PREVALENCE OF MUSCULOSKELETAL SYMPTOMS AND ITS' ASSOCIATED RISK FACTORS AMONG THE NURSES FROM SELECTED AREAS IN BANGLAGESH

By

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Statement of Authorship

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The ethical issues of the study has been strictly considered and protected. In case of dissemination the finding of this project for future publication, research supervisor will highly concern and it will be duly acknowledged as undergraduate thesis.

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Abstract

Background: This is highly recommended to reveal the information concerning musculoskeletal symptoms prevalence and its' associated risk factors among the working population to develop an effective and efficient preventive approach and intervention program. Nursing professionals are at great risk of developing musculoskeletal symptoms through the world reported in different studies. However, there is scarcity of evidence regarding symptoms prevalence and associated risk factors in the context of Bangladesh.

Objectives: The objectives were to find out the prevalence of musculoskeletal symptoms in the past 7 days and 12 months, the association between prevalence of musculoskeletal symptoms and selected socio-demographic factors and the association between prevalence of musculoskeletal symptoms and physical risk factors.

Methodology: A cross-sectional study was conducted with 105 participants who were selected by using convenient sampling from the hospital of Centre for the Rehabilitation of the Paralysed and also the other Enam Medical Collage hospital. The Dutch Musculoskeletal Questionnaire was used to determine the prevalence and association between Musculoskeletal Symptoms and socio-demographic factors and also to identify physical risk factors of musculoskeletal symptoms among the nurses.

Result: The result showed that 66.7% (95%CI 57.685%, 75.714%) participates reported that they had at least one musculoskeletal symptom within the last 12 months and 52.4% (95% CI 44.858%, 61.952%) participates reported that they had at least one musculoskeletal symptom within the last 7 days. The most affected body part was lower back. Socio-demographic factors were found to be significantly associated with musculoskeletal symptoms. Work-related physical risk factors of musculoskeletal symptoms were identified including Bend trunk slightly was the highest percentage (88.9%) among the nurses and second highest was the frequent movements arms, hand, or fingers, the percentage was 83.3. Some another study about musculoskeletal symptoms among nurses had high prevalence rate of musculoskeletal symptoms, the association between socio-demographic factors and musculoskeletal symptoms, and also physical risk factors which were responsible for musculoskeletal symptoms.

Conclusion: Now a days work related musculoskeletal disorders is the greatest problem in the world among the working population. At a same time, nurses are also suffering from different musculoskeletal disorders. Subsequently, this study shows that there is a high risk of musculoskeletal symptoms among the nurses. It will be managed by reducing physical risk factors through effective ergonomic management. So for the days ahead, further similar study is needed in this sector to find out the prevalence of musculoskeletal symptoms among the large number of nurses and also to identify job related stress like psychological factors.

Key words: *Work-related musculoskeletal disorders, physical risk factors, nursing professionals.*

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List of Abbreviations

WRMSD: Work-related Musculoskeletal Disorder

MSD: Musculoskeletal Disorder

MSS: Musculoskeletal Symptoms

SPSS: Statistical Package for Social Science

BHPI: Bangladesh Health Professions Institute

DMQ: Dutch Musculoskeletal Questionnaire

CRP: Centre for the Rehabilitation of the Paralysed

CHAPTER 1
INTRODUCTION

With passage of time, Musculoskeletal Disorders (MSD) becomes one of the most concerning occupational health problems among different workforce. The prevalence of self-reported musculoskeletal complaints is relatively high amongst the healthcare professionals around the world. Daraiseh *et al.* (2010), reveals that health professionals are at a great risk of developing musculoskeletal disorders. In fact, sick leave absenteeism, lost workday and high rate of health compensation due to work-related musculoskeletal disorders (Alexopoulos, Burdorf and Kalokerinou, 2006) make the issue most challenging for both developed and developing countries (Maul *et al.* 2003; Choobineh, Rajaeefard and Neghab, 2006). Excessive demand of physical workload including patient handling, awkward sustained posture are believed as most significant work-related physical factors associated with musculoskeletal complaints among the health professionals (Engels *et al.* 1996; Lorusso, Bruno and Labbate, 2007).

