time.* (Levin, 2006)

3.2. Study setting

The study was conducted at the parliament building or the National parliament of secretariat. There were 100 computer office workers responds to this study. The parliament building complex is situated on land 215 acres of the present Shere Bangla Nagar which is formally inaugurated on 28 January 1982 by president justice Abdus Satter. The complex consists of the parliament building, hostel, for members of parliament, Residential block, Crecent lake, Gardens and Roads. The building has three components they are- The parliament building (constructed area 1 lakh 50 thousand square feet).Within this there are 9 blocks (parliament chamber block, west block, north- west block, north block, north-east block, east block, south- east block, south block, south-west block,). Secondly, the south

plaza. In here there is: a controlling gate, driveway, main mechanical room, car parking space, telephone exchange, office of the maintenance engineers of the public work department, godown for keeping machine, others facilities, open space, stairs & ramps having direct link with the parliament building.

Finally there is the presidential square which is constructed over 65 thousand square feet. The construction work of Bangladesh parliament building was completed in June 1984. In it there are offices for the honourable president, honourable speaker, leader of the houses deputy leader, deputy speaker, member of the cabinet, leader of the opposition, secretary and secretariat officials. Beside there are office rooms for the three political parties, commercial bank, post office, prayer room, telephone exchange, cafeteria, dining hall, parliament library & biman office. There are 24 lift operated inside the building. The whole building is centrally air conditioned. There are provision for holding sessions inside the chamber, simultaneous interpretation system and automatic vote counting.

Number of seats: 354 chambers for members of parliament, 56 VIP gallery, 41 officers, 80 journalist & 430 visitors in the parliament.

3.3. Study participants

Computer office workers of the National parliament of Secretariat in Bangladesh were the study participants. Out of the 125 potential samples 100 completed questionnaires were returned for a response rate of 80%.

3.4. Sample size determination

Researcher selected 100 participants for her study. There was no published research of musculoskeletal symptoms among computer office workers in Bangladesh. For this reason researcher used 50% prevalence & the sample size was 372.4 by the standard formula of sample size calculation where Confidence Interval is 95%.

The formula is $Z^2 PQ/r^2 = Z^2 P (1-P)/r^2 = (1.96)^2 \times 0.5 \times 0.5/ (.05)^2 = 372.4$ where Z= constant that differ on CI, P= prevalence, Q= (1-P), r = Sampling errors which is 5 %. Researcher had got only two months for data collection. It was a short period of time to conduct research with standard amount of participants. As

the researcher was an undergraduate student had two months to complete data collection it will be very difficult for her to use 372 participants. For this 100 participants were selected for this study.

3.5. Inclusion criteria

Participants included matched the following criteria-

- ✓ The office workers who performing their job with a variety of computer task (eg: administrative, graphical and data entry task etc.) for at least two hours per day.

3.6. Exclusion criteria

Participants would be excluded if they met any of the following criteria-

- ✓ Participants suffering from disease affecting the musculoskeletal system such as Rheumatoid Arthritis (RA), Osteoarthritis (OA) & other connective tissue disorders.
- ✓ Having any previous surgery of the upper musculoskeletal extremity.
- ✓ Having weakness and paralysis.
- ✓ Pregnant woman

3.7. Sampling procedure

Simple random sampling was done to obtain the sample population. All participants name was written in a box, 100 were then randomly selected to participate in this study.

3.8. Data collection procedure

The researcher agreed a date and time with the participant, according to his or her available time. At first the, researcher took appointments from the participants. Then researcher informed the participants about the contents of the consent form. Data as collected from those participants who gave consent. The researcher used two questionnaires for this research. The Nordic questionnaire & The Maastricht Upper Extremity Questionnaire (MUEQ) was given to the participants. The questionnaires were explained to the participants and a date agreed for returning the data. The researcher did follow-up as a reminder and for any problems the

participants may face during the completion of the questions. After taking the given questionnaire the researcher ensured them she could meet with them for any missing value. Finally the researcher thanked them & completed her data collection.

3.9. Data collection instrument

Consent form, Paper, Pen & Pencil, two standardized questionnaires used for this study. Two scales are-

3.9.1 The Standardized Nordic questionnaire

For identifying the prevalence of musculoskeletal symptoms a valid questionnaire named "Standardized Nordic questionnaire (SNQ)" was used. The Standardized Nordic questionnaire filled out by the participants. Nordic questionnaire asked for prevalence, weekly prevalence of disability. The questions of this questionnaire were close ended questions. Every question answered by using tick in the boxes. The first column of this questionnaire described that if participants had experienced any trouble (such as ache, pain, discomfort, numbness) in the last 12 months in different body region (in neck, shoulder, elbow, wrist/hand, upper back, lower back, hips/thighs/buttocks, knees, ankles/feet). The second column described if participants had experienced any trouble in last 7 days in different body region (in neck, shoulder, elbow, wrist/hand, upper back, lower back, hips/thighs/buttocks, knees, ankles/feet). Lastly the 3rd column of this questionnaire described if trouble hampers participants daily living activities (such as job, housework, hobbies) in last 12 months in different body region (in neck, shoulder, elbow, wrist/hand, upper back, lower back, hips/thighs/buttocks, knees, ankles/feet). The time was taken to complete the questionnaire approximately 4min it varied about 2 to 9min (Kuorinka et al. 1988).

The Standardized Nordic questionnaire was translated to achieve Bangla version of the English scale that are conceptually equivalent in each of the target countries/cultures. According to WHO guidelines this scale was translated by following four steps that are given below.

Forward translation

This was the first step of translation in which three translators translated the scale and they were knowledgeable of the English speaking, culture but their mother tongue or primary languages were Bangla. Translators used conceptual equivalent of a word or phrase not a word-for-word translation. They strived to be simple, clear and concise in formulating a question and used most common word for the audience. Translators considered the typical respondent for the instrument being translated so that they would understand when he/she hear the question. During translation translators also considered issues of gender and age applicability and avoid offensive word to the target population during translation.

Expert panel

In this step of translation an experienced bilingual expert showed the translation of the questionnaire. He identified, resolved and questioned some word or expressions and suggests alternatives.

Back-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. His mother tongue was English and he had no knowledge of the questionnaire. After doing this back translation discrepancies was discussed with the bilingual expert panel as many time as need until a satisfactory version reached.

Pre-testing and cognitive interviewing

There were ten members selected for each section and they would represent male, female from all age groups for pretest. Through this interview researcher asked them about any word that they did not understand as well as any unacceptable or offensive word or expression. The pre-test respondent asked to choose which of the alternatives conforms better to their usual language.

Final version

The final version of the questionnaire in the Bangla language was the result of all the interactions described above.

3.9.2. The Masstricht Upper Extremity Questionnaire (MUEQ)

According to the WHO guidelines the Maastricht Upper Extremity Questionnaire was translated into Bangla so that it could be conceptually equivalent in target countries/culture, equally natural, acceptable and practically performed.
The Maastricht Upper Extremity Questionnaire (MUEQ) assessed the occurrence and nature of complaints of arm, neck & shoulder in computer workers & its associated physical & psychological risk factors. The questionnaire covered six main domains (workstation, posture during work, quality of break time, job control, and social support.) as well as socio demographic factor characteristics (age, gender, employment status). Furthermore some items assessed the quality of the work environment & the frequency and nature of extremity complaints in the neck, shoulder, upper and lower arm, elbow, hand, wrist. Some items specified the clinical manifestation of the complaints (tingling, fatigue, stiffness, weakness, numbness, swelling, continuous pain & change in color & temperature). Researcher did not use the complaints portion of this scale because this portion was not match with the objectives of the research.

The socio-demographic information is in the first portion of the scale. There are 9 questions in the socio-demographic portion of the questionnaire. Socio-demographic information consist of name, age, gender, number of working day in a week, number of working hours in a day, working hours with computer in a day, number of working years in current position.

The first domain of this scale is workstation. Here all the questions are close ended & participant gave answer by yes or no. workstation domain contained 7 questions. Here participants gave information about his workstation such as his desk height is suitable or not, chair height adjustability, arm support during mouse

use, enough space to work at desk, keyboard & screen is placed in front of participants.

The remaining 5 domains answer was given by five option (always, often, sometimes, seldom, never) by the participants.

The second domain was about body posture. There were 11 questions in body posture portion of this questionnaire. In this section questions are about duration of sitting in one position, sitting with lifted shoulder & awkward posture or not, performing repetitive task performance, physical exhausting job, twisted head or trunk towards left or right, asymmetrical sitting position.

Job control portion contain 9 questions. This portion of the questionnaire explained how participants control his job such as participants decision about how perform the job task, his participation in decision taking with other, participants independence about changing his own task, the time & speed of job task, solution of work problems by himself. His creativity, learning new things, developing abilities & undertaking different task in his work was discussed in this portion of the questionnaire.

Another part was about job demands. Job demands are made up of 7 questions. It described participants working style like- time to finish the work. Here participants expressed, did he work in an extensive pressure? Did he completed his task on time or take extra hours to finish the job task? If he found it difficult to work &finish his task on time & did he had too many job tasks.
Break time was consisting of 8 questions. This domain explained taking breaks of participants during work. Planning work breaks, dividing working time, decisions when to take break, alteration of body posture & job task, doing job task without computer, taking breaks for 10 minutes after 2 hours & participant thought about his work break is sufficient all this information are lie in the break time domain of the questionnaire.

Work environment was another domain. This portion of the questionnaire was consisting of 9 questions. Good work environment, type of ventilation (dry, cold,

unwanted or fresh air), and type of environment of work (noisy, too bright) inside the office, location of screen or screen reflects the office light; all information are covered in the work environment domain.

Social support was the last domain which contains 8 questions. During work participants feeling on the social support was explained in this domain of the questionnaire. This domain contained information about the smoothness of the work flow, opportunity of ask or inquire his work, depending on other colleges for his work task, atmosphere of the work, finding support from colleagues & supervisor for any mistake & friendly relationship with supervisor & colleagues (Eltayeb et al. 2007).

3.10. Data analysis

Data analysis had done by using the Statistical Package for social science (SPSS), Inc. new version of 17. Firstly the prevalence of musculoskeletal symptoms among computer users in last 12 months calculated by means of percentage through the first column of the standardized Nordic musculoskeletal questionnaire. Any disruption in carrying out normal activities (job, house work) due to MSS also calculated by means of percentage through the third column of the same questionnaire. Association between socio demographic factors (gender, age, number of working hours per day, time spend behind computer, working years in current position, days working in a week) with MSS had been identified through chai- square (χ^2) test. Ergonomic physical & psychological risk factors identified and its association with musculoskeletal symptoms also identified through the MUEQ questionnaire.

