

**THE PREVALENCE OF MUSCULOSKELETAL SYMPTOMS
AND ITS' ASSOCIATED RISK FACTORS AMONG SCHOOL
TEACHERS IN SELECTED AREAS OF BANGLADESH**



By

Tanzida Khanom

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Bachelor of Science in Occupational therapy
Bangladesh Health Professions Institute (BHPI)
Faculty of Medicine
University of Dhaka

Study completed by:

Tanzida Khanom Bresty

4th year, B.Sc. in Occupational Therapy

Signature

Study Supervisor's name, designation and signature:

Shamima Akter

Lecturer in Occupational Therapy,
Department of Occupational Therapy,
BHPI, CRP.

Signature

Head of department's name, designation and signature:

Nazmun Nahar

Assistant Professor
Head of the department
Department of Occupational Therapy
BHPI, CRP

Signature

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Signature: _____

Date: _____

Tanzida Khanom Bresty
4th year, B. Sc. in Occupational Therapy

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Abstract

Background: Teachers represent an occupational group who appear a high prevalence of musculoskeletal symptoms in different study of different country. Teacher often involve in different duties and responsibility that may be carried out uncomfortable working condition and causes of developing musculoskeletal symptoms in different body region. In Bangladesh, there is limited information on musculoskeletal symptoms among teachers. Therefore, this study conducted to estimate the current situation of musculoskeletal symptoms among school teachers.

Aim & objectives of this study: Aim of the study was- The prevalence of musculoskeletal symptoms and associated risk factors among school teachers in Bangladesh. Objectives of the study were- to find out prevalence of musculoskeletal symptoms during 7 days and in past 12 months, most affected body parts, physical risk factors and association between risk factors and musculoskeletal symptoms.

Methodology: A cross-sectional study was conducted with 130 school teacher in some selected school in Mymensingh. Participant was selected in convenient way. Dutch Musculoskeletal Questionnaire was used to find out prevalence of musculoskeletal symptoms, most affected body parts and estimate risk factors.

Result: The prevalence of musculoskeletal symptoms at least 1 body regions were 69.2% during 7 days and 73.1% in the past 12 months and the most affected area were neck, lower back, shoulder, knee and ankle. Investigator did not find strong association between socio-demographic factors or general factors such as age, gender, type of school employment duration, travel, shoe heel height, smoking, and amount of exertion except health's status in general and physically tired with musculoskeletal symptoms in last 12 months. But there was significant association between slightly or heavily bent posture for long times, bent or hold neck in a forward posture for long periods, bent or hold wrist bent for long period and Stretching to write on board with musculoskeletal symptoms in past 12 months of different body region.

Conclusion: Results is suggested that there is a high prevalence of musculoskeletal symptoms among teachers. The findings of musculoskeletal problem can be reduced by taking proper strategies and effective ergonomic management.

Key words: *Musculoskeletal symptom, Risk factor, Teacher.*

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List of Acronyms

BHPI: Bangladesh Health Professions Institute

DMQ: Dutch Musculoskeletal Questionnaire

MSD: Musculoskeletal Disorder

MSS: Musculoskeletal Symptoms

WRMSD: Work Related Musculoskeletal Disorders

CHAPTER 1 INTRODUCTION

Work is essential for men and women and it can become harmful for health if done in an inappropriate way. Musculoskeletal disorders are one of the most common health problems in both developed and developing countries (Yue, Liu and Li, 2012; Chaiklieng and Suggaravetsiri, 2012; Mariammal, Jaisheeda and Sornaraj, 2012; Cardoso et al. 2009).

Musculoskeletal disorders (MSDs) affect the muscles, bones, and joints and its severity may interrupt everyday activities (Dul and Weerdmeester, 2008; Centers for Disease Control and Prevention, 2004). Discomfort, minor aches, and sprains are some of more serious health problems of musculoskeletal symptoms which require medical treatment (Darwish and Al-Zuhair, 2013).

Professionals of different ages may suffer from musculoskeletal disorders (Chaiklieng and Suggaravetsiri, 2012). The risk factors of musculoskeletal disorders include awkward posture, prolonged posture, heavy lifting, manual handling, and inappropriate work environments. Large groups of the working population suffer from musculoskeletal symptoms and these affect an individual's quality of life (Baskurt, Baskurt and Gelecek, 2011).

Some groups of workers are exposed to musculoskeletal symptoms due to their working pattern. Teachers are one of these groups who are exposed by occupational characteristics and job function (Cardoso *et al.* 2009; Mariammal, Jaisheeda and Sornaraj, 2012; Chong and Chan, 2010). School teachers are using their physical, cognitive, and affective capacity to reach teaching objectives and give more effort to their psycho-physiologic functions (Mariammal, Jaisheeda and Sornaraj, 2012; Cardoso *et al.* 2009).

The nature of the school teachers job includes a head down posture, frequent reading, assignment correction, repeated writing on a high board, sustained sitting in front of a computer and standing up teaching in class, all of which are unsafe activities and they risk developing musculoskeletal symptoms (Chaiklieng and Suggaravetsiri, 2012; Erick and smith, 2011; Chong & Chan, 2010; Yue, Liu and Li, 2012).

There have many investigations suggesting ergonomic improvements to school furniture to ensure children's safety, but there has been very little attention to the improvement of furniture for teachers (Samad *et al.* 2010).

1.1 Background

A high prevalence of Musculoskeletal disorder is reported by school teachers in several studies (Cardoso *et al.* 2009; Erick and Smith, 2012; Chiu and Lam, 2007; Darwish and Al-Zuhair, 2013; Chaiklieng and Suggaravetsiri, 2012; Korkmaz, Cavlak and Telci, 2011, Mariammal, Jaisheeda and Sornaraj, 2012). Different studies reported that teachers are at high risk of developing musculoskeletal pain, and the prevalence of this ranged between 23.7% and 95.1% (Darwish and Al-Zuhair, 2013).

Another study in Hong Kong found that teachers showed a higher prevalence of neck pain 68.9%, shoulder pain 73.4% and low back pain 59.2% (Chiu and Lam, 2007). Eighty percent of people have experienced back pain in their life (Chaiklieng and Suggaravetsiri, 2012). Studies from Turkey showed that among 463 teachers, 51.4% reported musculoskeletal pain in different parts of the body and 85% of the population suffers from Spinal pain in modern day Turkey (Korkmaz, Cavlak and Telci, 2011).

The percentages of teachers reporting low back pain from Brazil, France and Malaysia are 41.1%, 34.8% and 40.4% respectively (Yue, Liu and Li, 2012; Samad *et al.* 2010). The teaching experience is a factor in the development of musculoskeletal symptoms in different parts of the body (Chong and Chan, 2010).

However, Mariammal, Jaisheeda and Sornaraj (2012) found that middle school (28.20%) and secondary school (23.61%) teachers were more affected by general body pain, although 67.93% of all teachers reported general body pain because of their teaching activity in India. Chong and Chan (2010) stated that primary school teachers suffer more from musculoskeletal pain than secondary school teachers.

A randomized study in Malaysia, among 272 teachers found that the prevalence of low back pain was 39.6% for men and 48.1% for women and low back pain 47.8% in the rural areas, 46.3% in the urban areas and 40.2% in the industrial areas. 25.2% of the teachers experienced low back pain from prolonged sitting and 23.4% from prolonged standing (Samad *et al.* 2010).

Musculoskeletal symptoms are caused by multi-factorial different physical influences (Korkmaz, Cavlak and Telci, 2011). Different socio-demographic factors such as age, gender, working conditions, and working hours are associated with developing musculoskeletal disorders (Korkmaz, Cavlak and Telci, 2011). The highest prevalence of musculoskeletal pain among teachers is found in the 40 to 49 ages group (Korkmaz, Cavlak and Telci, 2011; Mariammal, Jaisheeda and Sornaraj, 2012; Carbooso *et al.* 2009).

There are different patterns of musculoskeletal diseases among men and women (Darwish and Al-Zuhair, 2013). There are significant differences between the genders (Korkmaz, Cavlak and Telci, 2011) and the prevalence of musculoskeletal symptoms was higher among females than males (Chiu and Lam, 2007; Samad *et al.* 2010; Darwish and Al-Zuhair, 2013; Chong and Chan, 2010).

Most female teachers complained of pain when reaching overhead and this limited their activity (Korkmaz, Cavlak and Telci, 2011). Female teachers are significantly at risk of developing lifelong neck and upper limb pain after join the teaching profession (Chiu and Lam, 2007). Pain in the neck, upper back, lower back and shoulders and the upper limb region were common in female teachers (Korkmaz, Cavlak and Telci, 2011; Baskurt, Baskurt and Gelecek, 2011).

Most teachers reported musculoskeletal symptoms of the lower back, upper back, neck and shoulders (Baskur, Baskurt and Gelecek, 2011; Chiu and Lam 2007; Erick and Smith; 2011; Chong & Chan, 2010; Yue, Liu and Li, 2012). Repetitive strain injury (RSIs) is one type of musculoskeletal disorder which affects upper limbs, neck, shoulder and low back (Chaiklieng and Suggaravetsiri, 2012).

Physical exertions, prolonged standing, inappropriate posture and standing for several hours in the class room, can all result in back pain and musculoskeletal pain among teachers (Mariammal, Jaisheeda and Sornaraj, 2012; Erick and smith, 2011; Yue, Liu and Li, 2012).

Musculoskeletal symptoms are the main cause of absenteeism, early retirement, activity limitation and sick leave (Darwish and Al-Zuhair, 2013; Erick and Smith, 2011; Samad *et al.* 2010; Cardoso *et al.* 2009; Mariammal, Jaisheeda and Sornaraj, 2012).

Primary and high school teachers are risky occupational groups who are regularly affected by musculoskeletal symptoms (Baskurt, Baskurt and Gelecek, 2011). But despite all these studies, there is still scope to know symptoms, their severity and the implications for affected teachers (Baskurt, Baskurt and Gelecek, 2011). Therefore, it is important to know the prevalence rate and risk factors of musculoskeletal symptoms among school teacher.

1.2 Significance

In Bangladesh, many people engage with teaching profession. 43.0% of them work in primary schools & 28.5 work in high schools according to the World Bank 2010 (TRADING ECONOMICS, 2015). They work about 6-7 hours per day, and some give extra time in teaching. As we have seen, studies in different countries have shown that musculoskeletal symptoms and disorders such as back pain, muscle pain, shoulder pain etc are often developed among teachers.

However, in Bangladesh, there is no finding of a prevalence of musculoskeletal symptoms among teachers. This study will help to find out a specific result about the prevalence of musculoskeletal symptoms and its associated risk factors among school teachers. This study can help to find evidence and also help to make a treatment guideline or program to consider ergonomic solutions.

Occupational therapy is a health care profession in Bangladesh. Ergonomics is a part of this profession. It focuses on the normal posture, work duration and rest, occupational health and prevention of risk (Dul and Weerdmeester, 2008). Ergonomics applies to all professions. It provides guidelines, gives advice and analyses the relationship between operators and task in order to improve the degree of performance (Dul and Weerdmeester, 2008).

1.3 Aim

To identify prevalence of musculoskeletal symptoms and associated risk factors among school teachers.

1.4 Objective

1. To determine the prevalence of musculoskeletal symptoms among teachers during 7 days and 12 months preceding data collections.
2. To find out most affected body parts.