Along with other healthcare professionals, Munabi *et al.* (2014), reveals that musculoskeletal complaints have been investigated as a main occupational hazard and also important cause of morbidity among the nursing profession Epidemiological studies by Andoa *et al.* (2000); Choobineh, Rajaeefard and Neghab, (2006), shows that working in hospital or clinical settings as a nurse is a high risk occupation, and likely to develop work-related musculoskeletal disorders. Considering physical and intense workload, the nursing profession has been recognized as a physically demanding occupation, as it ranks second after industrial work (Trinkoff *et al.* 2003; Choobineh, Rajaeefard and Neghab, 2006). Anoda *et al.* (2000) and Smedley *et al.* (2003), reports a higher prevalence of low back pain has been complained by nurses compared with industrial workers. The workload of the nursing profession consists of forceful movement, heavy lifting, repetitive task, manual handling, sustained working posture and job related stress (Lorusson, Bruno and Labbate, 2007). Musculoskeletal symptoms have a significant impact on the quality of life regarding physical, psychological, economic and social well-being of nursing professionals. There is a lack of statistics on prevalence of musculoskeletal symptoms in nursing profession in the context of Bangladesh. The findings from this study could help to develop a

concrete prevention and intervention program for improving overall quality of life among nursing professionals.

1.1. Background

Musculoskeletal conditions are a major burden on individuals, health systems, and social care systems, with indirect costs being predominant (Woolf and Pfleger, 2003). Most work-related musculoskeletal disorders develop over time and can also result from fractures sustained in an accident (Musculoskeletal Disorders in Great Britain, 2014). Alexopoulos, Burdorf and Kalokerinou (2003), report that musculoskeletal disorder is a common cause of work-related disability among workers with the health professional and medical expense. Lorusso, Bruno and Labbate, (2007), reports that musculoskeletal Disorders are a major occupational problem and these occur at a high prevalence rate among healthcare workers. It is defined as the injury or disorder of muscle, nerves, tendons, joints, cartilages and spinal discs (Mejia *et al.* 2009; Ajibade, 2013). Musculoskeletal injuries include low back pain, shoulder pain, neck pain, tendonitis, tenosynovitis, wrist pain - carpal tunnel syndrome (Fabunmi, Oworu and Odunaiya, 2008; Ajibade, 2013).

The underlying cause of occupational morbidity among nurses in the world is musculoskeletal disorders (Andoa *et al.* 2000; Yip, 2001; Smith *et al.* 2005). Smedley *et al.* (2003), shows that the symptoms prevalence regarding musculoskeletal disorders amongst nursing professionals is relatively high.

Smith *et al.* (2005), reveals that there are two occupational aspects which are known as risk factors for nursing professionals. One is extrinsic occupational aspect, for example a forceful task, repetitive work, heavy lifting and manual handling (Yip, 2001; Smith *et al.* 2005). These are also known as workplace activities (Bernard, 1997; Choobineh**,** Rajaeefard and Neghab, 2006). Another one is intrinsic personnel items, for example age, tobacco smoking and body size variability (Smith *et al.* 2003; Lagerstrom *et al.* 1995; Smith *et al.* 2005). So in the nursing profession, it is found that patient handling is a main cause of work-related musculoskeletal disorders (Smith *et al.* 2003; Ajibade, 2013). Generally, nursing is also a highly stressful profession (Kawano, 2008). That is why job related risk factors are associated with both job satisfaction and musculoskeletal symptoms (Adams and Bond, 2000; Camerino, Cesana and Molteni, 2001; Kawano, 2008). Although low back pain is a focus of

many studies among nurses, there are very few studies where not only low back pain but also neck, shoulder and arm pain occur due to patient handling (Andoa *et al.* 2000). Individual and workplace risk factors, including physical workload and organizational factors, are also associated with musculoskeletal disorders of neck and shoulder (Marras, Cutlip and Burt, 2009; Palmer and Smedley, 2007; Hoe *et al.* 2012). Lipscomb

Low back was the most prevalent body region, 76% participants reported musculoskeletal complaints at lower back in a study of Netherlands. Another study of Hong Kong reveals 40.6% of nurses had low back pain at the period of preceding data collection. In China, epidemiological studies among hospital nurses found 45% of them complained neck pain.

The total number of musculoskeletal disorders cases in 2013 and 2014 was 526 000 out of a total 1241000 for all work-related illnesses (Musculoskeletal Disorders in Great Britain, 2014). In the Ontario Health Survey, for example, musculoskeletal conditions caused 40% of all chronic conditions, 54% of all long term disability, and 24% of all restricted activity days by doing surveys which were carried out in Canada, the USA, and Western Europe, the prevalence of physical disabilities caused by a musculoskeletal condition (Woolf and Pfleger, 2003). The total number of working days lost due to musculoskeletal disorders in 2013 and 2014 was 8.3 million, an average of 15.9 days per case of musculoskeletal disorders (Musculoskeletal Disorders in Great Britain, 2014). There has generally been a downward trend in the average days lost per worker due to musculoskeletal disorders since 2001 and 2002 among the professional of building trades, nurses, personal care and skilled agriculture trades where had higher rates of total cases of musculoskeletal disorders compared to the average across all occupations (Musculoskeletal Disorders in Great Britain, 2014). The number of work-related injuries or illnesses among registered nurses increased by 65% (Lipscomb *et al.* 2004).