3.11. Ethical considerations

- At first researcher was received approval of the proposal to conduct the study from BHPI faculties.
- Researcher took permission to conduct data collection from National parliament of Secretariat of Bangladesh.
- Researcher took permission from the corresponding author for using scales that will be used in her research.
- Written consent had taken from all participants.
- Aim and objectives of the study was informed to the participants.
- All provided information were maintained strictly confidential.
- All rights of the participant preserved for any time withdrawal.
- Ensured that will not cause any harm or benefited to them but in future computer office workers may get benefited from the study.

Chapter 4 Result

The result section is decorated with the Demographic characteristics, Prevalence of musculoskeletal symptoms in last 12 months, most commonly affected body parts in last 12 months, normal activities disruption in last 12 months and associations of MSS with demographic characteristics are also presented in this section.

4.1. Demographic characteristics of the study population

Table-1 represents the demographic characteristics of the study population. There are 100 computer office workers participate in this study and most of them are male. Maximum 31% (male = 26 and female = 5) of participants were noted in the age group of 41-45 years. Here all participants reported that they work 5-7 days in a week. The proportion of total working time used for computer tasks range from 2 to more than 7 hours. Here 56% of the participants worked actively with computer for 2-3 hours of their total working time and 32% spend 4-5 hours behind computer in a day. Table 1 also represent working years in current position. Mostly 49% participants work 11-19 years in current position.

Table: 1- Socio-demographic characteristics of the respondents (n=100)

Variables	Frequency (n)		Total
	Male	Female	
Age			
41-45	26	5	31
46-50	19	3	22
36-40	15	5	20
31-35	9	1	10
26-30	6	2	8
51-55	2	3	5
56-60	2	0	2
Total	100	0	2
Number of working hours/day			
More than 8 hours	55	13	68
Total6-8 hours	13	4	17
3-5 hours	13	2	15
Total	100		
Total time spending on computer			
2-3 hours	45	11	56
4-5 hours	26	6	32
6-7 hours	10	2	12
Total	100		
Number of working years in current position			
≤1 years	43	6	49
2-10 years	24	9	33
11-19 years	8	2	10
20- 28 years	6	2	8
Total	100		

4.2. Association between MSS and socio-demographic factors

The socio-demographic factors such as gender, number of working hours per day, time spend behind computer; working years in current position did not have any significant association on the presence of MSS in last 12 months except age (table-2). In this study there is a significant association between ages with MSS in last 12 months.

Table: 2- Association of MSS with socio-demographic and related variables (n-100).

Variables	**MSS in last 12 months**			**Chai-square (χ^2) Value**	**P-value**
	Yes n (%)	No n (%)	Total n (%)		
Sex					
Male	73	8	81	0.400	0.527
Female	18	1	19		
Age in year					
41-45	28	3	31		
46-50	22	0	22		
36-40	19	1	20		
31-35	7	3	10	13.801	0.05
26-30	8	0	8		
20-25	4	1	5		
51-55	2	0	2		
56-60	1	1	2		
Number of working hours per day					
More than 8 hours	62	6	68	0.548	0.760
6-8 hours	16	1	17		
Below 5 hours	13	2	15		
Total time spending on computer					
2-3 hours	49	7	56	2.320	0.314
4-5 hours	30	2	32		
6-7 hours	12	0	12		
More than 7 hours	0	0	0		
Number of working years in current position					
11-19 years	43	6	49	2.198	0.532
Less than or equal 1 years	32	1	33		
20-28 years	9	1	10		
2-10 years	7	1	8		

4.3. Prevalence of musculoskeletal symptoms (MSS) and normal activities disruption in last 12 months

Prevalence of the musculoskeletal symptoms (MSS) during last12 months among the men and women is identified out of 100 participants. The last one year prevalence of MSS indicated that 91.1% of the participants complaints at least one body part (neck, shoulder, elbow, wrist/hand, upper back, lower back, thigh, knee). The prevalence of normal activities disruption in last 12 months is 47.5%.

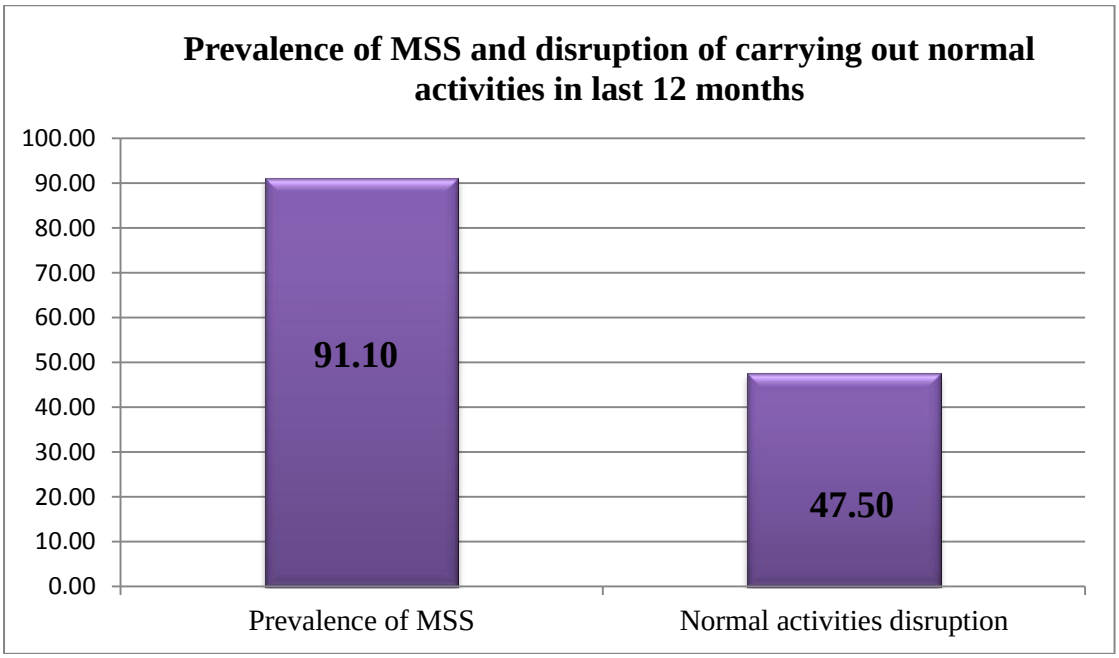

Fig: Prevalence of musculoskeletal symptoms (MSS) and normal activities disruption in last 12 months

4.4. Most affected body parts and normal activities disruption due to MSS in different body parts.

Participants reported MSS (in last 12 months) most frequently in the lower back, followed by the neck , upper back , shoulder , wrist/hand , knee , ankle/feet , thigh and elbow. The prevalence of normal activities disruption in last 12 months is 47.5%. The most commonly reported normal activities disruption complaints are due to lower back pain followed by shoulder, upper back and wrist/hand, thigh with neck, knee, elbows and ankle/feet.

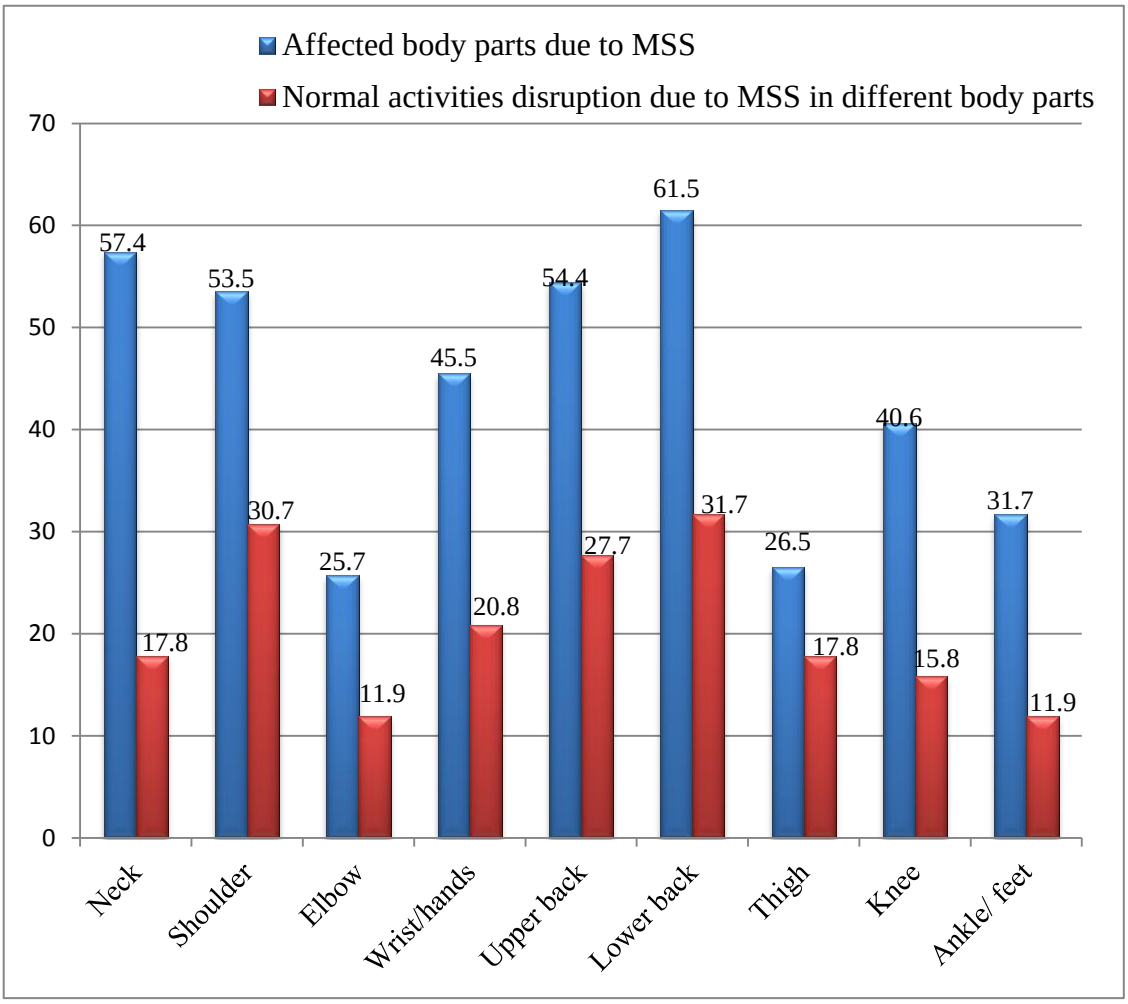

Fig: Most affected body parts and normal activities disruption due to MSS in different body parts