3. To examine the associated physical risk factors.
4. To find out association between risk factors and musculoskeletal symptoms.

CHAPTER 2 LITERATURE REVIEW

2.1 Musculoskeletal symptoms

Occupational Safety and Health Administration reported that musculoskeletal disorder is a condition which must have persisting symptoms (pain, paresthesias, numbness, discomfort) or there must be one or more physical findings (redness, loss of motion, deformity, swelling) (Sanders, 2004).

1. Pain

Pain originating musculoskeletal system and it is physical feelings cause by injury (Walter, 2008; Cambridge Dictionaries Online, 2014).

2. Ache

A continuous pain which unpleasant but not strong. It is used in combination with parts of the body to means continuous pain in the stated part (Walter, 2008; Cambridge Dictionaries Online, 2014).

3. Discomfort

A feeling of being uncomfortable physically or mentally, or something that causes short sleep during the day (Walter, 2008; Cambridge Dictionaries Online, 2014).

4. Numbness

Numbness describes a loss of sensation or feelings in a part of body (Walter, 2008, Cambridge Dictionaries Online, 2014).

2.1.1 Musculoskeletal disorder

Musculoskeletal disorders are injuries of muscle, nerve, tendon, ligament, joint, cartilage, or spinal discs (Dul and Weerdmeester, 2008). In Musculoskeletal disorder, different body parts are affected Such as, shoulder, arm, wrist, upper and lower back, knee, ankle etc (Dul and Weerdmeester, 2008). Musculoskeletal disorders are encompassing different conditions that are related with ergonomics risk factors and develops insidiously and recuperates slowly (Sanders, 2004). Musculoskeletal disorders are related to the intensity and duration of work, working nature (Sanders, 2004). Musculoskeletal disorders (MSDs) are minor physical disabilities of different conditions that affect the muscles, bones, and joints (Healthline, 2014).

Common musculoskeletal disorders (or injuries) are Carpal Tunnel Syndrome, Tendonitis, Muscle/Tendon strain, Ligament Sprain, Tension Neck Syndrome,

Thoracic Outlet Compression, Rotator Cuff Tendonitis, Epicondylitis, Radial Tunnel Syndrome, Digital Neuritis, Trigger Finger/Thumb, DeQuervain's Syndrome, Mechanical Back Syndrome, Degenerative Disc Disease, Ruptured / Herniated Disc, repetitive motion injury, repetitive stress injury, overuse injury etc (Canadian Centre for Occupational Health & Safety, 2014; Middlesworth, 2014; National Institute of Neurological Disorders and Stroke, 2013).

2.1.2 Work-related musculoskeletal disorder

Work-related musculoskeletal disorders (or injuries) are a group of painful disorders of muscle, tendon & nerves (Canadian Centre for Occupational Health & Safety, 2014). Work activity which are frequent & repetitive, or activities with awkward postures cause these disorders which may be painful during work or rest (Canadian Centre for Occupational Health & Safety, 2014; Middlesworth, 2014). Work-related musculoskeletal disorders (or injuries) affect the hands, wrists, elbows, neck, and shoulders (Canadian Centre for Occupational Health & Safety, 2014; Healthline, 2014). Work-related musculoskeletal disorders arise in the legs, hips, ankles, and feet when using leg on work (Canadian Centre for Occupational Health & Safety, 2014).

According to World Health Organization, Work-related musculoskeletal disorders arise when exposed to work activity and work condition that significantly contribute to their development or exacerbation but not acting as the side determinant of causation (European Agency for Safety and Health at Work, 2000).

Musculoskeletal disorders include carpal tunnel syndrome, bursitis, tendonitis, epicondylitis, ganglion cyst, tenosynovitis, and trigger finger that is caused by too many uninterrupted repetitions of an activity or motion, unnatural or awkward motions such as twisting the arm or wrist, overexertion, incorrect posture, or muscle fatigue (National Institute of Neurological Disorders and Stroke, 2013).

1. Causes of work-related musculoskeletal disorders

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

help to outrun recovery and the musculoskeletal imbalance persists, it will cause to develop musculoskeletal disorder (Middlesworth, 2014).

Work-related musculoskeletal disorders include 3 types of injuries-

1. Muscle injury

A muscle contraction for long time reduces the blood flow and the substances produced by the muscles are not removed fast. The accumulation of these substances irritates muscles and causes pain (Canadian Centre for Occupational Health & Safety, 2014).

2. Tendon injury

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

3. Nerve injury

The tissues surrounding nerves and it becomes swollen, and squeeze or compress nerves due to repetitive motions and awkward postures (Canadian Centre for Occupational Health & Safety, 2014).

2. Sign and symptoms of work related musculoskeletal disorders

The signs and symptoms of work-related musculoskeletal disorders are pain, weakness, swelling, burning, sensation or dull ache over affected area, numbness, tingling, wasting of muscle, cramping, reduce range of motion, reduce grip strength etc (Canadian Centre for Occupational Health & Safety, 2014; Sanders, 2004; Healthline, 2014).

Work-related musculoskeletal disorders may progress in stages from mild to severe (Canadian Centre for Occupational Health & Safety, 2014).

1. Early stage

Aching and tiredness of the affected limb occur during the work shift but disappear at night and during days off work - No reduction of work performance (Canadian Centre for Occupational Health & Safety, 2014).

2. Intermediate stage

Aching and tiredness occur early in the work shift and persist at night - Reduced capacity for repetitive work (Canadian Centre for Occupational Health & Safety, 2014).

3. Late stage

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

2.2 Risk factor of work-related musculoskeletal disorders

The causes of musculoskeletal disorder are multi factorial that is involving personal, work related, non-work related factors (Sanders, 2004). Musculoskeletal depend on age, occupation, activity level, lifestyle (Healthline, 2014). Risk factors of musculoskeletal disorder can be broken up into two categories and they are work-related (ergonomic) risk factors and individual-related risk factors (Middlesworth, 2014).

Work-related musculoskeletal disorders are associated with work patterns that include-

- ❖ Fixed or constrained body positions
- ❖ Continual repetition or movement
- ❖ Force concentrated on small parts of the body, such as the hand or wrist
- ❖ A pace of work that does not allow sufficient recovery between movements

(European Agency for Safety and Health at Work, 2000; Canadian Centre for Occupational Health & Safety, 2014; Sanders, 2004; Iowa State University 2013).

Heat, cold and vibration can also causes to the development of work related musculoskeletal disorders (Canadian Centre for Occupational Health & Safety, 2014; Sanders, 2004). Ergonomic risk factors of a job or task that are result of biomechanical stress on the worker (Iowa State University, 2013).

Work-related musculoskeletal disorders arise from movements of arm and hand such as bending, straightening, gripping, and holding, twisting, clenching and reaching that particularly harmful in the ordinary activities of daily life (Canadian Centre for Occupational Health & Safety, 2014). Muscles, bones, and joints naturally break

down with age and musculoskeletal disorders also associate with aging (Healthline, 2014).

2.2.1 Ergonomic risk factors

There are three primary Ergonomic risk factors for developing musculoskeletal disorders (Middlesworth, 2014). They are-

1. Repetition

Repetition refers to the performance the same motion over within a given time period (Sanders, 2004). When work is combined with other risks factors such high force and/or awkward postures it will be high repetitive task that can lead to develop of musculoskeletal problems (Middlesworth, 2014; Canadian Centre for Occupational Health & Safety, 2014). If the working cycle time is 30 seconds or less, this work will be highly repetitive (Middlesworth, 2014). Repetitive movements are hazardous when involve in the same joints and muscle groups in the same motion too often, too quickly and for too long (Canadian Centre for Occupational Health & Safety, 2014).

The musculoskeletal problems are associated with repetitive motion (Sanders, 2004; Environmental Health and Safety, 2013). Some back problems also result from repetitive activities (Canadian Centre for Occupational Health & Safety, 2014). The joints are most affected for repetitive motion injuries; especially the wrists, fingers, shoulders, and elbows (Lowa State University, 2013). Repetitive work that is done with the foot or knees may also result in musculoskeletal disorders (Environmental Health and Safety, 2013). Different muscular conditions that result from repeated motions performed in the normal work or daily activities (National Institute of Neurological Disorders and Stroke, 2013).

2. Posture

Posture arises from the functional demands of vision, reach, manipulation, strength, and endurance and it is constrained by the geometric relationship between the person's own anthropometry and the layout of the work place (Sanders, 2004). Individuals are adopted a posture during work tasks, functional demands and capabilities (Sanders, 2004; Dul and Weerdmeester, 2008). Posture is modified by the physical and spatial constraints of working environment (Sanders, 2004). Posture is one of the most frequent risk factor to develop musculoskeletal disorders (Sanders, 2004; Dul and Weerdmeester, 2008).

2.1 Awkward posture

Posture which is not necessarily the optimal biomechanical and length-tension relationship for muscles but that result in the lowest sum of muscle activation to stabilize body parts against gravity (Sanders, 2004). Awkward postures places excessive force on joints and overload the muscles and tendons around the effected joint (Middlesworth, 2014). Raised arm, bent neck, bent wrist, turn head, bent and twisted trunk etc are poor posture (Dul and Weerdmeester, 2008).

Working in awkward posture can be harmful when movements extend tissues beyond the normal range of motion that result musculoskeletal disorder (Sanders, 2004). Awkward postures refer to positions of the body (limbs, joints, back) that is deviated from the neutral position while job tasks are performed (Lowa State University, 2013).

2.1.1 The height of working surfaces – too high

Working surfaces that are too high usually affect the shoulders and the muscles must apply more contraction force to raise and hold the shoulders and elbows out to the side (Lowa State University, 2013).The shoulder muscles fatigue quickly in this position (Lowa State University, 2013).

2.1.2 The height of working surfaces – too low

When surfaces are too low, employees may have to bend their backs and necks to perform their tasks (Lowa State University, 2013). They may also have to reach down with their arms and shoulders to do the tasks (Lowa State University, 2013; Dul and Weerdmeester, 1993). Working surfaces that are too low usually affect the lower back and the neck (Lowa State University, 2013).

2.1.3 Maintaining same work positions or posture for a long period

Working for a long time in the same position, it causes feel stiff, sore and tired (Lowa State University, 2013). Static postures increase the amount of force required holding the arms and shoulders in a non-neutral posture without moving (Lowa State University, 2013). Static postures when sit for a prolonged period on chairs, stools or benches that do not provide adequate lumbar support (Lowa State University, 2013; Dul and Weerdmeester, 2008). When there is no lumbar support and the back is bent forward; the muscles of the back are lead to force the lumbar region that cause

pressure on the discs and reduces blood supply to the spinal tissue (Lowa State University, 2013).

2.2 Neck, Shoulder, Elbow, Wrist, Hip, Knee, Foot or Ankle

Awkward neck posture is result from poor work place, personal work style (Sanders, 2004). Prolong forward bending and twisting of neck causes to develop musculoskeletal symptoms in neck (Dul and Weerdmeester, 2008). When employees are involved long reaches, they are exposed to extreme awkward postures (Lowa State University, 2013).

In different study demonstrate that there has stronger association between awkward or extreme shoulder posture and work related musculoskeletal disorders (Sanders, 2004).