1.2. Significance

In Bangladesh, there are a large number of people who work in the nursing profession. In this area, nurses need to contribute much effort both physical and psychologically. Therefore it is very important for our responsible authority to take care of the nursing profession, in order to get proper services from them. As a result,

it is very important to identify the prevalence and risk. If the prevalence and risk factors is found, then it will be helpful to identify the association between musculoskeletal symptoms and demographic factors. After finding the prevalence and risk factors of musculoskeletal symptoms, we can take decisions in the future whether they will need any occupational therapy intervention to provide education about patient's handling or not. Nursing professionals need to avoid the risks of their job and also maintain the basic principles of ergonomics in their posture. Also they need to learn about how to lift, carry and support patients. Though in Bangladesh, musculoskeletal symptoms are common among health professionals, there is no study of the prevalence and risk factors of musculoskeletal symptoms among nurses. So, as a B.Sc. student in Occupational Therapy, the investigator believes that a study regarding ergonomical issues is essential for the nursing profession.

1.3. Aims and Objectives of the study

The aim of the study is to identify the prevalence of musculoskeletal symptoms and its' associated risk factors among nurses in selected areas of Bangladesh.

Objectives

- To find out the prevalence of musculoskeletal symptoms in the past 7 days and 12 months preceding data collection amongst nurses.
- To find out the most commonly affected body parts
- To identify the association between prevalence of musculoskeletal symptoms and selected socio-demographic factors.
- To identify the association between prevalence of musculoskeletal symptoms and physical risk factors.

CHAPTER 2
LITERATURE REVIEW

2.1. Musculoskeletal symptoms

Musculoskeletal symptoms can be defined as joint stiffness, muscle tightness, redness and swelling of the affected area. Pain is the most common symptom which is associated with musculoskeletal disorders (Musculoskeletal Pain, 2014). Musculoskeletal symptoms is that they may in fact have multiple medical problems which was experienced the sensations of "pins and needles", numbness, skin color changes, and dull aches (Sanders, 2004).

Symptoms may include: (Cherney, 2013)

- Pain
- Aching
- Stiffness of joint
- Painful joints
- Discomfort
- Numbness
- Tingling and
- Swelling

Musculoskeletal disorders

Musculoskeletal disorders consist of minor physical problems. This term is used to describe a variety of conditions that affect the muscles, bones, and joints (Cherney, 2013). Musculoskeletal disorders include a wide range of inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels (Punnett and Wegman, 2004). Clinical syndromes have been shown such as tendon inflammations and related conditions. These include tenosynovitis, epicondylitis, bursitis and nerve compression disorders such as carpal tunnel syndrome, sciatica and osteoarthritis (Punnett and Wegman, 2004). Most common musculoskeletal disorders include: (Cherney, 2013)

- Carpal tunnel syndrome occurs on the palm side of the wrist
- Myofascial pain in the neck and upper back
- Shoulder bursitis

- Rotator cuff tendonitis
- Tennis elbow
- De-Quervain's tendonitis
- Trigger fingers or tenosynovitis of fingers
- Wrist/forearm tendonitis
- Low back pain

There are many different areas of the body that make up the musculoskeletal system; several other diseases can produce significant musculoskeletal signs and symptoms. Musculoskeletal disorders can affect all major areas of the body, including the: (Cherney, 2013)

- neck
- shoulders
- wrists
- back (upper and lower)
- hips
- legs
- knees
- feet

2.2. Work-related musculoskeletal disorders

Work-related musculoskeletal disorder (WRMSD) is a painful disorder of muscles, tendons and nerves. There are some examples of work-related musculoskeletal disorders including carpal tunnel syndrome, tendonitis, thoracic outlet syndrome, and tension neck syndrome (Canadian Centre for Occupational Health and Safety, 2005). Work-related musculoskeletal disorders may affect the different parts of the body which are associated with movement. This is a major problem with serious consequences for workers, companies, and society in general. These are the results of the overuse of the musculoskeletal system (Simoneau, St-vincent and Chicoine, 1996). Work activities which are frequent or repetitive or both, and also activities with awkward postures, can cause these musculoskeletal disorders and may be painful during work or at rest (Work Related Musculoskeletal Disorders). Almost all work is done by the use of arms and hands. Therefore, most work-related musculoskeletal

disorders affect the hands, wrists, elbows, neck, and shoulders. During working time, using the legs can lead to musculoskeletal disorders of the legs, hips, ankles, and feet. Some back problems also caused by repetitive activities (Canadian Centre for Occupational Health and Safety, 2005). Work-related musculoskeletal disorders are very difficult to define within traditional disease classifications. These disorders have received many names, such as: (Canadian Centre for Occupational Health and Safety, 2005)