4.5. The physical and psychological risk factors for developing MSS

The physical and psychological risk factors are demonstrated in this section. The first domain is consists of suitable desk height, adjustable chair height, arm supported during mouse usage, lower back supports of chair, keyboard placement, screen placement, enough space of work. The first domain demonstrates that work stations of the computer users are very good. But a huge portion (74%) of the computer users do not have height adjustable chair. A big portion of the participants reported that their keyboard (85%) and screen (81%) is placed in front of them where 77% participants response that they have enough space to work. The second domain is about the body posture (good work posture, prolong sitting, sit with lifted shoulder, awkward sitting posture, performing repetitive work, exhausting job, head position, twisted head, trunk position). In this domain approximately half of the population reported that they keep a good work posture but sit for long hours when works in computer. In these domains 44% participants reported they perform repetitive work. The another domain is job control which represents decision of task performance, problem solving, developing abilities, new learning, creativity and performance of different task. Around 50% of participants reported that they decide how to perform their work, during work they have to creative and learn new things. Among the participants 55 % reported they solve their problem by themselves and 63% reported their work improves their abilities. Another domain is about job demand (extensive work pressure, difficulty and extra hours for finishing work). Here 41% reported sometimes they work under extensive pressure. In this section the name of the domain is break time. Though most of the participants have the opportunities to plan their work time, breaks and sufficient break time but only 40% of participant take 10 minutes break after two hours. The work environment domain (whether like air, light and noise) represented that most of the participant reported that they have a good work environment (including noise, air and light). The last domain is social support (getting help from colleagues and supervisor) which represents that colleagues are friendly and get help from them if any mistakes are done. Very few participants (18%) reported that they are not maintain correct posture and remaining portion reported they work in an awkward posture sometimes, often or always.

Table: 3 – The physical and psychological risk factors for developing MSS

Domain	Variable name	Response rate				
		Yes		No		
Work station	My desk (table) at work has suitable height.	82		18		
	I can adjust my chair height.	47		53		
	When I use the mouse device, my arm is supported by the table.	73		27		
	The chair I use during work supports my lower back.	74		26		
	My keyboard is placed directly in front of me.	85		15		
	The screen is placed directly in front of me.	81		19		
	I have enough space to work at my office.	77		23		
		Always	**Often**	**Sometimes**	**Seldom**	**Never**
Body posture	During my work I keep a good work posture.	49	27	19	3	2
	At work I sit for long hours in one position.	22	43	27	5	3
	For more than two hours per day I sit with lifted shoulders.	17	29	24	15	15
	During my work I sit in awkward posture.	12	14	38	18	18
	In work I perform repetitive tasks.	17	44	21	10	8
	I find my job physically exhausting.	9	9	28	32	22
	When I key my hand is placed in a straight line with my lower arm.	26	36	21	9	8

	When I work my head is bended.	17	20	23	16	24
	Head is twisted towards the left or right.	4	14	18	26	38
	Trunk is twisted towards the left or right.	7	10	20	22	41
	My Trunk is in asymmetrical position.	7	10	19	16	48
Job control	I decide how to perform my job task.	50	24	11	10	5
	I participate with others in decision taking.	21	27	34	12	6
	I decide my own task changes.	26	25	23	12	14
	I determine the time & speed job tasks.	34	37	15	9	5
	I solve work problems by myself.	19	55	19	2	5
	My work develops my abilities.	63	21	12	4	0
	In my work I learn new things.	44	37	14	5	0
	I have to be creative in my work.	40	27	21	6	6
	I under take different tasks in my work.	34	31	28	5	2
Job demand	I work under extensive work pressure.	8	22	41	20	9
	I find it difficult to finish my tasks on time.	2	15	37	24	22
	I take extra hours to finish my job tasks.	3	15	29	28	25
	I have no enough time to finish my job task.	3	5	23	39	30
	At work I speed to finish my tasks on time.	22	26	31	13	8

	I find my work tasks difficult.	5	15	23	28	29
	I have too many job tasks.	19	38	29	10	4
Break time	I can plan my work breaks.	16	28	33	12	11
	I can divide my work time.	21	36	24	12	7
	I can decide when to take a break.	19	39	21	7	14
	I alternate in my body posture.	16	26	41	8	9
	I alternate in my job task.	6	22	46	20	6
	I perform job task without computer.	20	22	44	9	5
	After two hours I take a break for 10 minutes.	25	40	12	16	0
	I find my work breaks sufficient.	25	18	30	11	16
Work environment	I find my work environment good.	47	30	12	5	6
	The air inside the office is too dry.	43	23	21	5	8
	The air inside the office is too cold.	17	22	36	15	10
	In the office there is unwanted air.	2	4	14	27	53
	There is available fresh air in my work.	16	33	20	13	18
	My work environment is noisy.	16	13	23	18	30
	My work place is too bright.	46	20	13	4	17
	I gaze at the computer screen.	14	26	42	14	4
	The computer screen reflects the office lights.	26	14	30	22	8

Social Support	The work flow goes smoothly.	16	26	35	10	13
	I can ask and enquire in my work.	19	33	29	10	9
	My work tasks depend on other colleges.	5	10	40	25	20
	My work atmosphere is comfortable.	31	33	21	8	7
	If I made a mistake in my work task I find support from my colleges.	46	28	16	9	1
	My colleagues are friendly.	53	22	13	4	8

Chapter 5 Discussion

This study demonstrated the prevalence and associated risk factors of developing musculoskeletal symptoms (MSS) among computer users. It also demonstrated socio demographic factors, the most affected body parts in last twelve months, any disruption in activities of daily living due to MSS and association between socio demographic factors and MSS.

5.1. The demographic characteristics of the study population

There is an association between ages with MSS. This result demonstrates that participants more than forty years old are mostly affected by MSS. This result is consistent with the findings that older workers had higher prevalence of MSS in telecommunication workers. Moreover middle and old age is associated with the development of age-related degenerative changes and loss of tissue strength (El-bestar, El-Mitwalli and Khashaba, 2011).

5.2. The prevalence of self- reported musculoskeletal symptoms (MSS)

One of the aims of this study was to estimate the prevalence of MSS in last 12 months among computer office worker in Bangladesh. This study has found the rate is high among the computer office workers. The last one year rate of MSS indicated that 91.1% of the participants complaint pain at least one body part (neck, shoulder, elbow, wrist/hand, upper back, lower back, thigh, hand and knee) which is very high in comparing with other studies. In Thailand a study showed that a higher prevalence of MSS found in a study of general computer office workers (Cho, Hwang & Cherng, 2012). In a study of 2011 were noted maximum 60% of computer users have work related MSS which had far difference in comparing with the present study (Sethi, Sandhu and Imbanathan, 2011). Another study showed that 95% participants reported MSS in right side of the body which was very close to the result of present study (Fagarasanu and Kumar, 2006). A survey of Netherlands showed that in 2002 and 2004, 28% of the computer office workers reported MSS in the last 1 year which is not close to the result of present study (Bongers et al. 2006).

As Bangladesh is a developing country, there is a lack of concern about ergonomic considerations. In Bangladesh there is no registered ergonomist. So the ergonomic considerations are overlooked when a workstation is set up. As a result the prevalence of self-reported musculoskeletal symptoms is high and it will be increased day by day. Symptoms

occur when interconnected structure (with joints and muscle) or adjacent structures that tend to compensate by contract or deviated from neutral alignment (Fagarasanu and Kumar, 2006).

5.3. Most affected body parts due to MSS

This study demonstrate that in a population of computer office worker the most affected body parts are lower back, neck, upper back and shoulder. In this study lower back (61.5%) is the most affected body parts, followed by the neck (57.4%), upper back (54.5%), shoulder (53.5%) and others. Another study shows that most affected body part is neck (63%) which is fully dissimilar with the present study (Sillanpaa et al. 2003). In a comparative cross sectional studies showed computer users (28.3%) have neck and upper extremity musculoskeletal disorders (MSD) compare to the control group (14.3%) at the telecommunications company where participants works as a computer users (El-bestar, El-Mitwalli and Khashaba, 2011). After searching from different database like Pubmed, Hinary and Google scholar, it has been founded that most of the research investigate musculoskeletal symptoms (MSS) of shoulder, neck, elbow, wrist/hands and upper back body parts among computer users. Different literature showed that higher prevalence of MSS in neck, shoulder and back areas. Literature also showed, though computer office worker have height adjustable chair, the participants have highest incidence of low back pain with high frequency and intensity level (Fagarasanu and Kumar, 2006). Though the present study is not representing the intensity of pain but it represents the incidence of pain in different body parts. Fagarasanu and Kumar, 2006 stated that the neck, shoulder, low back, and wrist were the highest prevalent body region with MSS which give a related result of the present study. A study of Netherlands showed that neck complaint (0.33%) is very close with shoulder complaints (0.31%) (Eltayeb et al. 2009). The present study also illustrates that neck complaints (57.4%) is close to shoulder complaints (53.5%) but this prevalence has a far difference in comparing with the previous study. The one year prevalence of neck and shoulder complaints in the study population was higher than the prevalence of arm, hand and elbow complaints (Ranasinghe et al. 2011).This phenomenon also has been seen in this study. A study of Taiwan reported that high prevalence of MSS in the shoulder, neck and upper back among the computer office workers (Cho, Hwang & Cherng, 2012). Literature shows that neck-shoulder region was the most common specific findings among computer office workers which are slightly different of this present study (El-bestar, El-Mitwalli and Khashaba, 2011). Literature showed that symptoms are grouped by different body region and the body parts most at risk for developing MSD are the neck, shoulder lower back and wrist in a population of computer office workers (Fagarasanu and Kumar, 2006).

5.4. Normal activities disruption due to MSS in different body parts

In this study 47.5% work disruption is founded due to MSS among computer office workers. The observed prevalence is very far to the prevalence (15.4%) reported from Sri Lankan computer office workers. They also had shown that they have to compromise their quality of life, increased medical expenses and absenteeism due to MSS (Ranasinghe et al. 2011). The present study explains work disruption means prevent out from normal activity due to pain in different body region. But the study of Srilanka explains work disruption means absenteeism from job due to MSS. A study shows that 5-10% of participants reported normal activities disruption due to MSS. (Lassen et al. 2005). So it is seen that the prevalence of work disruption is very high in Bangladesh rather than another country.