Worker use their shoulder in awkward position when need to overhead reaching, unsupported use of hand, hand away, from the body, performing a seated task in a chair that is too low, repetitive or prolong use of shoulder flexion and abduction, protraction, internal rotation of shoulder (Sanders, 2004; Dul and Weerdmeester, 2008).

About 130 degree of elbow extension, 85degree or less of elbow flexion causes of elbow pain (Sanders, 2004).Repetitive or prolong wrist flexion, extension, ulnar, and redial deviation causes of wrist pain (Sanders, 2004).

Prolong sitting, standing, walking, flexion of hips, and flexion of knee, dorsi or planter flexion of ankle lead to develop musculoskeletal symptoms (Dul and Weerdmeester, 2008).

2.3 Back

Back pain is range from a dull, constant ache, sharp pain that makes it hard to move (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2009). Back pain is more common the older within 30 to 40 years (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2009). Body weight and smoking are associated with musculoskeletal symptoms (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2009).

Excessive reaching, the extent of forward and side way reaching with bent and twist the trunk casus of developing back pain (Dul and Weerdmeester, 2008). Overweight weight, twisting spine can stress the back and cause pain (National Institute of

Arthritis and Musculoskeletal and Skin Diseases, 2009.) Many manual activity carried out while seated (e.g. writing, assembly work) require person to keep hand in front and this trunk have to bent forward (Dul and Weerdmeester, 2008).

3. Forceful exertions

Forceful exertions may be required contraction forces by the muscles, which causes to fatigue rapidly (Lowa State University, 2013). Excessive or prolonged forceful exertions also lead to overuse of muscles and may result in muscle strain, soreness and damage (Lowa State University, 2013; Middlesworth, 2014). Performing forceful exertions can also irritate tendons, joints and discs, which lead to inflammation, fluid buildup, and constriction of blood vessels and nerves in the area (Lowa State University, 2013).

Jobs may require employees to apply pinch forces with their fingers (picking up or placing small items on an assembly line with the fingers), static forces (applying a lot of physical effort to put the last turn on a screw, pulling hard on a 30-inch wrench to loosen a bolt), and dynamic forces (tossing objects into containers), it leads exertion in different body part (Lowa State University, 2013).

Overexertion depends on the magnitude of the force that generated relative to the capabilities of the body structures. It will vary among individuals according to individuals' strength and capabilities (Centers for Disease Control and Prevention, 2004). Many work require high force loads on the human body and response to high force requirements that associated with muscle fatigue; and it can lead to Musculoskeletal disorder (Middlesworth, 2014). Forceful exertions may occur when manual tasks are done and a lot of physical effort is needed to do a task (Centers for Disease Control and Prevention, 2004).

2.2.2 Individual risk factors include

1. Poor work practices

Poor practices leads stress on bodies that increases fatigue and decreases body's ability to properly recover (Middlesworth, 2014). Workers who use poor work practices, body mechanics and lifting techniques are cause to develop musculoskeletal disorders (Middlesworth, 2014).

2. Poor overall health habits

Smoke, drink excessively, or other poor health habits are risk factors for developing musculoskeletal disorders (Middlesworth, 2014).

3. Poor rest and recovery

Workers who do not get adequate rest and recovery time for fatigue muscles are higher risk to develop musculoskeletal disorders (Middlesworth, 2014; Dul and Weerdmeester, 2008).

4. Poor nutrition, fitness and hydration

Malnourished, dehydrated and poor level of physical fitness that are a higher risk of developing musculoskeletal and chronic health problems (Middlesworth, 2014).

2.2.3 Working environment

- 1.** The correct height depends on the task, individual body dimension, performance. Work need close to the body (Dul and Weerdmeester, 2008).
- 2.** Seat height will be adjustable and swivel, back support and arm rest need require that protect trunk from forward bending and twisting (Dul and Weerdmeester, 2008).
- 3.** For reading and writing need a sloping working surface. Sloping work surface helps to maintain neck and back in neutral position (Dul and Weerdmeester, 2008).
- 4.** Sufficient leg room for legs and feet allow person to be close to work without bending the trunk. It also allow stretch leg when prolong sitting (Dul and Weerdmeester, 2008).

2.3 Teacher

Teacher devotes to his or her job is partly self-determined, reflecting not only what the school requires or expects but also the teacher's efficiency, enthusiasm, and commitment (Mohannan, 2005; Chong and Chan, 2010).

2.3.1 Curriculum design

Teachers make appropriate objectives, syllabuses, reading lists, and modes of assessment (Mohannan, 2005).

2.3.2 Curriculum implantation

Preparation of teaching materials, classroom activities in lectures and tutorials, design of exercises, assignments, projects, and quizzes, feedback to students, and final examinations (Mohannan, 2005; Chong and Chan, 2010; Choat, 2014).

2.3.3 Classroom activities of the teacher

Oral presentation of material (lecturing), asking questions, responding to questions, providing learning tasks, getting students to work in groups, and lecture sessions (Mohannan, 2005).

2.3.4 Others

Teachers participate in decisions about school policies and issues (Choat, 2014). Teachers arrange Meeting with parents and provide high quality education, they must improve their skills, stay current in their fields, and learn about new teaching methods (Choat, 2014).

CHAPTER 3 METHODOLOGY

3.1 Study design

The study was conducted in cross-sectional of quantitative design. Cross-sectional study is a snapshot of the frequency and characteristics of a disease in a population at a particular point of time (EHIB, 2013; Levin, 2006). Cross-sectional research method is often used to utilize in many areas including social science and education (Cherry, 2014; Trochim, 2006). Cross-sectional studies are observational in nature and are known as descriptive research (Trochim, 2006). This type of study helps to find out the prevalence of acute or chronic conditions of a population (EHIB, 2013). Researchers record information that is present in a population, but they do not manipulate variables (Cherry, 2014; Trochim, 2006). This type of study utilizes different groups of people who differ in the variable of interest and other characteristics such as socioeconomic status, educational background, and ethnicity (Trochim, 2006; Crossman, 2014).

However, investigator wanted to find out the status of musculoskeletal symptoms among teachers at a point of time. Investigator also wanted to find out the risk factors among teachers at a short period of time. For this reason, the cross-sectional study was more appropriate design to fulfill the aim and objectives of this study.

3.2 Study setting

Study settings were the primary and secondary schools at Gafargoan upzila of Mymensingh district in Bangladesh. Government and non-government primary and secondary schools were selected for conducting study. Investigator selected primary and secondary schools in same environmental context. About 12 to 16 or more teachers were working in a particular secondary school and 7-10 were working in a primary school; and some staffs were working as helping hand.

Primary schools consist of class one to five and secondary schools are from six to ten. On an average, both primary and secondary school teachers work about 7 hours in a day with one hour break of. Sometimes they work extra time such as marking in paper of examination and other official work. Some of teachers come in school from far every day.

3.3. Participant selection

Study participants were primary and secondary school teachers of Mymensingh district in Bangladesh. The total amount of primary and secondary school teachers were about 2427 in Gafargoan upzila (Gafargoan Township, 2013).

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

According to standard formula, sample size will be-

$$Z^2PQ/r^2 = [(1.96)^2 \times 0.5 \times 0.5] \div (0.05)^2 = 384.16$$

As a student, it was quite difficult to collect data from the large range of sample within three months. For this reason, investigator collected data from 130 participants only.

The study sample was selected in convenient way. Convenience sampling is easy and quick statistical method of drawing representative data by selecting population with their volunteering and their availability and easy access (Business Dictionary, 2014; Crossman, 2014).

In this study, investigator selected equal amount of male and female participants to find out the ratio between them. The ratio of the participants were male: female = 1:1. Firstly, investigator choose the school in a convenient way. Participants who willingly responded to the study and fulfilled the inclusion criteria were selected.

3.4 Inclusion criteria

Same amount of male and female were included and the ratio of participant male: female = 1:1. Full time government and non-government Primary and secondary school teachers with at least one year teaching experience were participated in this study.

3.5 Exclusion criteria

Participant was excluded if he or she had joint disease such as osteoporosis, osteoarthritis, soft tissue disease, any recent injury or trauma, residual disability such

as polio, amputation etc, degenerative disc disease and pregnancy at the point of data collection period.

3.6 Data collection instrument

Data collection instruments were standard version of the Dutch Musculoskeletal Questionnaire (DMQ), pen and pencil, paper, tap, consent form, weight machine.

3.6.1 Information sheet and Consent form

For conducting this study, it was important to inform the participants about this study and needed to make sure that participants were interested to give information. An information sheet was included to make sense about study. A details information of study such as identity of investigator, institute affiliation, study aim and objectives, study design, study duration, participants rights and responsibilities, potential risk, benefit and participant's confidentiality were included in this information sheet (appendix- 4A & 5A) which was provided to participants to take informed consent.

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

3.6.2 Dutch Musculoskeletal Questionnaire

Ergonomists and occupational health professionals use Dutch Musculoskeletal Questionnaire to measure work-related musculoskeletal risk factors and symptoms of a working population in a standardized way (Hildedrandt, 2004). Investigator used standard version of the Dutch Musculoskeletal Questionnaire. The standard version of the Dutch Musculoskeletal Questionnaire comprised pages 1-9 (Hildedrandt, 2004). The Dutch Musculoskeletal Questionnaire also comparable with Nordic questionnaire where the definition of body areas of body presented pictorially (Vincent, 2005). The advantage of this questionnaire was that it was a standardized questionnaire and easy to use. The validity of the questionnaire was analyzed in different studies (Vincent, 2005). In this questionnaire, there was included some general questions such as age, sex, education, duration of work etc, work history, prevalence rate, posture, force etc (Hildedrandt, 2004). According to job nature of participant and in Bangladesh perspective, investigator needed to modify this questionnaire (appendix 4B) to conduct this study.

There were different parts of questionnaire. Part 1 had some general question, part 2 was defined as health-1 in which health behavior (smoking, drinking tea or coffee), physical fitness, body weight & height are included. Part 3 was defined as health-2 in which were included the prevalence of musculoskeletal symptoms (pain, discomfort) partly or entirety on body parts (neck, shoulder, back, wrist, hip, knee, feet etc) at the point of 12 months and 7 days perspective. Part 4 was defined as work-1 in which list of tasks and levels of exertion were included. Others parts were defined as work-2, work-3, work-4 in which work characteristics were included. In this study, Investigator was collected data by modified standard Dutch Musculoskeletal Questionnaire in Bangla (appendix 5B). Questionnaire was translated into Bangla. Investigator also calculated body mass index by $\text{weight}/\text{height}^2$. To calculate body mass index, it has four categories and they are < 18.5 = underweight, $18.5-24.9$ = normal, $25-29.9$ = over weight and 30 or more= obesity.

3.6.3 Procedure of translation and field test of the questionnaire

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

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

Back translation is important to identify the appropriateness of translation. Using the same approach as that outlined in the first step of the questionnaire would then be translated back to English by an independent translator. Investigator sent the questionnaire to bilingual expert who did not have any access to the original English version of the both questionnaire to produce a backward translation into English.