- Repetitive motion injuries
- Repetitive strain injuries
- Cumulative trauma disorders
- Occupational cervicobrachial disorders
- Overuse syndrome
- Regional musculoskeletal disorders
- Soft tissue disorders

2.3. Associated risk factors of work-related musculoskeletal disorders

A risk factor in the workplace, such as a strong force is also associated with a health problem. The risk factor may be directly or indirectly responsible for a health problem (Simoneau, St-vincent and Chicoine, 1996). There are different groups of factors which potentially contribute to musculoskeletal disorders:

- Physical or biomechanical work-related factors
- Organizational or psychosocial work-related factors
- Environmental factors

Physical factors

Physical factors include work procedures, equipment and environment that lead to biomechanical stress in the muscles, tendons, spinal discs and nerves (European Agency for Safety and Health at Work, 2001). Several factors have been associated with work related musculoskeletal disorders such as repetitive motion, excessive force, awkward and sustained postures, prolonged sitting and standing, are considered the principal physical work-related risk factors in relation to musculoskeletal disorders (Costa and Vieira, 2010)

- **Repetition:** Repetitive tasks require the same movements by using the same muscle groups over a prolonged period (European Agency for Safety and Health at Work, 2001). Some workers perform highly repetitive tasks that are at the highest risk for work related musculoskeletal disorders. Although repetition of movements never acts separately in any task, it is most likely the strongest risk factor. Tasks requiring repetitive movements always involve other risk factors for work related musculoskeletal disorders, such as fixed body position and force. In work involving movement repeated over and over again, the body becomes tired. This is why the worker cannot fully recover in the short periods of time that are given between tasks (Canadian Centre for Occupational Health and Safety, 2005). Repetitive work can cause musculoskeletal disorders in the neck/shoulders. Several interacting physical workplace factors contribute to potential risk factors for work related musculoskeletal disorders. Repetitive work is not necessarily considered the primary exposure factor, but should be considered along with the other work factors (Bernard, 1997).
- **Force:** Force is the mechanical effort required to carry out a movement. It may be exerted against a work piece or tool, or against gravity to stabilize body segments (Sanderas, 2004). Force has been implicated as a risk factor of musculoskeletal disorders because it has combined with other risk factors such as repetitive forceful movement. There is a relation between musculoskeletal disorders and repetitive forceful movement because the risk of musculoskeletal disorders increases when force is increased in the work (Sanderas, 2004). The force required to do the task and also plays an important role to become work related musculoskeletal disorders. More force equals more muscular effort and consequently a longer time is needed to recover between tasks. The more forceful movements develop fatigue to the muscle. Exerting force in certain hand positions is particularly hazardous (Canadian Centre for Occupational Health and Safety, 2005). The shape of the tool plays an important role also (European Agency for Safety and Health at Work, 2001). Force or forceful work is a risk factor for neck/shoulder musculoskeletal disorders which is related to the several interacting physical work load factors (Bernard, 1997).

- **Pace of Work:** Pace of work determines the duration of time which is enough for rest and recovery of the body between cycles of a particular task. The faster the pace that means the less time for rest that is the higher risk of work related musculoskeletal. When the worker has no control over timing and speed of work because of external factors like assembly line speed or quota systems then stress level increases. Controlling the pace of work externally denies the worker the flexibility to determine their own work speed. It's a human characteristic to work at varying rates at different times of the day (Canadian Centre for Occupational Health and Safety, 2005).
- **Awkward postures:** Posture is one of the most frequently cited risk factors for musculoskeletal disorders (Sanderas, 2004). In awkward postures of the joints with the hands above shoulder height or with the wrists noticeable bent are more facilitated to injuries and the muscles have less capacity for exerting force (European Agency for Safety and Health at Work, 2001). Often workers have to use awkward postures, because of the characteristics of the workplace. Inadequate work posture can constitute a risk factor for musculoskeletal disorders (Simoneau, St-vincent and Chicoine, 1996).
- **Vibration:** Vibration affects tendons, muscles, joints, and nerves. Most of the time workers using vibrating tools. For this reason they may experience numbness of the fingers, loss of touch and grip, and also feel pain (Canadian Centre for Occupational Health and Safety, 2005). There is a relationship between vibration and neck/shoulder musculoskeletal disorders. Machine operators exposed to static work and whole-body vibration is exposed to dynamic physical work. So it is one of the occupational status that is relates to neck musculoskeletal disorders (Bernard, 1997). Excessive work with hand-powered tools like hammer drills and other percussive breakers like concrete crushers, hand-held portable grinders, jig saws and chainsaws, may expose the hands to vibration and contribute to potential disruption to the blood circulation in the fingers and to the nerves of the hand and arm (European Agency for Safety and Health at Work, 2001).
- **Temperature:** Cold environments compromise muscle efficiency and may cause vascular and neurological damage. Sometimes workers use cold hands and also may exert more force than necessary which is affecting muscles, soft