5.5. The physical and psychological risk factors for developing MSS

The present study demonstrated that a huge number of participants sit for a long duration of time during work. Literature showed that computer users work for prolonged duration with poor workstation. These were considered as common risk factors (Ferreira and Saldiva, 2002). Static posture as a consequence of prolonged sitting posture is extreme risk factors for developing MSS (El-bestar, El-Mitwalli and Khashaba, 2011) which is also demonstrated in the present study. Studies indicated that exposure time (computer, mouse or keyboard times) are important risk factors in developing MSS (Lassen et al. 2004). The present study also demonstrated the same result. Several cross sectional studies have shown association between MSS with the duration of keyboard and screen use (Baker et al. 2008).

The prevalence of sitting in awkward posture is also high in the present study. Literature reported as a leading contributing factor for the musculoskeletal symptoms for neck, back, shoulder, and elbow regions was awkward posture.

On the other hand the leading factor for the forearm, wrist, and finger areas was frequent use.

Other study reported that prolonged standing or sitting; repeated movements and awkward postures were the most prevalent aggravating factors for lower back pain. Generally computer users need to maintain an erect posture, which requires low-grade trunk muscle contraction and that may result back pain (Cho, Hwang & Cherng, 2012).

This study represents that computer office workers work in an extensive pressure they improve their ability and creativity through work. They also have limited social support. Only 9% reported they never felt extensive work pressure. Work overload and limited social support from colleagues are most common and significant factors in developing MSS (Lassen et al.

2005). This result is similar with the present study. Literature also evident that high workload has a significant role in developing MSS especially in low back pain (Cho, Hwang & Cherng, 2012). This finding is similar with present study and a study of Thailand (Janwantanakul et al. 2008). The present study represent that approximately half portion of the participants shown that job demands (task difficulty) and job controls are highly associated risk factors in developing MSS (Eltayeb et al. 2009). A study of Danish industrial and service workers mentioned low social support and high job demand as risk factors (Bonde et al. 2003). Literature predicted that the persistence of musculoskeletal pain is depends on the risk factors (Lassen et al. 2005).

Chapter 6 Limitation, Recommendation and Conclusion

6.1. Limitations

The current study has some limitations that suggest directions for future research. First, the questionnaire used in this study was subjective and not based on actual measuring of the degree/level on body parts position. Data is not taken through objective assessment of the client. So the real picture may not come through this research. Second, though the participants are excluded from this research that has systemic disease, but there may have some participants who never diagnosed systemic disease through doctor or test or they do not know about their disease. Third, only one hundred participants actively participate in this study. So this may not be generalized and may not give the actual result. Fourth, as it is a cross sectional study the causal relationship is not founded through this study. Lastly, Standardized Nordic Questionnaire is not investigated or used yet in research in Bangladesh which may affect the validity.

6.2. Recommendation

The study result suggested that to prevent MSS among computer office workers ergonomic intervention is very important. Intervention should aim to prevent not only the physical perspective but also psychological and environmental perspectives. Further research should be done to find out causality of MSS. In addition the present study is cross sectional study, to imply the causal relationship between MSS with the socio-demographic factors, physical and psychological risk factors.

6.3. Conclusion

This study attempt to discover the prevalence of MSS with most affected body parts and normal activities disruption in last 12 months, In addition determine the association between musculoskeletal symptoms (MSS) with socio-demographic factors. It also demonstrates the activities of daily living (ADLs) disruption due to MSS among computer office workers.

This study found that high prevalence of MSS among the nine body parts of computer office workers. Their normal activities disruption also founded due to MSS. A strong association between age and MSS has been founded. The results of this study shows that some physical and psychological risk factors such as height adjustable chair, sit for long hours, perform repetitive work, awkward posture, decide how to perform their work, creativity, problem

solving by himself, work satisfactions, lack of break and social support. In this present era it is difficult to continue work without computer in office settings. MSS is very common among computer office workers. If workers become sick it will have a significant effect on their performance and production. As a result office work will not be performed in a normal manner. Some small ergonomic changes, modifications and education can bring a huge impact on 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 computer office workers.

Reference*

- Baker, N.A., Sussman, N.B., Redfern, M.S., 2008. Discriminating between individuals with and without musculoskeletal disorders of the upper extremity by means of items related to computer keyboard use. *Journal of Occupational Rehabilitation*, 18 (2), pp. 157-165.
- Bekiari, E.I., Lyrakos, G.N., Damigos, D., Mavreas, V., Chanopoulos, K., Dimoliatis, I.D.K., 2011. A validation study and psychometrical evaluation of the Masstricht Upper Extremity Questionnaire (MUEQ) for the Greek-speaking population. *Journal of Musculoskeletal Neuronal Interact*, 11(1), pp. 52-76.
- Bergquist, U., Wolqast, E., Nilsson, B. & Voss, M., 2001. Musculoskeletal disorders among visual display terminal workers individual, ergonomic, & work organisational factors. *Ergonomics*, 38(4),pp. 763-776.
- Bjornerem, A.M. and Kothiyal, K., 2009. Effects of computer monitor setting on muscular activity, user comfort and acceptability in office work. *Work*, 32, 155-163.
- Bongers, P.M., Kremer, A. and Terlaak, J., 2002. Are psychosocial factors, risk factors for symptoms and signs of the shoulder , elbow, or hand/wrist?: A review of the epidemiological literature. *Am J Ind Med*, 41, pp. 315-342.
- Bongers, P.M., Limker, S., Heuvel, S, van, D. and Blatter, B, 2006. Epidemiology of work related neck and upper limb problems: psychosocial and personal risk factors (part-1) and effective interventions from a bio behavioural perspective (part ll). *Journal of occupational rehabilitation*, 16**,** pp. 279-302.
- Census, 2011. *Population and Housing Census 2011 BANGLADESH at a glance.* [pdf] Banglades: BBS. Available at: <http://www.bbs.gov.bd/WebTestApplication/userfiles/Image/Census2011/Bangladesh_glance.pdf>
  [Accessed 15 March 2013]

*****According to Harvard style of referencing, 2012. 4th ed. Anglia Ruskin University, UK.

- Cho, C.Y., Hwang, Y.S and Cherng, R.J., 2012. Musculoskeletal Symptoms and Associated Risk Factors among Office Workers with High Workload Computer Use. *Journal of Manipulative and Physiological therapeutics,* 35(7), 534-540.
- Crawford, J.O., 2007. The Nordic Musculoskeletal Questionnaire. *Occupational Medicine,* 57(4)**,** pp. 300–301.
- Croon, E.D., Sluiter, J., Kuijer, P.P. and Dresen, M.F., 2005. The effects of office concepts on worker health and performance: a systematic review of the literature. *Ergonomics,* 48(2), pp. 119-134.
- Devereux, J.J., Vlachonikolis, I.J. & Buckle, P.W., 2002, Epidemiological study to investigate potential interaction between physical and psychosocial factors at work that may increase the risk of symptoms of musculoskeletal disorder of the neck and upper limb, *Occup Environ Med,* 59, PP. 269–277.
- Dickinson, C.E., Campion, K., Foster, A.F., Newman, S.J., O'Rourke, A.M.T and Thomas, P.G., 1992. Questionnaire development: an examination of the Nordic Musculoskeletal Questionnaire. *Applied Ergonomics,* 13 (3).
- Diën, J.H.V., Looze, M.P.D and Hermans, V., 2010. Effects of dynamic office chairs on trunk kinematics, trunk extensor EMG and spinal shrinkage. *Ergonomics*, 44(7), pp.739-750.
- El-Bestar, S.F., El-Mitwalli, A.A and Khashaba, E., 2011. Neck-Upper Extremity Musculoskeletal Disorders among Workers in the Telecommunications Company at Mansoura city. *International journal of Occupational Safety and Ergonomics*, 17(2), pp. 195-205.
- Eltayeb, S., Staal, J.B., Hassan, A. and de Bie, R.A., 2009. Work Related Risk Factors for Neck, Shoulder and Arms Complaints: A Cohort Study Among Dutch Computer Office Workers. *Journal of Occupational Rehabilitation,* 19(4), pp.315-322.
- Eltayeb, S., Staal, J.B., Kennes, J., Lamberts, P.H. and Bie R.A., 2007. Prevalence of complaints of arm, neck and shoulder among computer office workers and psychometric evaluation of a risk factor questionnaire. *BMC Musculoskeletal Disorders*, [e-journal] 8(68), Available through: BioMed Central website <http://www.ncbi.nlm.nih.gov/pubmed/17629925>
  [Accessed 27 March 2013]
- Erdinc, O., 2011. Upper extremity musculoskeletal discomfort among occupational notebook personal computer users: Work interference, associations with risk factors

and the use of notebook computer stand and docking station. *Work*, 39(4), pp.455-463.

- Fagarasanu, M. and Kumar, S., 2006. Musculoskeletal symptoms in support staff in a large telecommunication company. *Work*, 27(2), pp.137-142.
- Fang, S., Dropkin, J., Herbert, R., Triola, D. and Landsbergis, P., 2007. Workers' Compensation Experiences of Computer Users with Musculoskeletal Disorders. *American Journal of Industrial Medicine*, 50(7), pp. 512-518.
- Feuerstein, M., Nicholas, R.A., Huang, G.D., Dimberg, L., Ali, D., Rogers, H., 2004. Job stress management and ergonomic intervention for work-related upper extremity symptoms. *Applied Ergonomics*, 35 (6), pp. 565-574.
- Gerr, F., Marcus, M., Ensor, C., Kleinbaum, D., Cohen, S., Edwards, A., Gentry, E., Ortiz, D.J. and Monteilh, C., 2002. A prospective Study of Computer Users: I. Study Design and Incidence of Musculoskeletal Symptoms and Disorders. *American Journal of Industrial Medicine*, 41, pp.221-235.
- Gerr, F., Marcus, M., Ensor, C, Kleinbaum, D., Cohen, S., Edwards, A., Gentry, E., Daniel J., Ortiz, D., Montei, C., 2002.A prospective study of computer users: I. Study design and incidence of musculoskeletal symptoms and disorders. *American Journal of Industrial Medicine*, 41(4), pp. 221-235.
- Gerr, F., Marcus, M. and Monteilh, C., 2004. Epidemiology of musculoskeletal disorders among computer users: lesson learned from the role of posture and keyboard use. *Journal of Electromyography and Kinesiology*, 14(1), pp. 25-31.
- Hedge, A., Morimoto, S. and Mccrobie, D., 1999. Effects of keyboard tray geometry on Upper body posture and comfort. *Ergonomics*, 42(10), pp.1333-1349.
- Huisstede, B.M.A., Miedema, H.S., Verhagen, A.P. Koes, B.W., Verhaar, J.A.N., 2007. Multidisciplinary consensus on the terminology and classification of complaints of arm, neck and shoulder. *occupational environment med,* 64(5), pp. 313-319.
- Iqbal, M., Akhter, S. and Azem, A., International Conference on Industrial Engineering and Management, 2010. *Investigating the Relation between Ergonomic Risk factors and Musculoskeletal Disorder (MSDS) of Computer Operators.* Dhaka, 9-10 January, 2010. Bangladesh.
- Jacobs, K., 2008, *Ergonomics for Therapist.* 3rd ed. USA: Elsvier.
- Janwantanakul, P., Pensri, P., Jiamjarasrangsri, V. and Sinsongsook, T., 2008. Prevalence of self-reported musculoskeletal symptoms among office workers. *Occupational Medicine*, 58(6), pp. 436-438.