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

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

3.7 Data collection procedure

The study was conducted in cross-sectional design to find out the current situation at point of time. Bangladesh Health Professions Institute approved the study protocol (appendix-1). The author of DMQ questionnaire gave permission for using this questionnaire (appendix-2). The authorities of education, Primary Thana Educational Officer and Thana Educational Officer also provided permission to conduct the study at different primary and secondary schools without any disruption of daily work flow (appendix-3). Different schools were selected in convenient way for data collection. Survey started when the participants fulfilled the inclusion criteria and they responded to give information. Participant gave information willingly. The participants were known about the study through information sheet and filled up consent in Bangle (appendix-5A) form by signing. They had right to skip from this study any time. Investigator also took verbal permission from authority of different schools. Investigator used modified standard Dutch Musculoskeletal Questionnaire in Bangle (appendix-5B) for data collection.

Firstly, investigator gave information sheet and consent form to participants and described the purpose of study. When participants understood about study, they were prepared to response according to questionnaire. Most of participants gave information in teacher's room one by one. There had no volunteer to collect data. This questionnaire addressed teacher's work and health. Most of the questions were simply answered by yes or no. participant could not consult with their colleagues. They only marked one answer and were chosen the answer that in opinion is best.

3.8 Analysis

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

Finally the computerized data was ready for analysis. The procedure of musculoskeletal symptoms among teacher in past 12 months was calculated by percentage through the first row of section B of Dutch musculoskeletal questionnaire (DMQ). The demographic data were calculated by frequencies of section A (general factor) of DMQ. To reduce the impact of missing value and increase the reliability of the analysis, data analysis process was carried out using the SPSS (statistic package for social science Inc. version 17.0).

The investigator used the raw data in SPSS to find out the percentage of socio-demographic factors, prevalence of musculoskeletal symptoms in nine body regions & associated physical risk factors. Moreover, investigator used frequencies in SPSS for finding the percentage of socio-demographic factors & prevalence of musculoskeletal symptoms in nine body regions.

If there is a relationship between two categorical variables, chi-square test for association will use to discover categorical variables (Laerd statistic, 2013). Therefore, Chi-square test (χ^2) was used to find out the statistic significant association between risk factors and musculoskeletal symptoms among teacher. Chi-square test was conducted at with $p < .05$, to find out the association between the prevalence of musculoskeletal symptoms and risk factors.

3.9 Ethical Consideration

The investigator awarded about the ethical issues. These were outlined below:

- Investigator received approval of proposal from the faculties of BHPI.
- Investigator took permission from the ethical committee to conduct the research.
- Permission was taken for using Dutch Musculoskeletal Questionnaire.

- Permission was taken from study area
- Written consent was given to the study participant and they had the right to withdraw from the study at any time.
- All participants were informed about the aim of the study.
- Make sure the confidentiality about participant's name and other information. The information was gathered from the participants anonymously.

CHAPTER 4 RESULTS

4. Result

4.1 The mean, standard deviation of characteristics of the study participants (n=130).

General factors	Mean	±Std. Deviation
Age	39.30	8.733
Height	4.9837	.24525
Weight	62.7231	9.24097
Working experience	14.13	8.733

Table 1: Mean, standard deviation of characteristics of the study participants.

4.2 Characteristics of the study participants involved in teaching profession.

General factor	Frequency (N = 130)	Percentage (%)
Age		
21- 40	71	54.6
41 -55	59	45.4
Type of school		
Government	58	44.6
Non-government	72	55.4
Employment duration		
1-5	29	22.3
6-10	24	18.5
11-15	26	20.0
16-20	18	13.8
< 20	33	25.4
Travel		
On foot	44	33.8
Pushbike	24	18.5
Rickshaw	17	13.1
Bicycle	14	10.8
Others	31	23.8
Shoe height > 1 inch		
Yes	31	23.8
No	99	76.2
Health status in general		
Good	48	36.9
not too bad	77	59.2
Poor	5	3.8
Physically tired		
Not tired	5	36.9
A bit tired	96	59.2

Very tired	29	3.8
Height		
4f 8" - 5f	22	16.9
5f 1" - 5f 5"	83	63.8
5f 6"- 5f 10"	24	18.5
>5f 10"	1	.8
Weight		
42-52	14	10.8
53-63	57	43.8
64-74	46	35.4
>74	13	10.0
Body mass index		
Under weight	1	0.8
Normal weight	81	62.3
Over weight	46	35.4
Obesity	2	1.5
Smoking		
Yes, I am smoking nowadays	6	4.6
Yes, I did smoke in the past	23	17.7
No, I never smoked	101	77.7
Amount of exertion		
Normal	118	90.8
Heavy	12	9.2

Table 2: Characteristics of the study participants involved in teaching profession.

The investigator selected 130 participants for this study. In (table 2), it is showed the characteristics and general factors of the study participants involved in teaching profession. The investigator categorized age in two ranges and they are (21- 40), (41- 55). In this study, 54.6% participants were between 21- 40 and 45.4% of 41-55 age range and the mean age 39.30, \pm 8.733. Study participants were working (types of school) in both Government and Non-government school; the percentage was 44.6% and 55.4%. The investigator also categorized employment duration or working experience in (1-5), (6-10), (11-15), (16-20) and (<20); the percentage were 22.3%, 18.5%, 20.0%, 13.8%, 25.4% and mean working experience 14.13, SD \pm 8.733. In total participants, 33.8% participants travel on foot, 18.5 by pushbike, 13.1% by rickshaw, 10.8% by bicycle and 23.8 by others vehicles.

23.8% in total amount of participants had shoe heel height > 1 inch. In generally, the health status of study participant good for 36.9%, not too bad for 59.2% and poor for 3.8%. The percentage of tiredness; 36.9% for not tired, 59.2% for a bit tired and 3.8% very tired. Similarly, investigator categorized height (4f 8" - 5f), (5f 1" - 5f 5"), (5f

6"- 5f 10"), (>5f 10") and it's prevalence 16.9%, 63.8%, 18.5%, .8%; mean height 4.9837, SD \pm .24525. Weight were categorized (42-52), (53-63), (64-74), (>74) and its prevalence 10.8%, 43.8%, 35.4%, 10.0%; mean weight 62.72319, SD \pm .24097. Body mass index of study participant were 0.8% underweight, 62.3% normal, 35.4% over weight and 1.5% obesity. In this study, 4.6% were smoking, 17.7% were smoked in the past and 77.7% never smoked. The amount of exertion of study participants were light, normal and heavy; and its parentage were 0.0%, 90.8% and 9.2%.

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

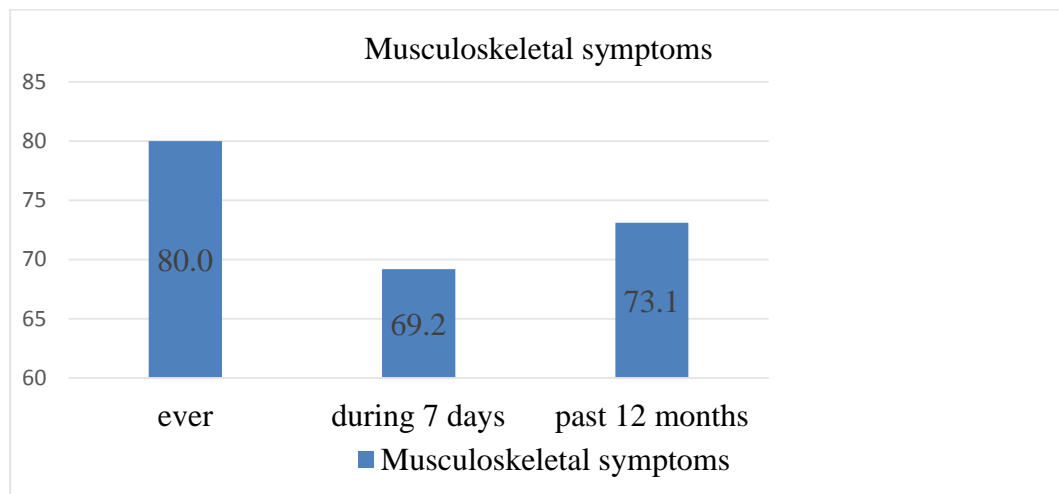


Figure-1: The prevalence of developing musculoskeletal symptoms at least 1 body regions at ever, 7 days and 12 months.

In this study, figure-1 presented that study participants had developing musculoskeletal symptoms at least 1 body regions at ever 80.0% (95% CI 86.86%, 73.14%), during 7 days 69.2% (95% CI 77.04%, 61.36%) and 73.1% (95% CI 80.55%, 65.56%) in the past 12 months.

4.4 Prevalence (%) of developing musculoskeletal symptoms during 7 days and in the past 12 months preceding data collection (n=130) in different body region.

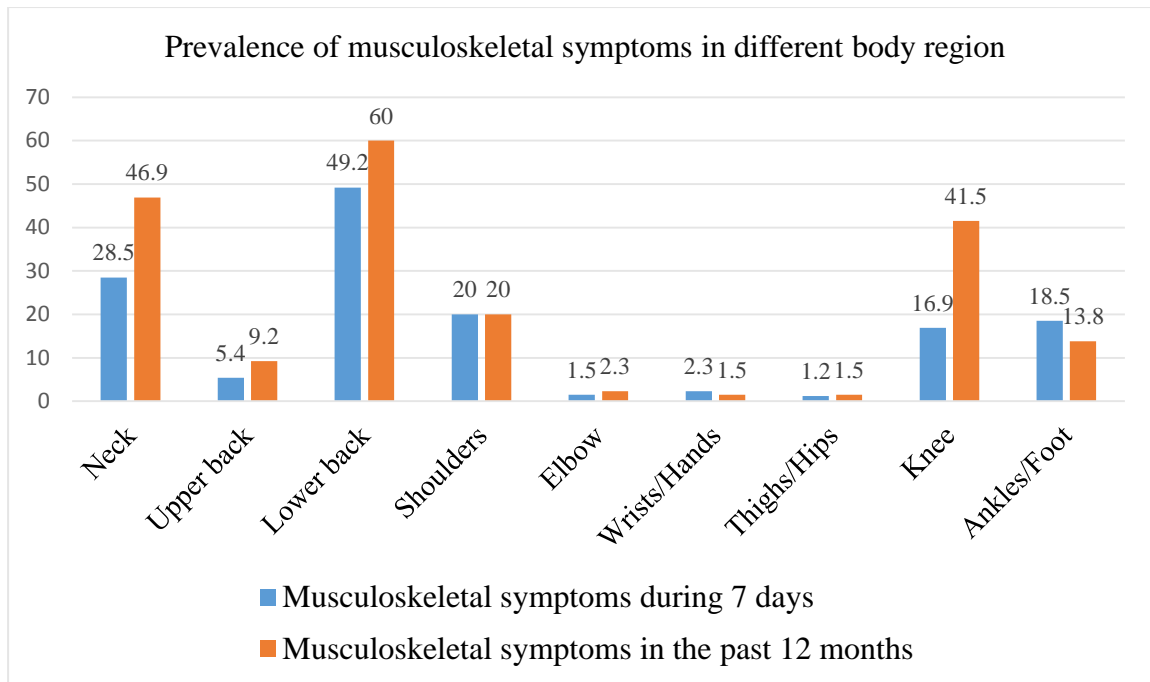


Figure 2: Prevalence of musculoskeletal symptoms in different body regions during 7 days and in the past 12 months prior to data collection.