tissues and joints. This can lead to a more harmful for the fatigues and to the development of disorders (European Agency for Safety and Health at Work, 2001). Temperature and humidity affect the worker performing repetitive work. When it is too hot and too cold, the workers become tire more quickly and it is influenced to injury. On the other hand, cold temperatures not only decrease the flexibility of muscles and joints but also increase the injury (Canadian Centre for Occupational Health and Safety, 2005).

- **Static postures**: Work with the static posture means keeping the muscles contracted without relaxation. It is the opposite of dynamic muscular work, which refers to an alternation between contraction and relaxation (Work related musculoskeletal disorders, 1996). The shoulder muscles are tensed because of the arms rising above the shoulder level while the hands work without any rest. Hairdressers, dentists, computer operators and musicians are examples of workers who work for a long time in a static posture. This repeated static posture can help to raise the injuries (Sanderas, 2004). The impact of static muscle loads is musculoskeletal pain that requires low-level muscle tension or constrained work postures over a long period. Static postures are those postures held over a period of time that resist the force of a body part (Sanderas, 2004).
- **Prolonged standing or prolonged sitting:** It may result in fatigue and discomfort in the legs. It can lead to the development of musculoskeletal disorders e.g. painful feet and other foot problems (European Agency for Safety and Health at Work, 2001). Prolonged sitting requires the muscles to hold the trunk, neck and shoulders in a fixed position. This squeezes the blood vessels in the muscles by reducing the blood supply. An insufficient blood supply accelerates fatigue and makes the muscles prone to injury (Simoneau, St-vincent and Chicoine, 1996).
- **Manual handling:** It refers to the transfer, pushing, pulling and carrying of loads by one or more employees. When heavy manual handling is repetitive and combined with awkward work postures (e.g. with the trunk bent forward, or bent and twisted at the same time) it may be a high risk of musculoskeletal disorders in the lumbar region. However, some loads may be considered favorable; they contribute to the dynamics of movement and to the efficiency

of blood circulation as well as when the load is suitable for the duration of the activity and the recovery time allowed (European Agency for Safety and Health at Work, 2001).

Psychosocial factors

Psychosocial factors are often classified as the more subjective aspects of the work environment. Psychosocial stressors are conditions that realized as threatening, harmful, or bothersome. These place demands on employees that cause a reaction of physiologic adaptation responses (Sanderas, 2004). To exposure the physical risk factors and insufficient rest or recovery time that is the principal of psychological factors which can lead to musculoskeletal disorders. Mental strain can cause muscular tension, and increase existing physical strain. Work conditions that may increase mental strain include:

- Psychologically demanding activities where the workers are exposed to high levels of work stress, work pressure and mental demands, as a consequence for example of tight deadlines and low levels of autonomy.
- Activities where there is a little support from colleagues, supervisors and managers (European Agency for Safety and Health at Work, 2001).

Environmental factors

Musculoskeletal disorder is a multi-factorial condition because of the relationship between work activities and associated risk factors. This means that when different physical factors are present, co-existing with environmental factors (European Agency for Safety and Health at Work, 2001) and also some factors such as a work situation, work station design, work place layout, height of the working station, equipment and standing work station. These factors may raise a high risk of developing musculoskeletal disorders (Simoneau, St-vincent and Chicoine, 1996).

2.4. Musculoskeletal disorders among workers

There are few studies on the prevalence of work related musculoskeletal disorders and their association with occupational tasks which have been performed in the manufacturing sector (Ghasemkhani, Mahmud and Jabbarii, 2008). In the USA, 92 576 injuries or illnesses resulted from repetitive motion including typing or key entry,

and repetitive placing, grasping or moving of objects or tools (Ghasemkhani, Mahmud and Jabbarii, 2008).