- Jensen, C., 2003. Development of neck and hand-wrist symptoms in relation to duration of computer use work. *Scandinavian journal of Work Environment and Health*, 29(3), pp. 197-205.
- Johnstone, V., Jull, G., Souvlis, T. and Jimmieson, N.L., 2010. Interactive effects from self-reported physical and psychosocial factors in the workplace on neck pain and disability in female office workers, 53(4), pp.502-513.
- Korhonen, T., Ketola, R., Toivonen, R., Luukkonen, R., Häkkänen, M. and Juntura, E.V., 2003. Work related and individual predictors for neck pain among office employees working with video display units. *Occupational Environment Medicine*, 60(7), pp.475-482.
- Kothiyal, K. and Bjørnerem, M., 2009. Effects of Computer monitor setting on muscular activity, user comfort and acceptability in office work. *Work*, 32(2), pp. 155-163.
- Kromer, K.H.E., 2008. *Fitting the task to the human*. Taylor & Francis: London.
- Kuorinka, I., Jonsson, B., Kilbom, A., Vinterberg, H., Biering-Sorensen, F., Andersson, G. et al., 1988. Standerdised Nordic questionnaire for the analysis of musculoskeletal symptoms. *Appl Ergon*, 18(3), pp. 233-7.
- Lapointe, J., Dionne, C.E., Brisson C. and Montreuil S., 2009. Interaction between postural risk factors and strain on self-reported musculoskeletal symptoms among users of video display units: a three-year prospective study. *Scandinavian journal of Work Environment and Health*, 35(2), pp. 134-144.
- Lassen, C.F., Mikkelsen, S., Kryger, A.I. and Andersen, J.H., 2005. Risk factors for persistent elbow forearm and hand pain among computer workers. *Scandinavian Journal of Work, Environment & Health*, 31(2), pp. 122-131.
- Lehman, K.R., Psihogios, J.P. and Meulennbroek, R.G.J., 2001. Effects of sitting versus standing and scanner type on cashiers. *Ergonomics*, 44(7), pp. 719-738.
- Levin, K.A., 2006. Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, 7, pp. 24-25.
- Lindegard, A., Wahlström, J., Hagberg, M., Vilhelmsson, R., Toomingas, A. and Tornqvist E.W., 2012. Perceived exertion, comfort and working technique in professional computer users and associations with the incidence of neck and upper extremity symptoms. *BMC Musculoskeletal Disorders*, [e-journal] 12 (68), Available through: BioMed Central website <http://www.biomedcentral.com/1471-2474/13/38> [Accessed 3rd April 2013].

- Mann, C.J., 2003. Observational research methods. research design II: cohort, cross sectional, and case control studies. *Emergency Medicine Journal*, 20, pp.54-60.
- Menzel, N.N, Brooks, S.M., Bernard, T.E. and Nelson, A., 2004. The physical workload of nursing personnel: association with musculoskeletal discomfort. *International journal of Nursing Studies*, 41, pp.859-867.
- Nakazawa T, Okubo Y, Suwazono Y, Kobayashi E, Komine S, Kato N, Nogawa K., 2002. Association between duration of daily VDT use and subjective symptoms. *American Journal of Industrial Medicine,* 42(5), pp. 421-426.
- National Conference of State Legislatures, 2013. *National Unemployment Update,* [online] Availableat <http://www.ncsl.org/issues-research/labor/national-employment-monthly-update.aspx>
  [Accessed 15th March 2013]
- Novak, C.B &Mackinnon, S.E., 1997, Repetitive use and static postures: A source of nerve compression and pain, *Journal of Hand Therapy*, 10(2), pp. 151-159.
- Orkii.com, 2013. *Bangladesh – Country Summary*. [online] Available at: <http://www.orkii.com/bangladesh>
  [Accessed 15th March 2013].
- Preliminary Results. 2011. *Population & housing census: preliminary results July 2011*. Bangladesh: Bangladesh Bureau of Statistics.
- Ranasinghe, P., Perera, Y.S., Lamabadusuriya, D.A., Kulatunga, S., Jayawardana, N., Rajapakse, S. and Katulanda, P., 2011. Work-related complaints of arm, neck and shoulder among computer office workers in an Asian country: prevalence and validation of a risk-factors questionnaire. *BMC Musculoskeletal Disorders*, [e-journal] 12 (68), Available through: BioMed Central website <http://www.biomedcentral.com/1471-2474/12/68> [Accessed 2nd April 2013>
- Ranasinghe, P., Perera, Y.S., Lamabadusuriya, D.A., Kulatunga, S., Jayawardana, N., Rajapakse, S. and Katulanda, P., 2011. Work-related complaints of arm, neck and shoulder among computer office workers: a cross-sectional evaluation of prevalence and risk factors in a developing country. *Environmental Health*, [e-journal] 10 (70), Available through: BioMed Central website <http://www.ncbi.nlm.nih.gov/pubmed/21816073> [Accessed 3rd April 2013].
- Rocha, L.E., Glina, D.M.R., Marinho, M.D. F. and Nakasato, D., 2005. Risk factors for musculoskeletal symptoms among call centre operators of a bank in Sao paulo, Brazil, 43(4), pp. 637-646.

- Sanders, M.J. ed., 2004.*Ergonomics and the Management of Musculoskeletal Disorders*.2nd edn. Butterworth Heinemann Elsevier, USA.
- Saravanan, K, 2011, Importance and need of ergonomics in the apparel industry, PTJ. Available at- <http://www.ptj.com.pk/Web-2011/01-2011/PDF-January2011/Apparel-and-Knitwear-K-Saravan.pdf>
  [Accessed 4th April, 2013].
- Sethi, J., Sandhu, J.S. and Imbanathan, V., 2011. Effects of Body Mass Index on Work related musculoskeletal discomfort and occupational stress of computer workers in a developed ergonomic setup. *Sports Medicine Arthroscopy Rehabilitation therapy technology*, 3(22).
- Sharan, D. and S, P.A., 2012. Correlation of ergonomic risk factors with RULA in IT professionals from India. *Work*, 41, pp. 512-515
- Sillanpää, J., Huikko, S., Nyberg, M., Kivi, P., Laippala, P. and Uitti, J., 2003. Effect of Work with visual display units on musculoskeletal disorders in the office environment. *Occupational Medicine*, 53(7), pp. 443-451.
- Szeto, G.P.Y., Straker, L.M. and O'Sullivan, P.B., 2005. A Comparison of symptomatic and asymptomatic office workers performing monotonous keyboard work--1: Neck and shoulder muscle recruitment patterns. *Manual Therapy*, 10(4), pp.270-80.
- Toomingas, A., Nilsson, T., Hagberg, M., Hagman, M. and Tornqvist, E.W., 2003. Symptoms and clinical findings from the musculoskeletal system among operators at a call centre in Sweden—a 10-month follow-up study. *International journal of Occupational Safety and Ergonomics*, 9(4), pp. 405-418.
- United States Department of Labor, 2013.*Occupational Safety and Health Administration* [online] Available at: <https://www.osha.gov/SLTC/etools/computerworkstations>
  [Accessed 10th October 2013].
- Waersted, M., Hanvold, T.N and Veiersted, K.B., 2010. Computer work and musculoskeletal disorders of the neck and upper extremity: A systematic review. *BMC Musculoskeletal Disorders*, [e-journal] 11(79), Available through: BioMed Central website <http://www.ncbi.nlm.nih.gov/pubmed/20429925>
  [Accessed 3 June 2013].
- Wahlstrom, J., 2005. Ergonomics, musculoskeletal disorders and computer work. *Occupational Medicine*, 55, pp.168-176.

- World development indicators, 2013. *Bangladesh - Country Summary*. [online]Bangladesh: The World Bank: Available at: http://www.orkii.com/bangladesh [Accesed on 15 March 2013]
- Wu, S., He, L., Li, J., Wang, J. and Wang, S., 2012. Visual Display Terminal use Increase the Prevalence and Risk of Work-related Musculoskeletal Disorders among Chinese Office Workers: A Cross-sectional study. *Journal of Occupational Health*, 54(1), pp. 34-43.

Appendix

Appendix 1: Permission letter

Permission letter

Date: 01.08.13
To
The Head of the Department
Department of Occupational Therapy,
BHPI, CRP, Savar, Dhaka

Subject: **An application for seeking permission to conduct the research project.**

Sir,

I beg most respectfully to state that I am seeking permission to conduct the research project as a part of my 4th year course module. My research title is "*Self-reported musculoskeletal complaints & its risk factors of arm, neck, shoulder among computer office workers.*". The aim of the study is to determine the prevalence & associated physical & psychological risk factors of musculoskeletal symptoms among computer office workers in Bangladesh. Now I am seeking for your kind approval to start my research project & I would like to assure that anything of my project will not harmful for the participants.
So, I therefore, pray & hope that you would be kind enough to grant me the permission for conducting the research & will help me to conduct a successful study as a part of my course.