Figure 2 presented that the prevalence of musculoskeletal symptoms in nine body regions during 7 days and in the past 12 months preceding data collection. In this study, neck, lower back, shoulders, knees and ankle are commonly affected and upper back, elbows, wrists and hips are less affected during 7 days and in the past 12 months. The prevalence of musculoskeletal symptoms in most common body region were neck 28.5% (95% CI 36.15%, 20.85%), lower back 49.2% (95% CI 57.78%, 40.62%), shoulders 20.0% (95% CI 26.86%, 13.14%), knees 16.9% (95% CI 23.36%, 10.44%) & ankles 18.5% (95% CI 25.36%, 11.64%) during 7 days.

In this study, the high prevalence of musculoskeletal symptoms were lower back pain 60.0% (95% CI 68.42%, 51.57%) neck 46.9% (95% CI 55.53%, 38.27%), knees 41.5% (Right 34.6 % and Left 20.0%) (95% CI 49.97%, 33.03%) at the past 12 months. Similarly, the investigator found that moderate affected body regions are shoulders 20.0% (Right 17.7% and Left 3.8%) (95% CI 26.86%, 13.14%) and ankles 13.8% (Right 12.3% and Left 7.7%) (95% CI 19.73%, 7.87%) and less are upper back 9.2% (95% CI 14.1%, 4.3%), elbows 2.3% (Right 2.3% and Left 0.8%) (95% CI 5.04%, -0.44%) wrists 1.5% (Right 1.5% and Left 0.0%) (95% CI 3.58%, -0.58) and hips 1.5% (Right 1.5% and Left .8%) (95% CI 3.58%, -0.58) at the past 12 months.

4.5 Association between socio- demographic or general factors and reported musculoskeletal symptoms in the past 12 months at least 1 body region prior of data collection. (n=130)

The socio-demographic factors or general factors such as age, gender, type of school employment duration, travel, Shoe heel height, body mass index, smoking, and amount of exertion did not have any significant association on the presence of in last musculoskeletal symptoms 12 months (table-3). In this study, there is a significant association between health's statuses in general and physically tired with musculoskeletal symptoms in last 12 months and p-value; health's statuses in general (.045) and physically tired (.019). (See table-3)

Reported demographic factor N=130		MSS in past 12 months		Chi ² value	P- value
		Yes (%)	No (%)		
Age	21- 40	52 (73.2)	26.8(19)	0.002	0.963
	41 – 55	43 (72.9)	7 (27.1)		
Gender	Male	44 (67.7)	21 (32.3)	1.916	0.166
	Female	51 (78.5)	14 (21.5)		
Type of school	Government	41 (70.7)	17 (29.3)	0.303	0.582
	Non- government	54 (75.0)	18 (25.0)		
Employment experience	1-5	20 (69.0)	9 (31.0)	2.424	0.658
	6-10	20 (83.3)	4 (16.7)		
	11-15	20 (76.9)	6 (23.1)		
	16-20	13 (72.2)	5 (27.8)		
	< 20	22 (66.7)	11 (33.3)		
Travel	On foot	31 (70.5)	13 (29.5)	7.207	0.125
	Pushbike	17 (70.8)	7 (29.2)		
	Rickshaw	10 (58.8)	7 (41.2)		
	Bicycle	9 (64.3)	5 (35.7)		
	Others	28 (90.0)	3 (9.90)		
Shoe height > 1 inch	Yes	21 (67.7)	10 (32.3)	0.589	0.443
	No	74 (74.7)	25 (25.3)		
Health status in general	Good	29 (60.4)	19 (39.6)	6.200	0.045
	not too bad	62 (80.5)	15 (19.5)		
	Poor	4 (80.0)	1 (20.00)		
Physically tired	Not tired	5 (100)	0 (0)	7.898	0.019
	A bit tired	64 (66.7)	32 (33.3)		
	Very tired	26 (89.7)	3 (10.3)		
Body mass index	Underweight	0 (0.0)	1 (100.0)	3.470	0.325
	Normal	59 (72.8)	22 (27.2)		
	Over weight	34 (73.9)	12 (26.1)		
	Obesity	2 (100.0)	0 (0.0)		
Smoking	Yes, smoking nowadays	5 (83.3)	1 (16.7)	0.362	0.835
	Yes, smoke in the past	17 (73.9)	6 (26.1)		
	No, I never smoked	73 (72.3)	28 (27.7)		
Amount of exertion	Normal	87 (73.7)	31 (26.3)	0.276	0.599
	Heavy	8 (66.7)	4 (33.3)		

* Chi- square test

Table 3: Association between socio- demographic or general factors and reported musculoskeletal symptoms in the past 12 months.

4.6 Association between reported physical factors and musculoskeletal symptoms in the past 12 months at least 1 body region prior to data collection. (n=130)

The physical factors such as sitting for long periods, standing for long periods, walking for long time and hold hands above shoulder level did not have any significant association on the presence of in last musculoskeletal symptoms 12 months (table-4). In this study, there was a significant association between slightly or heavily bent posture for long time, bent or hold neck in a forward posture for long periods, bent or hold wrist bent for long period, stretching to write on board with musculoskeletal symptoms in last 12 months and p-value; slightly or heavily bent posture for long time (.050), bent or hold neck in a forward posture for long periods (.009), bent or hold wrist bent for long period (.041), Stretching to write on board (.013). (See table-4)

Reported factor	physical	N=	%	Musculoskeletal symptoms in past 12 months		Chi ² value	P-value
				Yes (%)	No (%)		
In a slightly or heavily bent posture for long time	Yes	81	62.3	64 (79.0)	17 (21.0)	3.848	.050
	No	49	37.7	31 (63.3)	18 (36.7)		
Sitting for long periods	Yes	65	50.0	48 (73.8)	17 (26.2)	0.039	.843
	No	65	50.0	47 (72.3)	18 (27.7)		
Standing for long periods	Yes	70	53.8	51 (72.9)	19 (27.1)	0.004	.951
	No	80	46.2	44 (73.3)	16 (26.9)		
Bent or hold neck in a forward posture for long periods	Yes	96	73.8	76 (79.2)	20 (20.8)	6.919	.009
	No	34	26.2	19 (55.9)	15 (44.1)		
Bent or hold wrist bent for long period	Yes	40	30.8	34 (85.0)	6 (15.0)	4.175	.041
	No	90	69.2	61 (67.8)	29 (32.2)		
Hold hands above shoulder level	Yes	95	73.1	72 (75.8)	23 (24.2)	1.320	.251
	No	35	26.9	23 (65.7)	12 (34.3)		
Stretching to write on board	Yes	98	75.4	77 (78.6)	21 (21.4)	6.109	.013
	No	32	24.6	18 (56.3)	14 (43.8)		
walking for long time	Yes	17	13.1	11 (64.7)	6 (35.3)	0.008	.404
	No	113	86.9	84 (74.3)	29 (25.7)		

* Chi- square test

Table 4: Association between reported physical factors and musculoskeletal symptoms in the past 12 months.

4.7 Association between physical factors and reported musculoskeletal symptoms of different body region in the past 12 months prior of data collection. (n=130)

In this study, table-5 presented association between physical factors such as (sitting for long periods, standing for long periods, walking for long time, hold hands above shoulder level, slightly or heavily bent posture for long time, bent or hold neck in a forward posture for long periods, bent or hold wrist bent for long period, Stretching to write on board) and reported musculoskeletal symptoms of different body region such

as neck, lower back, right shoulder, right elbow, right wrist, hips, knees, and ankles in the past 12 months (table-5). In this study, there had a significant association between bent or hold neck in a forward posture for long periods and neck (p-value; .000), lower back associated with slightly or heavily bent posture for long time and sitting for long periods (p-value; .002 and .032), shoulder (right) pain associated with hold hands above shoulder level and stretching to write on board (p-value; .007 and .013), wrist pain associated with bent or hold wrist bent for long period (p-value; .033), knee pain associated with standing for long periods (p-value; .013), ankle pain associated with standing for long periods and shoe heel height > 1 inch (p-value; .028 and .001) (See table 5)

Risk factor	Musculoskeletal symptoms in past 12 months of neck		Chi ² value	P- value	
	Yes (%)	No (%)			
Bent or hold neck in a forward posture for long periods	Yes	55 (57.3)	41 (42.7)	15.845	.000
	No	6 (17.6)	28 (82.4)		
Musculoskeletal symptoms in past 12 months of lower back					
		Yes (%)	No (%)		
In a slightly or heavily bent posture for long time	Yes	57 (70.4)	24 (29.6)	9.630	.002
	No	21 (42.9)	28 (57.1)		
Sitting for long periods	Yes	45 (69.2)	20 (30.8)	4.615	.032
	No	33 (50.8)	32 (49.2)		
Musculoskeletal symptoms in past 12 months of right shoulder					
		Yes (%)	No (%)		
Hold hands above shoulder level	Yes	22 (23.2)	73 (76.8)	7.238	.007
	No	1 (2.3)	34 (97.1)		
Stretching to write on board	Yes	22 (22.4)	76 (77.6)	6.186	.013
	No	1 (3.1)	31 (96.9)		
Musculoskeletal symptoms in past 12 months of right wrist/hand					
		Yes	No		
Bent or hold wrist for long period	Yes	2 (5.0)	34 (95.0)	4.570	.033
	No	0 (.0)	90 (100)		
Musculoskeletal symptoms in past 12 months of knees					
		Yes (%)	No (%)		
Standing for long periods	Yes	36 (51.4)	34 (48.6)	6.109	.013
	No	18 (30.0)	42 (70.0)		
Musculoskeletal symptoms in past 12 months of ankles/feet					
		Yes (%)	No (%)		
Standing for long periods	Yes	14 (20.0)	56 (80.0)	4.815	.028
	No	4 (6.7)	56 (93.3)		
shoe height > 1 inch	Yes	10 (32.3)	21 (67.7)	11.568	.001
	No	8 (8.1)	91 (91.9)		

* Chi- square test

Table 5: Association between reported physical factors and musculoskeletal symptoms of different body region in the past 12 months prior to data collection

CHAPTER 5 DISCUSSION

High prevalence of musculoskeletal symptoms among different working population is commonly reported in different study. In addition, scarcity of evidence in identification of risk factor responsible to develop musculoskeletal symptoms. Therefore, this study was conducted to identify the prevalence and associated risk factor among school teachers.

The study found expectedly a high prevalence of musculoskeletal symptoms among school teachers during their work. In this study, developing musculoskeletal symptoms at least 1 body regions overall 80.0%, during 7 days 69.2% and 73.1% in the past 12 months & the most affected area were neck, lower back, shoulder, knee and ankle in the last 7 days & 12 months.

Several study in other country showed a great portion of school teachers reported musculoskeletal symptoms. Among 893 teachers, the prevalence of neck pain and lower back pain were 48.7% and 45.6% (Yue, Liu and Li, 2012).

A study of Turkey, among 463 participants, 51.4% teacher reported musculoskeletal pain in at least 1 region and 42.5% for neck, 36.9% for upper-back, 43.8% for lower-back, 28.7% for shoulder, 8% for elbow, 13.4% for wrist, 8.4% for hip, 32% for knee and 21.8% for ankle (Korkmaz, Cavlak and Telci, 2011).