In the US, more than 600,000 workers have work related musculoskeletal disorders resulting from work in every year (Costa and Vieira, 2010; United Electrical Radio and Machine Workers of America, 1999). Reports have indicated the highest incidence rates of work related injuries and illnesses from repetitive motion in industries such as packing plants (National Institute for Occupational Safety and Health, 1997).

There is a relationship between packing workstations and the workers and it is important to the industry. However, it is identified that musculoskeletal risk factors has been occurred for improving productivity. It is investigated that the relationship between workers' repetitive work and postural discomfort are the musculoskeletal risk factors for the industrial workers (Ohlsson, Attewell and Paisson, 1995; Costa and Vieira, 2010). Hairdressers, dentists, computer operators and musicians are examples of workers who have long-term static postures (European Agency for Safety and Health at Work, 2001). In US at the late 1980s, 40% of occupational illnesses are reported disorders related trauma from repetitive work movements in the private industry. The following professions experienced more musculoskeletal problems than average in 2007: (Cherney, 2013)

- Attendants
- Delivery truck drivers
- Freight handlers
- Laborers
- Nursing aides
- Orderlies

2.5. Nursing professionals in Bangladesh

Nursing profession is one of the noblest professions in the world. Nursing is the art of caring for the sick through the science of health care. As a vital component of medical care, it has a far reaching effect on human life and already has passed a long way to its goal. Today, it offers tremendous scope of career growth and opportunities are

more and varied (Bangladesh Basic B. Sc. Nursing Forum, 2014). Nursing is a dynamic profession which takes care of health scientifically. Professional nursing requires advanced education and training. Nursing is also an art of applying scientific principles in intelligent and humanitarian way to care for and assist people in promoting, maintaining and restoring health (Nursing, 2013). Nursing is dynamic and responds to the changing nature of social needs. Four features of contemporary nursing practice have been described:

1. Attention to the full range of human experiences and responses to health and illness without restriction to problem-focused orientation.
2. Integration of objective data. With knowledge gained from an understanding of patient's subjective experience.
3. Application of scientific knowledge to the process of diagnosis and treatment.
4. Provision of a caring relationship that facilitating health and healing (Bangladesh Basic B. Sc. Nursing Forum, 2014).

In Bangladesh, today nurses are functioning as key members on different aspects of health care. Still the nursing profession is not given respect to play a vital role in the patient care. There are several factors influencing this low status e.g. low status of women, nurses do not have high educational qualification or economic standing, nurses perform activities regarded as a routine activities such as physical care, maintenance of cleanliness, carrying out doctor's order etc. (Bangladesh Basic B. Sc. Nursing Forum, 2014).

Today, Bangladesh faces the biggest challenge that is the lack of human resources in health - physician, specialists, nurses or paramedics. As per a recent Planning Commission study, the country is short of 6 lakh doctors and 10 lakh trained nurses. For every 25 thousand Bangladesh, there is just one nurse. Nursing education is much more important rather than making them to be prepared. It means continuous growth in the capacity to work with the health team, patients and the community. Bangladesh Nursing and midwifery Council is contributing its modest share in the field of nursing education since 2001. The Institute is committed to produce world class nursing professionals by providing world class nursing education by boasting of its infrastructure and professionally qualified team of faculty (Bangladesh Basic B. Sc. Nursing Forum, 2014).

2.6. Musculoskeletal disorders among nursing profession

Nurses employed in hospitals are particularly responsible to work-related musculoskeletal disorders. Their work mainly involves frequently heavy lifting, often in awkward postures and sometimes forceful movements of the upper limbs for this reason low back, neck and shoulder pain have been shown to be highly prevalent among nurses (Carugno, Pesatori and Ferrario, 2012). Health care workers, especially those with direct patient contact such as among the nursing professions are the highest rate of musculoskeletal complaints. For the past several decades, nurses have experienced a high prevalence of musculoskeletal complaints. Work-related musculoskeletal complaints might have a significant impact on nurses because of musculoskeletal pain and discomfort (Najenson, Treger and Kalichman, 2014). Various physical risk factors such as manual handling, frequent bending and twisting, forceful movements and awkward working postures have been shown the association between this occupational group and musculoskeletal disorders (Lorusso, Bruno and Labbate, 2007). Nursing profession is a high incidence of back pain where particularly lower back pain is the most frequent injury in the nursing profession because of biomechanical demands. Absenteeism levels are the most common in the nursing profession rather than other working professionals due to back pain (Manuel, Au-Yong and Santos, 2011).