I remain
Sir

1.08.13
Fariha Chowdhury
4th year B.Sc. in Occupational Therapy

Attachment: Proposal of research

Signature & comments of the Supervisor	Signature & comments of the Head of the Department
Overall, it is a good propo-sal. I recommend it for further proceeding. 12/Aug/2013 Md. Monjurul Habib Lecturer in Occupational Therapy Department of Occupational Therapy BHPI, CRP, Savar, Dhaka-1343, Bangladesh	As per supervisor's comment it may allow to conduct this study. Best of luck. 12/08/13 Nazmun Nahar Assistant professor & Head of the Department Department of Occupational Therapy BHPI, CRP, Savar, Dhaka- 1343,Bangladesh

Appendix 2: Permission letter for data collection

বাংলাদেশ জাতীয় সংসদ সচিবালয়
ফাইন্যান্স এন্ড পাবলিক রিলেশন উইং
গ্রন্থাগার ও গবেষণা অধিশাখা

নথি নং- ১১.৭৭৬.০০০.০০.০০.০০২.২০১১ (১৪৫.১)

তারিখঃ ০৭ অগ্রহায়ন, ১৪২০ বঙ্গাব্দ
২১ নভেম্বর, ২০১৩ খ্রিস্টাব্দ

অনুমতি পত্র

বাংলাদেশ হেলথ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই) এর অধ্যাপক ও অধ্যক্ষ ডাঃ এম এ কাদের কর্তৃক ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল কোর্সের ছাত্রী ফারিহা চৌধুরীর রিসার্চ সংক্রান্ত কাজে সফরের জন্য আবেদনের প্রেক্ষিতে তাঁকে বাংলাদেশ জাতীয় সংসদ সচিবালয় গ্রন্থাগার অফিস সময়সূচী অনুযায়ী নিম্নবর্ণিত শর্তে অদ্য ২১-১১-২০১৩ হতে ২৮-১১-২০১৩ খ্রিস্টাব্দ পর্যন্ত বাংলাদেশ জাতীয় সংসদ সচিবালয় গ্রন্থাগার সফরের অনুমতি প্রদান করা হইল।

১. জাতীয় সংসদ গ্রন্থাগার সফরকালে গ্রন্থাগার ব্যবহারের প্রচলিত শর্তাবলী পালন করিতে হইবে;
২. কোন পুস্তক গ্রন্থাগারের বাহিরে নেওয়া যাইবে না;
৩. সংসদ গ্রন্থাগারের অভ্যন্তরে ধুমপান ও পানাহার করা যাইবে না;
৪. গ্রন্থাগারের পুস্তক সংরক্ষণ কক্ষে প্রবেশ এবং সেলফ হইতে নিজ হাতে বই নেওয়া যাইবে না;
৫. গ্রন্থাগার সফরকালে নীরবতা পালন করিতে হইবে।

(নাইমুল আজম খান)
উপ-পরিচালক (গবেষণা ও শিক্ষা)
বাংলাদেশ জাতীয় সংসদ সচিবালয়
ফোনঃ ৮১৭১৩৪৯ (অফিস)।

ফারিহা চৌধুরী,
৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল কোর্স
বাংলাদেশ হেলথ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই),
সিআরপি, সাভার, ঢাকা। ও
পিতা মোঃ দিদারুল আলম চৌধুরী
সিনিয়র সহকারী সচিব,
কমিটি-৯ ও ১০
বাংলাদেশ জাতীয় সংসদ সচিবালয়, ঢাকা।

নথি নং- ১১.৭৭৬.০০০.০০.০০.০০২.২০১১ (১৪৫.১)

তারিখঃ ০৭ অগ্রহায়ন, ১৪২০ বঙ্গাব্দ
২১ নভেম্বর, ২০১৩ খ্রিস্টাব্দ

অনুলিপি সদয় অবগতির জন্য প্রেরণ করা হলোঃ

১. মাননীয় স্পীকারের একান্ত সচিব, বাংলাদেশ জাতীয় সংসদ, ঢাকা।
২. সচিব মহোদয়ের একান্ত সচিব, বাংলাদেশ জাতীয় সংসদ সচিবালয়, ঢাকা।
৩. অতিরিক্ত সচিব (এফএন্ডপিআর) এর ব্যক্তিগত কর্মকর্তা, বাংলাদেশ জাতীয় সংসদ সচিবালয়, ঢাকা।
৪. পরিচালক (গ্রন্থাগার ও গবেষণা) এর ব্যক্তিগত কর্মকর্তা, বাংলাদেশ জাতীয় সংসদ সচিবালয়, ঢাকা।

প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য প্রেরণ করা হলোঃ

১. ডেপুটি সার্জেন্ট-এ্যাট-আর্মস, বাংলাদেশ জাতীয় সংসদ সচিবালয়, ঢাকা।
২. অধ্যাপক ডাঃ এম.এ কাদের, অধ্যক্ষ, বিএইচপিআই, সাভার, ঢাকা।

(নাইমুল আজম খান)
উপ-পরিচালক (গবেষণা ও শিক্ষা)

Data collection instrument

Appendix 3: Maastricht Upper Extremity Questionnaire (MUEQ)

General Information:

1.	Gender	□ Male □ Female
2.	Surname	_____
3.	Date of birth?	___-___-19___
4.	Where do you work?	□ Heerlen □ Maastricht □ Both
5.	What is your current position?	_____
6.	How long have you been working in this position?	___ Year
7.	How many days do you work per week? (*over time not included*)	___ Day
8.	How many hours do you work per day? *(breaks and over time not included)*	___ Hour
9.	How many hours per working day do you work behind your computer?	___ Hour

Work Station

10.	My desk (table) at work has suitable height.	□ No □ Yes
11.	I can adjust my chair height.	□ No □ Yes
12.	When I use the mouse device, my arm is supported by the table.	□ No □ Yes
13.	The chair I use during work supports my lower back.	□ No □ Yes
14.	My keyboard is placed directly in front of me.	□ No □ Yes
15.	The screen is placed directly in front of me.	□ No □ Yes
16.	I have enough space to work at my office.	□ No □ Yes

Body Posture

	Always	Often	Sometimes	Seldom	Never
17. During my work I keep a good work posture.	□	□	□	□	□
18. At work I sit for long hours in one position.	□	□	□	□	□
19. For more than two hours per day I sit with lifted shoulders.	□	□	□	□	□
20. During my work I sit in awkward posture.	□	□	□	□	□
21. In work I perform repetitive tasks.	□	□	□	□	□
22. I find my job physically exhausting.	□	□	□	□	□
23. When I key my hand is placed in a straight line with my lower arm.	□	□	□	□	□
24. When I work my head is bended.	□	□	□	□	□
25. Head is twisted towards the left or right.	□	□	□	□	□
26. Trunk is twisted towards the left or right.	□	□	□	□	□
27. My Trunk is in asymmetrical position.	□	□	□	□	□

Job Control

	Always	Often	Sometimes	Seldom	Never
28. I decide how to perform my job task.	□	□	□	□	□
29. I participate with others in decision taking.	□	□	□	□	□
30. I decide my own task changes.	□	□	□	□	□
31. I determine the time & speed job tasks.	□	□	□	□	□
32. I solve work problems by myself.	□	□	□	□	□
33. My work develops my abilities.	□	□	□	□	□
34. In my work I learn new things.	□	□	□	□	□
35. I have to be creative in my work.	□	□	□	□	□
36. I under take different tasks in my work.	□	□	□	□	□

Job Demand

	Always	Often	Sometimes	Seldom	Never
37. I work under extensive work pressure.	□	□	□	□	□
38. I find it difficult to finish my tasks on time.	□	□	□	□	□
39. I take extra hours to finish my job tasks.	□	□	□	□	□
40. I have no enough time to finish my job task.	□	□	□	□	□
41. At work I speed to finish my tasks on time.	□	□	□	□	□
42. I find my work tasks difficult.	□	□	□	□	□
43. I have too many job tasks.	□	□	□	□	□

Break Time

	Always	Often	Sometimes	Seldom	Never
44. I can plan my work breaks.	□	□	□	□	□
45. I can divide my work time.	□	□	□	□	□
46. I can decide when to take a break.	□	□	□	□	□
47. I alternate in my body posture.	□	□	□	□	□
48. I alternate in my job task.	□	□	□	□	□
49. I perform job task without computer.	□	□	□	□	□
50. After two hours I take a break for 10 minutes.	□	□	□	□	□
51. I find my work breaks sufficient.	□	□	□	□	□

Work environment

	Always	Often	Sometimes	Seldom	Never
52. I find my work environment good.	□	□	□	□	□
53. The air inside the office is too dry.	□	□	□	□	□
54. The air inside the office is too cold.	□	□	□	□	□
55. In the office there is unwanted air.	□	□	□	□	□
56. There is available fresh air in my work.	□	□	□	□	□
57. My work environment is noisy.	□	□	□	□	□
58. My work place is too bright.	□	□	□	□	□
59. I gaze at the computer screen.	□	□	□	□	□
60. The computer screen reflects the office lights.	□	□	□	□	□

Social Support

	Always	Often	Sometimes	Seldom	Never
61. The work flow goes smoothly.	□	□	□	□	□
62. I can ask and enquire in my work.	□	□	□	□	□
63. My work tasks depend on other colleges.	□	□	□	□	□
64. My work atmosphere is comfortable.	□	□	□	□	□
65. If I made a mistake in my work task I find support from my colleges.	□	□	□	□	□
66. If I made a mistake in my work task I find support from my supervisors.	□	□	□	□	□
67. My colleagues are friendly.	□	□	□	□	□
68. My supervisors are friendly.	□	□	□	□	□

Appendix 4: Standardized Nordic Musculoskeletal Questionnaire

Please answer by using the tick boxes ☑
– *one tick for each question*

Please note that this part of the questionnaire should be answered, even if you have never had trouble in any parts of your body.