Similarly, a cross-sectional analytic research of Thailand, among 452 participant, the prevalence of musculoskeletal symptoms were low back pain 54.4%, shoulder 41.6%, upper back pain 36.1%, neck pain 34.5% and arm pain 27.9%, respectively (Chaiklienga and Suggaravetsirib, 2012). Another study of Turkey, among 531, a large proportion of teachers reported musculoskeletal symptoms at lower back 48.4%, upper back 42.6%, neck 41.4%, shoulders 37.1%, wrists/hands 23.9%, knees 18.6%, elbows and hips/thighs 13.2%, ankles/feet 7.3% (Baskurt, Baskurt and Gelecek, 2011).

Moreover, the study of Australia found that the higher prevalence of developing musculoskeletal symptoms was 83.3% in the previous 12 months among teachers and affected body parts were neck, upper back, shoulder, knee and ankle/feet (Erick and Smith, 2014). A study of Saudi showed that Prevalence of musculoskeletal symptoms

was 79.17% and most common body regions were lower back 63.8%, shoulder 45.4%, neck 42.1%, leg 40.0%, wrist 16.2%, and elbow joint 10.0% (Darwish and Al-Zuhair, 2013).

Another study of Mangalore, the higher prevalence of musculoskeletal pain was 99.6% among school teachers during the past 12 months (Bhat, 2013). Neck pain 66.1%, low back pain 61.8%, knee pain 32.0% and shoulder pain 25.9% were the most prevalent musculoskeletal complaints of school teachers (Bhat, 2013). Besides, a study of Hong Kong, the prevalence musculoskeletal symptoms in Shoulder pain 73.4%, neck pain 68.9% and lower-back pain 59.2% (Chong and Chan, 2010).

In this study, investigator found the high prevalence of developing musculoskeletal symptoms was female than male. Similarly, developing musculoskeletal symptoms was higher than male in different study (Chaiklienga and Suggaravetsirib, 2012; Darwish and Al-Zuhair, 2013).

In this study, investigator did not find significant association between socio-demographic factors or general factors such as age, gender, type of school employment duration, travel, shoe heel height, smoking, body mass index and amount of exertion except health's status in general and physically tired with musculoskeletal symptoms in last 12 months. But there had shown association between demographic factors and musculoskeletal symptoms in different study.

Darwish and Al-Zuhair (2013) stated that there has significant relationship of type of school, age, weight, number of children, shoe type, teaching years, and working daily hours with musculoskeletal symptoms. In another study, female gender and age were associated with developing musculoskeletal symptoms (Erick and Smith, 2014; Korkmaz, Cavlak and Telci, 2011; Baskurt, Baskurt and Gelecek, 2011).

In this study the investigator found that study participants often standing for long periods, sitting for long periods, stretching to write on board, slightly or heavily bent posture for long time, bent or hold neck in a forward posture for long periods, bent or hold wrist for long period and also hold hands above shoulder level or stretch hand to write on high boards during work. Teachers are mostly working in sitting, standing and need to stretch on boards for writing (Chaiklienga and Suggaravetsirib, 2012). A study of Thailand, researcher found that the working postures of teachers were

prolonged standing or sitting, working in awkward posture, writing with the elevated arm on the board which were risk factor to develop musculoskeletal symptoms (Baskurt, Baskurt and Gelecek, 2011).

In this study, there had a significant association between slightly or heavily bent posture for long time, bent or hold neck in a forward posture for long periods, bent or hold wrist bent for long period, Stretching to write on board with musculoskeletal symptoms in past 12 months of different body region. Different study suggested that physical factors, rapid physical activity and awkward arm position were positively associated with musculoskeletal disorder (Erick and Smith, 2014, Baskurt, Baskurt and Gelecek, 2011).

Prolonged standing and sitting, static posture and uncomfortable back support are associated with lower back pain (Yue, Liu and Li, 2012; Samad *et al.* 2010). Prolonged standing has been closely associated with neck/shoulder pain (Erick and Smith, 2013). Another study of Chine reported that developing of neck pain associated with working in forward bending of head for long time of school teachers (Erick and Smith, 2013; Chiu and Lam, 2007). Awkward arm position is associated with shoulder pain (Erick and Smith, 2014).

CHAPTER 6

LIMITATION AND RECOMMENDATION

6.1 Limitations

There are some factors limiting to the findings of this investigation.

- The overall sample size was relatively small and samples were chosen from only one areas and some selected school of Bangladesh in Dhaka by using convenient method.
- Only 130 participants actively participate in this study. So this may not be generalized and may not give the actual result. The result of the present study should be cautious to generalize.

6.2 Recommendations

- The study result suggested that to prevent musculoskeletal symptoms among teachers, 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 the risk level and psychological perspectives to developing musculoskeletal symptoms.
- A future large scale investigation of the incidence of musculoskeletal symptoms among teachers are warranted & may investigate.
- In this study, a huge number of people are affected by musculoskeletal symptoms. Therefore, it is necessary to prevent or improve the management of work related musculoskeletal symptoms teachers.

CHAPTER 7 CONCLUSION

In Bangladesh, there is no actual information about the musculoskeletal symptoms prevalence and associated physical risk factors among school teacher. Therefore, this study discover the prevalence of musculoskeletal symptoms with most affected body parts & associated risk factors of musculoskeletal symptoms among school teacher in Bangladesh. In addition, determine the association between musculoskeletal symptoms (MSS) with socio-demographic factors and physical factors.

This study found a high prevalence of musculoskeletal symptoms and respondent reported musculoskeletal symptoms in different parts of the body at last 7 days & 12 months. In these studies the most affected area were lower back, neck & others regions are affected respectively. Teacher were involved awkward posture in back, neck, arm etc during work as well as uncomfortable position that are potentially associated with developing musculoskeletal symptoms.

Work related musculoskeletal symptoms impact in physical and mental health, individual work as well as quality of life. Therefore, musculoskeletal symptoms becomes cause of absenteeism, activity limitation and sick leave. If individual become sick, it will be hamper on their performance and production. As a result, individual can't perform work in a normal manner. So it is important for an occupational therapist to explore their role in these areas & run different prevention programs efficiently & effectively by small ergonomic changes, modifications and education. The government can play a vital role to decrease the rate of incidence, prevention & treatment.

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* The list of references is followed according to Harvard referencing style (Leabharlann UCD, UCD Library), March 2014. <http://www.ucd.ie/libray>.

Appendix 1

Permission letter for conducting study

Permission Letter for conducting research

Date: 9.8.14

Head of the Department,
Department of Occupational Therapy,
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343.

Subject: Prayer for seeking permission to conduct the research project.

Sir,

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

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

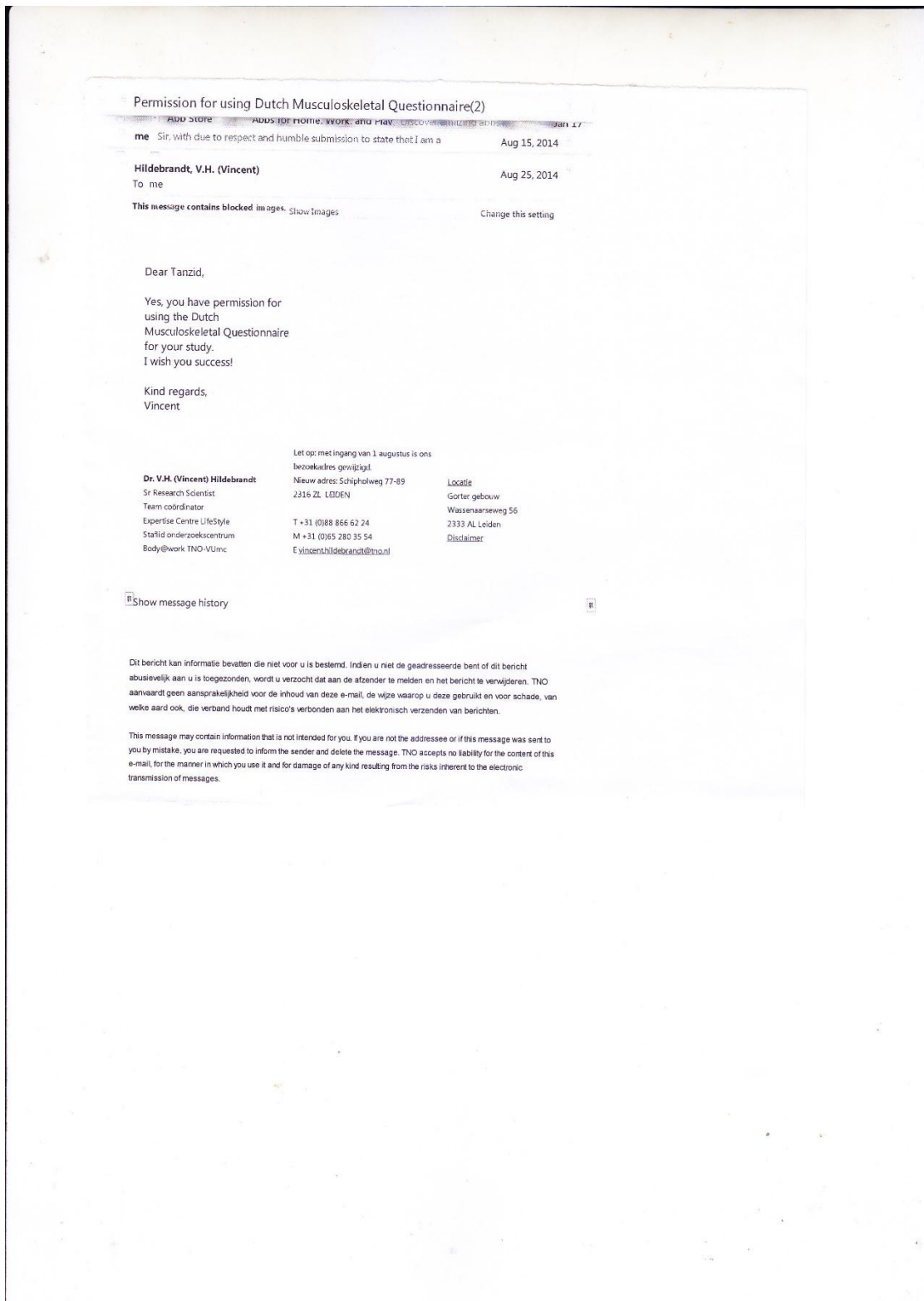
Sincerely,

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

Approved by	Signature
Head of the Department Nazmun Nahar Assistant professor & Head of the department, Department of Occupational Therapy, Bangladesh Health Professions Institute, CRP, Savar, Dhaka.	As per supervisor's comment it may allow her to conduct this study. <i>Uzair</i> 12.08.14
Research supervisor Shamima Akter Lecturer in Occupational Therapy, Department of Occupational Therapy, Bangladesh Health Professions Institute, CRP, Savar, Dhaka.	The study proposal has been approved to carry on. <i>Shamima</i> 09.08.14

Appendix 1

Permission letter for DMQ questionnaire



Appendix 3

Permission letter for data collection (A)



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)

CRP-Chapain, Savar, Dhaka, Tel: 7745464-5, 7741404, Fax: 7745069
BHPI-Mirpur Campus, Plot-A/5, Block-A, Section-14, Mirpur, Dhaka-1206. Tel: 8020178, 8053662-3, Fax: 8053661

তারিখ : ০২.১১.২০১৪

প্রতি

থানা মাধ্যমিক শিক্ষা কর্মকর্তা

গফরগাঁও, ময়মনসিংহ।

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

জনাব,

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

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

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্রী তানজিদা খানম বৃষ্টি তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আহ্বান।

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

ধন্যবাদান্তে

Sr. M. M. M.