CHAPTER 3
METHODOLOGY

3.1. Study design

The investigator selected quantitative cross sectional study design to estimate the prevalence and associated risk factors of musculoskeletal symptoms at the last 7 days and 12 months preceding data collection. Quantitative methods are appropriate for this study because the issue is known about, is relatively simple and clear cut, time effective (Levin, 2006). Likewise, quantitative design is appropriate for those studies that is intended to investigate prevalence and association with factors (Lorusso, Bruno and Labbate 2007; Levin, 2006). According to Shaughnessy, Zechmeister and Zechmeister, (2003), in cross-sectional design one or more samples are drawn from the population at one point of time and this study is an analysis of the present situation and is carried out at one specific time, or over a short period (Levin, 2006). This study also wants to see the situation of musculoskeletal symptoms among nurses over two periods of time preceding data collection. Therefore, the selection of study design truly reflects the intention of the investigator.

3.2. Study setting

The study was conducted in the CRP hospital and also the other Enam Medical College hospital.

Centre for the Rehabilitation of the Paralysed (CRP), it is situated in Savar, which 20 km away from Dhaka. The founder of CRP is a British physiotherapist Valerie Taylor. It was founded in 1979 by the help of a small group of Bengalis. In CRP, there is an institute of BHPI with the combination of a Nursing institute which was established in 1993. In CRP hospital, B. Sc. in nursing course has been started since session 2013-2014 and there are 18 students under the B. Sc. in nursing. In clinical side of nursing institute, there are a very few number of nurses who work with the multidisciplinary team. The number of nurses in CRP hospital is 20. They are working in different areas likely the ward, outdoor and also one operation room.

Enam Medical College is situated at 9/3 Parbotti Nagar, Thana Road at Savar. It is a 7^{th} floor building. This campus is very near to the CRP. It takes10 minutes to go to Enam Medical College from CRP. It was established in 2003, fulfilling all the

guidelines and criteria set up by the Ministry of Health and Family Welfare, Bangladesh Medical & Dental Council and University of Dhaka. There is about 150 nurses' who are involved with the clinical practice. Nurses who work in different sectors such as operation room, in the ward, Intensive Care Unit, emergency care unit, and pediatric unit.

3.3. Participant selection procedure

Nurses who involved in clinical practice in different hospitals, and also clinics were the study population. Nurses were the study participants who had worked in this profession at Centre for the Rehabilitation of the Paralysed and Enam Medical College hospital for at least 12 months preceding data collection.

The formula for standard sample size is Z^2PQ/r^2, where Z= constant value depends on CI, P=prevalence, Q= (1-P) and r=sampling error which is 5%. As there was no published research of musculoskeletal symptoms among nurses in Bangladesh, so the investigator used P=50% prevalence. Therefore according to standard formula, sample size was $Z^2PQ/r^2= (1.96)^2\times 0.5\times 0.5/ (0.5)^2= 372.4$. However, it was quite difficult as a student to collect data within three months from this huge sample. That's why investigator selected 105 participants.

3.3.1. Sampling procedure

Convenient sampling procedure was selected in this study for data collection. Convenient sampling is a process in which a sample is draw from the subjects' conveniently available (Bailey, 1997; Crossman, 2014). Convenient sampling can be used in the study because it is mostly easier, cheaper, and quicker. Moreover it also might be used for considering the financial or temporal reasons (Bailey, 1997). Considering this issues, investigator collected data from 105 participants from the selected area.

3.3.2. Inclusion criteria

Both male and female nurses who performing their job for at least 12 months preceding data collection.

3.3.3. Exclusion criteria

- Pregnant female nurses were excluded at the time of data collection.
- Participants who were affected by osteoarthritis, rheumatoid arthritis, recent surgery or injury
- Participants who had any disabilities

3.4. Data collection instrument

Information Sheet & Consent form, paper, pen & pencil and Dutch Musculoskeletal Questionnaire.

- ***Tape measure***

A tape measure by Komelon Company, 12 ft. 35 meter, was used to determine the height of the participants.

- ***A weight machine***

Weight machine (the brand was Navenaii, a product of Crockerikes garden LDT. MBS 22 model, made in china) was used for measuring weight.

- ***Information sheet & Consent form***

An Information sheet (Appendix 4) including details information on study aim and objectives, study design, study duration, institute affiliation, identity of investigator, participant's confidentiality, participant's rights and responsibilities, potential risk, and benefit were ensured for participants to provide prior to take informed consent.