Have you at any time during the **last 12 months** had **trouble (such as ache, pain, discomfort, numbness)** in:	Have you had **trouble** during the **last 7 days:**	During the **last 12 months** have you been **prevented** from carrying out normal activities (eg. job, housework, hobbies) because of this trouble:
1 *Neck* No 1☐ Yes 2☐	2 *Neck* No 1☐ Yes 2☐	3 *Neck* No 1☐ Yes 2☐
4 *Shoulders* No 1☐ Yes 2☐ in the right shoulder 3☐ in the left shoulder 4☐ in both shoulders	5 *Shoulders* No 1☐ Yes 2☐ in the right shoulder 3☐ in the left shoulder 4☐ in both shoulders	6 *Shoulders (both/either)* No 1☐ Yes 2☐
7 *Elbows* No 1☐ Yes 2☐ in the right elbow 3☐ in the left elbow 4☐ in both elbows	8 *Elbows* No 1☐ Yes 2☐ in the right elbow 3☐ in the left elbow 4☐ in both elbows	9 *Elbows (both/either)* No 1☐ Yes 2☐
10 *Wrists/hands* No 1☐ Yes 2☐ in the right wrist/hand 3☐ in the left wrist/hand 4☐ in both wrists/hands	11 *Wrists/hands* No 1☐ Yes 2☐ in the right wrist/hand 3☐ in the left wrist/hand 4☐ in both wrists/hands	12 *Wrists/hands (both/either)* No 1☐ Yes 2☐
13 *Upper back* No 1☐ Yes 2☐	14 *Upper back* No 1☐ Yes 2☐	15 *Upper back* No 1☐ Yes 2☐
16 *Lower back (small of the back)* No 1☐ Yes 2☐	17 *Lower back* No 1☐ Yes 2☐	18 *Lower back* No 1☐ Yes 2☐
19 *One or both hips/thighs/buttocks* No 1☐ Yes 2☐	20 *Hips/thighs/buttocks* No 1☐ Yes 2☐	21 *Hips/thighs/buttocks* No 1☐ Yes 2☐
22 *One or both knees* No 1☐ Yes 2☐	23 *Knees* No 1☐ Yes 2☐	24 *Knees* No 1☐ Yes 2☐
25 *One or both ankles/feet* No 1☐ Yes 2☐	26 *Ankles/feet* No 1☐ Yes 2☐	27 *Ankles/feet* No 1☐ Yes 2☐

Figure 2 Musculoskeletal questionnaire

Appendix 5:
Permission letter from the author of Nordic musculoskeletal questionnaire

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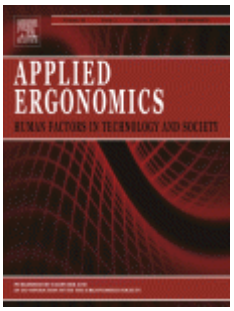

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Author:	I. Kuorinka,B. Jonsson,A. Kilbom,H. Vinterberg,F. Biering-Sørensen,G. Andersson,K. Jørgensen
Publication:	Applied Ergonomics
Publisher:	Elsevier
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দয়া করে উত্তরের জন্য সঠিক বক্সে (আপনার জন্য যেটি প্রযোজ্য) টিক দিন

প্রতিটি প্রশ্নের জন্য একটি টিক চিহ্ন ব্যবহার করুন

√

বিঃ দ্র ঃ দয়া করে সকল প্রশ্নের উত্তর দিন, যদিও আপনার শরীরের কোন অংশে সমস্যা না থাকে।

অংশগ্রহণকারীর নামঃ **বয়সঃ** **কোড নংঃ**

বিগত ১২ মাসের মধ্যে, যে কোন সময়ে আপনি কি নিম্নে উল্লেখিত শরীরের অংশসমূহে কোন ধরনের সমস্যা বোধ করেছেন? (যেমন ঃ অবিরাম অস্বস্তিকর বেদনা, ব্যাথা, অস্বস্তি, অবশ)	বিগত ৭ দিনের মধ্যে আপনি কি কোন ধরণের সমস্যা বোধ করেছেন ?	উলে-খিত সমস্যা সমূহের জন্য (অবিরাম অস্বস্তিকর বেদনা, ব্যাথা, অস্বস্তি, অবশ) বিগত ১২ মাসের মধ্যে আপনি কি আপনার স্বাভাবিক কার্যাবলি (যেমনঃ চাকুরি, গৃহস্থলির কাজ, শখ) থেকে বিরত থেকেছেন?
১. ঘাড় না হ্যাঁ ১ ☐ ২ ☐	২. ঘাড় না হ্যাঁ ১ ☐ ২ ☐	৩. ঘাড় না হ্যাঁ ১ ☐ ☐
৪. কাঁধ সমূহ ১ না হ্যাঁ ☐ ২ ☐ কাঁধে ৩ ☐ কাঁধে ৪ ☐ কাঁধে	৫. কাঁধ সমূহ না হ্যাঁ ১ ☐ ২ ☐ কাঁধে ৩ ☐ কাঁধে ৪ ☐ কাঁধে	৬. কাঁধ সমূহ (এক কাঁধ/ উভয় কাঁধ) না হ্যাঁ ১ ☐ ☐
৭. কনুই সমূহ না হ্যাঁ ১ ☐ ২ ☐ নুইয়ে ৩ ☐ ইয়ে ৪ ☐ কনুইয়ে	৮. কনুইসমূহ না হ্যাঁ ১ ☐ ২ ☐ কনুইয়ে ৩ ☐ নুইয়ে ৪ ☐ কনুইয়ে	৯. কনুইসমূহ (এক কনুই / উভয় কনুই) না হ্যাঁ ১ ☐ ২ ☐
১০. কব্জিসমূহ / হাত সমূহ না হ্যাঁ ১ ☐ ২ ☐ (কব্জি / হাত) ৩ ☐ কব্জি / হাত) ৪ ☐ কব্জি / উভয় হাত	১১. কব্জি সমূহ / হাত সমূহ না হ্যাঁ ১ ☐ ২ ☐ (কব্জি / হাত) ৩ ☐ কব্জি / হাত) ৪ ☐ কব্জি / উভয় হাত	১২. কব্জি সমূহ/ হাত সমূহ (এক হাত অথবা এক কব্জি / উভয় হাত অথবা উভয় কব্জি) না হ্যাঁ ১ ☐ ☐
১৩. পিঠ না হ্যাঁ ১ ☐ ২ ☐	১৪. পিঠ না হ্যাঁ ১ ☐ ২ ☐	১৫. পিঠ না হ্যাঁ ১ ☐ ২ ☐
১৬. কোমর (পিঠের নিচের অংশ) না হ্যা ১ ☐ ☐	১৭. কোমর না হ্যা ১ ☐ ২ ☐	১৮. কোমর না হ্যা ১ ☐ ২ ☐
১৯. এক অথবা উভয় উরু অস্থিদ্বয়ের সংযোগ স্থল/ উরুদ্বয় / নিতম্ব (Hips/thigh/buttoks) না হ্যাঁ ১ ☐ ☐	২০. উরুঅস্থিদ্বয়ের সংযোগ স্থল/ উর ্দ্বয় / নিতম্ব না হ্যাঁ ১ ☐ ২ ☐	২১. উরু অস্থিদ্বয়ের সংযোগ স্থল/ উরুদ্বয় / নিতম্ব (Hips/thigh/buttoks) না হ্যাঁ ১ ☐ ☐
২২. এক অথবা উভয় হাঁটু না হ্যাঁ ১ ☐ ২ ☐	২৩. উভয় হাঁটু না হ্যাঁ ১ ☐ ২ ☐	২৪. উভয় হাঁটু না হ্যাঁ ১ ☐ ২ ☐
২৫. এক অথবা উভয় (গোড়ালির গাঁট/ পায়ের পাতা) না হ্যাঁ ১ ☐ ☐	২৬. গোড়ালির গাঁট/ পায়ের পাতা না হ্যাঁ ১ ☐ ☐	২৭. গোড়ালির গাঁট/ পায়ের পাতা না হ্যাঁ ১ ☐ ☐

ম্যাসট্রিক্ট আপার এক্সট্রিমিটি প্রশ্নাবলী

সাধারণ তথ্য:

১। লিঙ্গ- □ পুরুষ □ মহিলা

২। পূর্ণনাম-

৩। জন্মতারিখ-

৪। কর্মস্থল-

৫। আপনার বর্তমান পদবী-

৬। কত দিন ধরে আপনি এ পদে আছেন?
.....

৭। সপ্তাহে আপনি কতদিন কাজ করেন? .....

(বিরতি ও অতিরিক্ত কাজের সময় বাদ দিয়ে)

৮। প্রতিদিন কত ঘন্টা কাজ করেন?
.....

(বিরতি ও অতিরিক্ত কাজের সময় বাদ দিয়ে)

৯। অফিসে প্রতিদিন কম্পিউটার এর কাজের পেছনে আপনি কত সময় ব্যয় করেন?

(বিরতি ও অতিরিক্ত কাজের সময় বাদ দিয়ে)
.....

কর্মস্থান:

১০। কর্মস্থলে আমার ডেস্ক (টেবিল) সন্তোষজনক/ উপযুক্ত উচ্চতায় আছে। □ হ্যা □ না

১১। আমি আমার সুবিধা-মত চেয়ারের উচ্চতা পরিবর্তন করতে পারি। □ হ্যা □ না

১২। যখন আমি মাউস ব্যাবহার করি তখন আমার হাত টেবিলের উপর থাকে। □ হ্যাঁ □না

১৩। কাজের সময় আমি যে চেয়ার ব্যবহার করি তা আমার পিঠের নিচের অংশের/কোমরের ভার বহন করে। □ হ্যা □ না

১৪। কিবোর্ডটি সরাসরি আমার সামনে রাখা থাকে। □ হ্যা □ না

১৫। কম্পিউটারের মনিটরটিও সরাসরি আমার সামনে রাখা থাকে। □ হ্যাঁ □ না

১৬। কাজ করার জন্য আমার অফিসে পর্যাপ্ত পরিমাণ জায়গা আছে। □ হ্যাঁ □ না

শারীরিক অবস্থানভঙ্গিঃ	সবসময়	প্রায়ই	মাঝে মাঝে	কদাচিৎ	কখনও না
১৭। কাজ করার সময় আমি একটা ভাল অবস্থানে বসে কাজ করি।	□	□	□	□	□
১৮। কাজের সময় আমি একই ভাবে দীর্ঘ সময় বসে থাকি।	□	□	□	□	□
১৯। প্রতিদিন দুই ঘন্টার বেশি সময় যাবৎ আমি কাঁধ উঁচু করে বসে কাজ করি।	□	□	□	□	□
২০। কাজ করার সময় আমি সঠিক অবস্থানে বসি না।	□	□	□	□	□
২১। অফিসে একই কাজ বারবার করি।	□	□	□	□	□
২২। শারীরিক ভাবে আমার কাজটি খুব ক্লান্তিকর।	□	□	□	□	□
২৩। কীবোর্ড ব্যাবহার কালে আমার হাত এবং বাহু সোজাসুজি ভাবে থাকে।	□	□	□	□	□
২৪। কাজ করার সময় আমার মাথা ঝুঁকে থাকে।	□	□	□	□	□
২৫। মাথা ডানে অথবা বামে ঝুঁকে/ বেকে থাকে।	□	□	□	□	□
২৬। ধড় ডানে অথবা বামে বেঁকে থাকে।	□	□	□	□	□
২৭। আমি একদিকে বেঁকে থাকি।	□	□	□	□	□