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



অনুমতি দেওয়া
গেল।
মনিরুজ্জামান
(সিনিয়র অধ্যাপক)
অকুপেশনাল থেরাপি বিভাগ
বিএইচপিআই।

Permission letter for data collection (A)



বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই) BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)

(The Academic Institute of CRP)

CRP-Chapain, Savar, Dhaka, Tel: 7745464-5, 7741404, Fax: 7745069

BIPI-Mirpur Campus, Plot-A/5, Block-A, Section-14, Mirpur, Dhaka-1206. Tel: 8020178, 8053662-3, Fax: 8053661

তারিখ : ০২.১১.২০১৪

স্বাক্ষরিত
০২.১১.১৪
প্রতি
শিক্ষা কর্মকর্তা
গফরগাঁও, ময়মনসিংহ।

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

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

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্রী তানজিদা খানম বৃষ্টি তার রিসার্চ সংক্রান্ত কাজের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী।

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

ধন্যবাদান্তে

Su. M22

শেখ মনিরুজ্জামান

সহকারী অধ্যাপক ও বিভাগীয় প্রধান (ভারপ্রাপ্ত)

অকুপেশনাল থেরাপি বিভাগ

বিএইচপিআই।



Appendix 4 (A)

Information sheet, consent form in English

Title of research- Prevalence of musculoskeletal symptoms and associated risk factors among school teacher in Bangladesh.

This research is a part of occupational therapy course module and the name of the researcher is Tanzida Khanom Bresty 4th year, B Sc in occupational therapy, Bangladesh Health Professions Institute, Center for the Rehabilitation of the Paralyzed (CRP). Chapain, Savar, Dhaka-1343.

- All the information will be collected from the interview with your consent.
- This study will take 15 minutes from you.
- You can withdraw from the study at any time. You will not be bound to answer to anybody.
- This study will not harmful for you and does not get any facility.
- You will participant this study willingly.
- It would be kept in safely and maintained confidentiality. Only the researcher will be eligible to access in the information for her publication and any name or address will not publish anywhere of the study.
- You can consult with the researcher and the research supervisor about the research process or get answer of any question regarding the research project.

Consent form

In this study, I am _____ a participant and have been clearly informed the purpose of the study. I read this information sheet and understand this. This study will not harmful for me. I am willing to participate in the study with giving consent.

Signature of participant

Date:

Signature of researcher

Date:

Signature of witness

Date:

Appendix 4 (B)

Dutch musculoskeletal questionnaire

DMQ

Do read the first:

This questionnaire addresses your work and your health.

Most questions can simply answered by yes or no. please do not thing too long about each question and do not consult with your colleagues.

You should only mark one answer, even if sometimes choosing between the possibilities given might de difficult: in that case choose the answer that in your opinion is best. Try to answer all questions.

In case you doubt about the answer to be given, try to choose the possibility that nears best reality. Your answer will be treated in the strictest confidence. Apart from the research workers will ever access to the data without your permission, not even your superiors! In the report about this study your personal data cannot be recognized.

Thank you very much for your cooperation!

Participant Code no:

General questions (Socio-demographic factor)

Please read the explanation on the previous page before answering the questions below!

1. What is your age? Years
2. What is your gender? Male ₁ female ₂
3. What is the highest education that you completed successfully?
4. Type of school? Government ₁ non-government ₂
5. What is your marital status? Single ₁ /Married ₂ /Divorce ₃ /Widow ₄
6. How many years have you been carrying out your present work? years
7. How do you usually travel to your work (more than one answer is possible)?
On foot ₁
Pushbike ₂
Motor ₃
Rickshaw ₄
Bicycle ₅
Others ₆

8. Have your shoe height > 1 inch? Yes 1 no 2
9. Monthly income taka

Health (1)

1. How is your health status in general?
 Good 1
 Not too bad 2
 Poor 3
2. –How tall are you? About ft
 - What is your weight? About kg
3. How tired are you normally at the end of a working day physically?
 Not tired 1
 A bit tired 2
 Very tired 3
4. Do you smoke or did you smoke in the past?
 Yes, I am smoking nowadays 1
 Yes, I did smoke in the past 2
 No, I never smoked 3
5. Do you drinking coffee, tea or betel leave? Yes 1 no 2

Health (2)

1. Have you ever had trouble (pain, discomfort) from your
- | | | |
|--------------|-------|------|
| Neck | Yes 1 | no 2 |
| Upper back | Yes 1 | no 2 |
| Lower back | Yes 1 | no 2 |
| Shoulder | Yes 1 | no 2 |
| Elbows | Yes 1 | no 2 |
| Wrists/hands | Yes 1 | no 2 |
| Hips/thighs | Yes 1 | no 2 |
| Knees | Yes 1 | no 2 |
| Ankles/feet | Yes 1 | no 2 |
2. Have you had in the past 12 months trouble (pain, discomfort) from your:
- | | | |
|---------------|-------|------|
| Neck | Yes 1 | no 2 |
| Upper back | Yes 1 | no 2 |
| Lower back | Yes 1 | no 2 |
| Left Shoulder | Yes 1 | no 2 |

Right Shoulder	Yes	1	no	2
Left Elbows	Yes	1	no	2
Right Elbows	Yes	1	no	2
Left Wrists/hands	Yes	1	no	2
Right Wrists/hands	Yes	1	no	2
Left Hips/thighs	Yes	1	no	2
Right Hips/thighs	Yes	1	no	2
Left Knees	Yes	1	no	2
Right Knees	Yes	1	no	2
Left Ankles/feet	Yes	1	no	2
Right Ankles/feet	Yes	1	no	2

3. Have you had during the past 7 days trouble (pain, discomfort) from your:

Neck	Yes	1	no	2
Upper back	Yes	1	no	2
Lower back	Yes	1	no	2
Shoulder	Yes	1	no	2
Elbows	Yes	1	no	2
Wrists/hands	Yes	1	no	2
Hips/thighs	Yes	1	no	2
Knees	Yes	1	no	2
Ankles/feet	Yes	1	no	2

Work (1)

1. Please mark for each task and all tasks together the number which best indicates the amount of exertion associated with that task (light, normal, heavy, very heavy).

The task should be the same as in the table above.

	Light	Normal	Heavy
1.	1	2	3
2.	1	2	3
3.	1	2	3
4.	1	2	3
5.	1	2	3
All task together, taking into amount the frequency	1	2	3

Work (2) characteristics

1. – Do you out the same work almost the whole day? Yes 1 no 2

2. This question addresses breaks.
 - how many breaks do you have during a normal working day? Yes 1 no 2
 - are your normal breaks sufficient? Yes 1 no 2

3. Which kind of work do you have in your work?
 - Standing for long periods Yes 1 no 2
 - Sitting for long periods Yes 1 no 2
 - Job which require extension of arms/ hand Yes 1 no 2
 - Working in the same position for long periods Yes 1 no 2
 - Doing repetitive tasks many times per minute Yes 1 no 2
 - Stretching to write on board Yes 1 no 2

Work (3)

1. Do you in your work often have to:
 - Bent slightly or heavily with your trunk? Yes 1 no 2
 - Twist slightly or heavily with your trunk? Yes 1 no 2
 - Bent and twist simultaneously Yes 1 no 2

2. Do you in your work often have to work:
 - In a slightly or heavily bent posture for long time? Yes 1 no 2
 - In a slightly or heavily twist posture for long time? Yes 1 no 2
 - In a bent and twisted for long period? Yes 1 no 2

3. Do you in your work often have to:
 - Bent your neck forward or hold your neck in a forward posture for long periods?
Yes 1 no 2
 - Bent your neck backward or hold your neck in a backward posture for long periods?
Yes 1 no 2
 - Twist your neck or hold your neck in a posture for long periods?
Yes 1 no 2

4. Do you in your work often have to:
- Bent your wrist or hold wrist bent for long period? Yes 1 no 2
 - Twist your wrist or hold wrist twist for long period? Yes 1 no 2
5. Do you in your work often have to make:
- The same movements with your arms, hands of fingers many times per minute? Yes 1 no 2
 - The same movements (bending, twisting) with your trunk many times per minute? Yes 1 no 2
 - The same movements (bending, twisting) with your head many times per minute? Yes 1 no 2

Work (4)

1. Do you in your work often have to:
- Reach with your arms or hands? Yes 1 no 2
 - Hold your hands at or under shoulder level? Yes 1 no 2
 - Hold your hands above shoulder level? Yes 1 no 2
2. Do you in your work often have to:
- Stands for long periods? Yes 1 no 2
 - Sit for long periods? Yes 1 no 2
 - Walk for long period? Yes 1 no 2
 - Work in the same posture for long periods? Yes 1 no 2

Appendix 5 (A)

Information sheet, consent form in Bangla

তথ্য পত্র

গবেষনার বিষয় হল – বাংলাদেশের স্কুল শিক্ষকদের অস্থি, পেশিগত রোগের উপসর্গের হার এবং এর সাথে সম্পর্কিত ঝুঁকি পূর্ণ বিষয়।

এ গবেষণাটি অকুপেশনাল থেরাপি কোর্সের একটি অংশ এবং গবেষকের নাম হল তানজিদা খানম বৃষ্টি, ৪র্থ বর্ষ, বি এসি ইন অকুপেশনাল থেরাপি, বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট, পক্ষাঘাত গ্রস্তদের পূর্ববাস্তব কেন্দ্র, চাপাইন, সাভার-১৩৪৩।

- সম্মতির সাথে সকল তথ্য আপনার কাছ থেকে সাক্ষারের মাধ্যমে সংগ্রহ হবে।
- গবেষণাটি আপনার ১৫ মিনিট সময় নিবে।
- আপনি যে কোন সময় এ গবেষণা থেকে নিজের অংশগ্রহণ প্রত্যাহার করতে পারবেন। আপনি কার কাছে উত্তর দিতে বাধ্য থাকিবেন।
- এ গবেষণার ফলে আপনার কোন ক্ষতি হবে না এবং কোন সুবিধা পাবেন না।
- এ গবেষণায় আপনার অংশগ্রহণ ঐচ্ছিক।
- তথ্যগুলো নিরাপদে এবং এর গোপনীয়তা দৃঢ়ভাবে বজায় রাখা হবে। এ তথ্যগুলো একমাত্র গবেষক তাঁর প্রকাশনায় ব্যবহার করতে পারবে এবং এ গবেষণার কোন স্থানে কোন নাম অথবা ঠিকানা প্রকাশিত হবে না।
- আপনি গবেষক এবং গবেষণা তত্ত্বাবধাকের সাথে গবেষণার প্রক্রিয়া এবং গবেষণা সম্পর্কিত যে কোন প্রশ্নের উত্তর পেতে পরামর্শ করতে পারবেন।

সম্মতি পত্র

এ গবেষণায় আমি _____
একজন অংশগ্রহণকারী এবং এ গবেষণার উদ্দেশ্য আমি পরিষ্কার ভাবে জানি। আমি এ তথ্যপত্রটি পড়েছি এবং বুঝতে পেরেছি। এ গবেষণাটি ফলে আমার কোন ক্ষতি হবে না এবং আমি সম্মতির সাথে জানাচ্ছি যে, আমি স্বেচ্ছায় এ গবেষণায় অংশগ্রহণ করতে ইচ্ছুক।

অংশগ্রহণকারীর সাক্ষর	তারিখঃ
গবেষকের সাক্ষর	তারিখঃ
সাক্ষ্যদানকারীর সাক্ষর	তারিখঃ

Appendix 5 (B)

Dutch musculoskeletal questionnaire

প্রথমে পড়ে নিনঃ

এ প্রশ্ন পত্রটি আপনার স্বাস্থ্য এবং কাজ সম্পর্কিত।

বেশির ভাগ প্রশ্নের উত্তর হ্যাঁ বা না দ্বারা দেয়া যাবে। দয়াকরে একটি প্রশ্নের জন্য বেশিক্ষণ চিন্তা করবেন না এবং আপনার সহকারীদের সাহায্য নিবেন না। আপনি মাত্র একটি উত্তর চিহ্নিত করতে পারবেন। এমনকি যদি মাঝেমধ্যে সম্ভাব্য উত্তর দিতে কঠিন হয়ঃ সে ক্ষেত্রে আপনার সর্বোচ্চ ধারণাটি নির্বাচন করবেন।

আপনার দেয়া উত্তরে যদি আপনার সন্দেহ থাকে তবে চেষ্টা করবেন বাস্তবতার সাথে মিল রেখে সম্ভাব্য সঠিক উত্তর নির্বাচন করতে। আপনার উত্তর গুলো যথাযথ ভাবে নিরাপদে রাখা হবে। আপনার অনুমতি ব্যতীত আপনার তথ্য গুলো গবেষক এমনকি গবেষনার তত্ত্বাবধায়কও ব্যবহার করতে পারবেন না। এ গবেষণায় আপনার ব্যক্তিগত তথ্য গুলো চিহ্নিত থাকবে না।

সহযোগিতার জন্য আপনাকে অনেক ধন্যবাদ।

অংশগ্রহনকারীর কোড নম্বরঃ

সাধারণ প্রশ্ন

নিম্নের প্রশ্নের উত্তর দেয়ার আগে, দয়া করে পর্ববর্তী পৃষ্ঠার বিবরণী পড়ুন

- ১। আপনার বয়স কত? বছর
- ২। আপনার লিঙ্গ কি? পুরুষ ১ মহিলা ২
- ৩। আপনার সর্বোচ্চ শিক্ষাগত যোগ্যতা কি?
- ৪। স্কুলের ধরণ কি? সরকারি ১ বেসরকারি ২
- ৫। আপনার বৈবাহিক অবস্থা কি? অবিবাহিত ১ / বিবাহিত ২ / বিবাহ বিচ্ছেদ ৩ / বিধবা ৪
- ৬। কত বছর যাবৎ আপনি আপনার বর্তমান কাজটি করছেন? বছর
- ৭। সাধারণত আপনি দিনে কত ঘন্টা কাজ করেন? ঘন্টা
- ৮। সাধারণত আপনি আপনার কাজে কিভাবে যান? পায়ে হেঁটে ১ / মোটরসাইকেল ২ / রিক্সা ৩ / সাইকেল ৪ / অন্য ৫

৯। আপনার জুতার উচ্চতা কি ১ ইঞ্চি থেকে বেশি? হ্যাঁ ১ না ১

১০। প্রতি মাসে কত টাকা আয় করেন? টাকা

স্বাস্থ্য ১

১। সর্বোপরি আপনার স্বাস্থ্যের অবস্থা কি? ভাল ১/ এত খারাপ না ২/ খারাপ ৩

২। - আপনার উচ্চতা কত? ফুট

- আপনার ওজন কত? কেজি

৩। সারাদিনের কাজ শেষে আপনি শারীরিক ভাবে কতটুকু ক্লান্ত হন? ক্লান্ত না ১/ সামান্য ক্লান্ত ২/ খুব ক্লান্ত ৩

৪। আপনি কি ধূমপান করেন অথবা আগে ধূমপান করতেন? হ্যাঁ, আমি ধূমপান করি ১

হ্যাঁ, আমি আগে ধূমপান করতাম ২

না, আমি কখন ধূমপান করি নাই ৩

৫। আপনি কি কফি, চা, পান খান? হ্যাঁ ১ না ২

স্বাস্থ্য ২

১। কখনও কি আপনি নিম্নে উল্লেখিত শরীরের অংশ সুমহে কোন ধরনের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করছেন।

ঘাড়	হ্যাঁ ১	না ২
পিঠের ওপরের অংশ	হ্যাঁ ১	না ২
পিঠের নিচের অংশ	হ্যাঁ ১	না ২
কাঁধ	হ্যাঁ ১	না ২
কনুই	হ্যাঁ ১	না ২
কঙ্গি / হাত	হ্যাঁ ১	না ২
নিতম্বের সংযোগ বা উরু	হ্যাঁ ১	না ২
হাঁটু	হ্যাঁ ১	না ২
গোড়ালি বা পায়ের পাতা	হ্যাঁ ১	না ২

২। বিগত ১২ মাসে, কখনও কি আপনি নিম্নে উল্লেখিত শরীরের অংশ সূমহে কোন ধরনের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করছেন।

ঘাড়	হ্যাঁ ১	না ২
পিঠের ওপরের অংশ	হ্যাঁ ১	না ২
পিঠের নিচের অংশ	হ্যাঁ ১	না ২
বাম কাঁধ	হ্যাঁ ১	না ২
ডান কাঁধ	হ্যাঁ ১	না ২
বাম কনুই	হ্যাঁ ১	না ২
ডান কনুই	হ্যাঁ ১	না ২
বাম কজ্জি / হাত	হ্যাঁ ১	না ২
ডান কজ্জি / হাত	হ্যাঁ ১	না ২
বাম নিতম্বের সংযোগ বা উরু	হ্যাঁ ১	না ২
ডান নিতম্বের সংযোগ বা উরু	হ্যাঁ ১	না ২
বাম হাঁটু	হ্যাঁ ১	না ২
ডান হাঁটু	হ্যাঁ ১	না ২
বাম গোড়ালি বা পায়ের পাতা	হ্যাঁ ১	না ২
ডান গোড়ালি বা পায়ের পাতা	হ্যাঁ ১	না ২

৩। বিগত ৭ দিনে, কখনও কি আপনি নিম্নে উল্লেখিত শরীরের অংশ সূমহে কোন ধরনের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করছেন।

ঘাড়	হ্যাঁ ১	না ২
পিঠের ওপরের অংশ	হ্যাঁ ১	না ২
পিঠের নিচের অংশ	হ্যাঁ ১	না ২
কাঁধ	হ্যাঁ ১	না ২
কনুই	হ্যাঁ ১	না ২
কজ্জি / হাত	হ্যাঁ ১	না ২
নিতম্বের সংযোগ বা উরু	হ্যাঁ ১	না ২
হাঁটু	হ্যাঁ ১	না ২
গোড়ালি বা পায়ের পাতা	হ্যাঁ ১	না ২

কাজ ১

দয়া করে প্রতিটি কাজ এবং একত্রে সকল কাজের জন্য চিহ্নিত করুন যা ঐ কাজের সাথে সম্পর্কিত শ্রমের পরিমাণ নির্দেশ করে।

	হালকা	স্বাভাবিক	ভারী
১।	১	২	৩
২।	১	২	৩
৩।	১	২	৩
৪।	১	২	৩
৫।	১	২	৩
সকল কাজ একসাথে, বারবার করার পরিমাণ	১	২	৩

কাজ ২

১। প্রায় সারাদিন কি আপনি একই ধরনের কাজ করেন?	হ্যাঁ ১	না ২
২। এ প্রশ্ন বিরতি সম্পর্কিত?		
- স্বাভাবিক কাজের দিনে আপনি কতবার বিরতি নিয়ে থাকেন?	হ্যাঁ ১	না ২
- স্বাভাবিক বিরতি কি আপনার জন্য যতেষ্ট?	হ্যাঁ ১	না ২
৩। আপনাকে কোন ধরনের কাজ বেশি করতে হয়?		
অনেকক্ষন দাড়িয়ে থাকতে হয়	হ্যাঁ ১	না ২
অনেকক্ষন বসে থাকতে হয়	হ্যাঁ ১	না ২
বালু বা হাত প্রসারিত করে করতে হয় এমন কাজ	হ্যাঁ ১	না ২
অনেকক্ষন একই অবস্থায় কাজ করতে হয়	হ্যাঁ ১	না ২
প্রতি মিনিটে বারবার একই কাজ করতে হয়	হ্যাঁ ১	না ২
বোর্ডে লেখার জন্য হাত প্রসারিত করতে হয়	হ্যাঁ ১	না ২

১। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- কোমর একটু বা বেশি ঝাঁকাতে হয় ? হ্যাঁ ১ না ২
- কোমর একটু বা বেশি মোচড় দিতে হয় ? হ্যাঁ ১ না ২
- একসাথে ঝাঁকাতে এবং মোচড় দিতে হয় ? হ্যাঁ ১ না ২

২। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- অনেকক্ষণ ধরে কিছুটা বা বেশি ঝাঁকে থাকতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ ধরে কিছুটা বা বেশি মোচড় দিতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ ধরে একসাথে ঝাঁকে এবং মোচড় দিয়ে ? হ্যাঁ ১ না ২

৩। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- অনেকক্ষণ ঘাড় সামনের দিকে নত করে বা সামনের দিকে স্থির অবস্থায় রাখতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ ঘাড় পিছনের দিকে নত করে বা পিছনের দিকে স্থির অবস্থায় রাখতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ ঘাড় মোচড় দিয়ে বা স্থির অবস্থায় রাখতে হয় ? হ্যাঁ ১ না ২

৪। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- অনেকক্ষণ কজি বাঁকা করে বা বাঁকা অবস্থায় স্থির রাখতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ কজি মোচড় দিয়ে বা মোচড় অবস্থায় স্থির রাখতে হয় ? হ্যাঁ ১ না ২

৫। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- এক মিনিটে অনেকবার বাহু, হাতের আঙ্গুল একইভাবে নাড়াচাড়া করতে হয় ? হ্যাঁ ১ না ২
- এক মিনিটে অনেকবার কোমর একইভাবে নাড়াচাড়া করতে হয় (ঝাঁকে, মোচড় দিয়ে) ? হ্যাঁ ১ না ২
- এক মিনিটে অনেকবার মাথা একইভাবে নাড়াচাড়া করতে হয় (ঝাঁকে, মোচড় দিয়ে) ? হ্যাঁ ১ না ২

১। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- বাহু বা হাত প্রসারিত করে ? হ্যাঁ ১ না ২
- কাঁধ উচ্চতায় বা এর নিচে হাত ধরে রাখতে হয় ? হ্যাঁ ১ না ২
- কাঁধ উচ্চতার উপরে হাত ধরে রাখতে হয় ? হ্যাঁ ১ না ২

২। আপনার কাজে জন্য আপনাকে কি প্রায়ইঃ

- অনেকক্ষণ কি দাঁড়িয়ে থাকতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ কি বসে থাকতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ কি হাঁটতে হয় ? হ্যাঁ ১ না ২
- অনেকক্ষণ কি একই অবস্থায় কাজ করতে হয় ? হ্যাঁ ১ না ২