কাজ নিয়ন্ত্রনঃ	সবসময়	প্রায়ই	মাঝে মাঝে	কদাচিৎ	কখনও না
২৮। কাজ কিভাবে করব তা আমি নিজেই ঠিক করি।	□	□	□	□	□
২৯। যেকোনো সিদ্ধান্ত গ্রহণের সময় আমি অন্যদের সাথে অংশগ্রহণ করি।	□	□	□	□	□
৩০। আমি নিজেই আমার কাজে পরিবর্তন আনার সিদ্ধান্ত নিতে পারি।	□	□	□	□	□
৩১। আমি নিজেই আমার কাজের গতি এবং কাজের সময় ঠিক করি।	□	□	□	□	□
৩২। কাজের সমস্যা গুলো আমি নিজেই সমাধান করি।	□	□	□	□	□
৩৩। আমার কাজ আমার দক্ষতা বৃদ্ধি করে।	□	□	□	□	□
৩৪। আমি আমার কাজের মাধ্যমে নতুন অনেক কিছু শিখতে পারি।	□	□	□	□	□
৩৫। আমার কাজে আমাকে সৃষ্টিশীল হতে হয়।	□	□	□	□	□

৩৬। আমি আমার চাকুরীতে বিভিন্ন ধরনের কাজ করি।	□	□	□	□	□

<u>কর্ম চাহিদা</u>:	সবসময়	প্রায়ই	মাঝে মাঝে	কদাচিৎ	কখনও না
৩৭। আমি অতিরিক্ত চাপের মধ্যে আমার কাজ করি।	□	□	□	□	□
৩৮। সঠিক সময়ে কাজ শেষ করা আমার জন্যে কঠিন হয়ে পরে।	□	□	□	□	□
৩৯। আমার কাজ শেষ করার জন্যে আমাকে অতিরিক্ত সময় নিতে হয়।	□	□	□	□	□
৪০। কাজ শেষ করার জন্যে আমার পর্যাপ্ত সময় নাই।	□	□	□	□	□
৪১। সঠিক সময়ে কাজ শেষ করার জন্যে আমাকে দ্রুত গতিতে কাজ করতে হয়।	□	□	□	□	□
৪২। আমার কাজ গুলো অনেক কঠিন।	□	□	□	□	□
৪৩। আমাকে অনেক কাজ করতে হয়।	□	□	□	□	□

<u>বিরতির সময়</u>:	সবসময়	প্রায়ই	মাঝে মাঝে	কদাচিৎ	কখনও না
৪৪। আমি আমার কর্মবিরতির পরিকল্পনা করতে পারি।	□	□	□	□	□
৪৫। আমি আমার কাজের সময়টাকে ভাগ করতে পারি।	□	□	□	□	□
৪৬। কখন বিরতি নিব তা আমি নিজেই ঠিক করি।	□	□	□	□	□
৪৭। আমি আমার শারীরিক অবস্থান ভঙ্গি পরিবর্তন করি।	□	□	□	□	□
৪৮। আমি আমার কাজের ধারাবাহিকতা পরিবর্তন করি।	□	□	□	□	□
৪৯। আমি কম্পিউটার ছাড়াও কাজ করি।	□	□	□	□	□
৫০। দুই ঘন্টা পর পর আমি দশ মিনিট বিরতি নিই।	□	□	□	□	□
৫১। আমি আমার কর্মবিরতি টাকে পর্যাপ্ত মনে করি।	□	□	□	□	□

কাজের পরিবেশ:	সবসময়	প্রায়ই	মাঝে মাঝে	কদাচিৎ	কখনও না
৫২। আমার কাজের পরিবেশ খুব ভাল।	□	□	□	□	□
৫৩। অফিসের ভেতরের পরিবেশ খুব শুষ্ক।	□	□	□	□	□
৫৪। অফিসের ভেতরের বাতাস খুব ঠাণ্ডা।	□	□	□	□	□
৫৫। অফিসে অপ্রয়োজনীয় বাতাস বেশী।	□	□	□	□	□
৫৬। কাজের সময় পর্যাপ্ত পরিমাণ শুষ্ক বাতাস পাওয়া যায়।	□	□	□	□	□
৫৭। আমার কাজের পরিবেশ অনেক কোলাহলপূর্ণ।	□	□	□	□	□
৫৮। কর্মস্থল খুব বেশী আলোকিত।	□	□	□	□	□
৫৯। আমি কম্পিউটার মনিটরের দিকে স্থিরদৃষ্টিতে তাকিয়ে থাকি।	□	□	□	□	□
৬০। কম্পিউটারের মনিটর আলোর প্রতিফলন করে।	□	□	□	□	□

সামাজিক সহায়তা:	সবসময়	প্রায়ই	মাঝে মাঝে	কদাচিৎ	কখনও না
৬১। কাজের গতি বাধাহীন।	□	□	□	□	□
৬২। কাজ বিষয়ক যে কোন প্রশ্ন বা তদন্ত করতে পারি।	□	□	□	□	□
৬৩। আমার কাজ অন্যান্য সহকর্মীদের উপর নির্ভরশীল।	□	□	□	□	□
৬৪। আমার কাজের পরিবেশ স্বস্তিদায়ক।	□	□	□	□	□
৬৫। যদি আমি আমার কাজে কোন ভুল করি, আমি আমার অন্যন্য সহকর্মীদের থেকে সাহায্য পাই।	□	□	□	□	□
৬৬। যদি আমি আমার কাজে কোন ভুল করি,আমার সুপারভাইজারের সাহায্য পাই।	□	□	□	□	□
৬৭। আমার সহকর্মীরা বন্ধুভাবাপন্ন।	□	□	□	□	□
৬৮। আমার সুপাআরভাইজারও বন্ধুভাবাপন্ন।	□	□	□	□	□

Appendix 7	Consent form

Name of the investigator ---------- has been asked to take part in a research study on the Self-reported musculoskeletal complaints and its physical and psychological risk factors of arm, neck, shoulder and back among computer office workers. The aims of the study is to identify the prevalence & associated physical & psychological risk factors of complaints of arm, neck, shoulder & back among office computer users in Bangladesh.

---------- will be given two questionnaire to fill up which will take approximately 15 minutes and the researcher will fill up a questionnaire by observing his posture which will take not more than 5 minutes.

Participants will have the choice to answer with the questionnaire or not. Participants will entirely voluntary and respondent has the right to withdraw consent and discontinue participation in the study at any time without prejudice to present or future benefits. There is no cost for any part of the study.

No discomfort or risk is anticipated. It is hoped that respondent will enjoy participating in this study. Information from this study will be anonymously coded to ensure confidentiality. The written document from the study will be kept in a locked cabinet. The materials or written document of this study will be viewed by the researcher and her supervisor only and will be destroyed upon completion of data analysis.

The researcher will be available to answer any questions you may have concerning the study, the procedures and any risks or benefit that may arise from participating in this study.

As a participant of the previously named client, I give permission for her to participate in the research study described.

A copy of this consent form has been given to me.

Signed:

Participant---------- Date---------

Investigator---------- Date---------

সম্মতি পত্র

আমি ফারিহা চৌধুরি, গবেষণাকারী আমার গবেষণায় আপনার অংশগ্রহণের অনুমতি প্রার্থনা করছি। বাংলাদেশের কম্পিউটার অফিস করমিদের ঘাড়, বাহু, কাঁধ ও মেরুদণ্ডের নিজস্ব অভিযোগ এবং এই সম্পর্কিতশারীরিক, মানুষিক সমস্যা সমূহই হচ্ছে আমার গবেষণার বিষয়বস্তু। আমার গবেষণার উদ্দেশ্য হচ্ছে বাংলাদেশের কম্পিউটার অফিস কর্মীদের ঘাড়, বাহু, কাঁধ ও মেরুদণ্ডের নিজস্ব বা স্বকীয় অভিযোগের শতকরা হার এবং এই সম্পর্কিত শারীরিক ও মানুষিক ঝুঁকিসমূহ চিহ্নিত করা।

.....। আপনাকে দুটি প্রশ্নপত্র দেয়া হবে, প্রশ্নপত্রে উত্তর লিপিবদ্ধ করতে হবে। যার জন্য কিছু সময় প্রয়োজন হতে পারে। এছাড়াও গবেষণাকারী আপনার বসার অবস্থা পর্যবেক্ষণ করে নিজে একটি প্রশ্নপত্র পূরণ করবে।

এইগবেষণায়আপনারঅংশগ্রহণসম্পূর্ণঐচ্ছিক।আপনারসম্পূর্ণঅধিকারআছেযেকোনোসময়েসম্মতিওঅংশগ্রহণপ্রত্যাহার করবার। এই গবেষণায়অংশগ্রহণ করার জন্য আপনি কোন প্রকার আর্থিক সহায়তা পাবেন না।

এই গবেষণায়অংশগ্রহণে আপনাকে কোন অস্বস্তি বা ঝুঁকির সম্মুখীন হতে হবে না। গোপনীয়তা রক্ষার্থে নাম-হীনভাবে তথ্য সংরক্ষিত হবে। আপনারনামঠিকানাকোনধরনেরপ্রকাশনায়কোনভাবেপ্রকাশকরাহবেনা।লিখিতউপকরণগুলোতালাবন্ধড্রয়ারেসংরক্ষিতহবে।শুধুমাত্রগবেষণাকারী এবং তার তত্বাবধায়কএতথ্যগুলোরপ্রবেশাধিকারপাবে এবং তথ্য উপাত্তগুলো বিশ্লেষণ করার পর এই তথ্য সমূহনষ্ট করে ফেলা হবে।

এই গবেষণায়অংশগ্রহণ কালীন যে কোন ঝুঁকি, সমস্যা বা সংশ্লিষ্ট গবেষণা সংক্রান্ত যে কোন প্রশ্নের উত্তর দেয়ার জন্য গবেষণাকারী বাধ্য থাকবেন।

আমি উপরের তথ্যগুলো সম্পর্কে সম্পূর্ণ অবগত এবং ঐচ্ছিকভাবে এই গবেষণায় অংশগ্রহণ করবার সম্মতি প্রদান করলাম।

সাক্ষর:

গবেষণাকারী ..... তারিখ .....

অংশগ্রহণকারী ..... তারিখ .....