A written consent form was also prepared for participants to verify the level of understanding the information sheet, and awareness about the potential benefits. Participants were also concerned about any risk to participate as a volunteer in this study with their signature.

- ***Dutch Musculoskeletal Questionnaire***

The Dutch Musculoskeletal Questionnaire is very important to find out the prevalence of musculoskeletal symptoms from different body parts among different working population (Hildebrandt, 2005). It is allowed to all the ergonomists and occupational health professionals to identify work-related musculoskeletal risk factors by the mostly easier, quicker and a standardized way (Hildebrandt, 2005). This questionnaire is used by asking the participants about any feeling or discomfort among the nine

body region likely neck, upper back, lower back, shoulder, elbow, wrist, hips, knee, and ankles over the last 7 days and over the last 12 months or ever (Hildebrandt, 2005). It has been also used to identify the association between socio-demographic factors likely age, gender, education, duration of employment, work history, shifting work and musculoskeletal (Hildebrandt, 2005). By using this questionnaire, physical and psychological risk factors have been identified with the help of musculoskeletal workload. Because there is a relationship between work tasks and musculoskeletal symptoms in this questionnaire (Hildebrandt, 2005). Here, the investigator used the slandered Questionnaire, section of demographic, health 1 and health 2, and work 1,2,3,4 to identify demographic factors, prevalence rate, and physical risk factors but did not use the section of work 5 & 6 for psychological risk factors(Hildebrandt, 2005).

For translating Dutch Musculoskeletal Questionnaire into Bengali, the investigator selected two translators for forward translation A & B. They are health professionals who had already completed their graduation. Both translators converted original Dutch Musculoskeletal Questionnaire in Bengali independently with a focus to produce a conceptually equivalent translation of the original questionnaire & consider familiar & easily understandable language but not a word-for-word translation.

After receiving independent forward A & B translation, investigator and a linguistic expert who was experienced in instrument development and translation discussed two forward versions of those questionnaires during a meeting and approved a combined version in order to produce a conceptually equivalent translation named Bangla version DMQ 1.0 of the original questionnaire.

After finalizing Bangla version DMQ 1.0, 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. Comparison of this backward translation with Version 1.0 was done to find out any discrepancies, mistakes, mistranslations, inaccuracies, and misunderstanding in the Bangla version 1 and sometimes in backward translation was identified. Finally DMQ version 2.0 was prepared for the field test.

Before starting of the data collection the investigator accomplished the field test with 5 participants who speak in Bengali language in order to conduct a comprehension test through face to face interview. This test was performed to find out the difficulties which were existed in the questionnaires. During this period, the investigator investigated whether the subjects had any difficulty in understanding and also examine the participant's interpretation or expression of all questions. By this test the investigator used the re-model of the questionnaires with the help of supervisor for the participant as they can understand the voice that the investigator wants to get from them. Based on participant's interpretation what they choose better alternatives to their usual language the third version of the questionnaire was developed. The Bangla version DMQ 3.0 of the questionnaire was considered as final version.

3.5. Data collection procedure

The Institutional Review Committee of the Bangladesh Health Professions Institute approved the study protocol (Appendix 1). The authorities of the Centre for the Rehabilitation of the Paralysed and Enam Medical College Hospital also provided permission to conduct the study at their hospital without any disruption to daily work flow (Appendix 3). The nurses were also informed by the authority of the hospitals that they can involve in the study if they want. Time and place were confirmed with the eligible participants before collecting data. Then the contents of information sheet were briefly explained and also the study aim and objectives were mentioned to all participants. If they showed interest to participate, they were asked to give written consent (Appendix 4) and also asked to take part in face to face interview. The interview was conducted in a quiet room using the "Bengali version DMQ 3.0" of the Dutch Musculoskeletal Questionnaire (Appendix 5). Data collection method was face to face interview by using structured questionnaire which allowed the investigator to describe briefly the items of the questionnaire according to need and understanding level of the participants so that they could be able to response and answer correctly.

3.6. Data analysis

Data input and analysis process was performed by using the Statistical Package for Social Science (SPSS), version 17 (SPSS Inc., Chicago, IL, USA) to increase the trustworthiness of the analysis and lessen the influence of the missing value. Every questionnaire had a code number for avoiding the missing or overwriting data into the

SPSS. At first, the investigator considered every question as a variable, then inputted into SPSS. The raw data was put on the SPSS and Microsoft Office Excel sheet. Every question was rechecked for missing information double quoted response or unclear information. The variables were labeled in a list & the investigator established a computer based data definition record file that consisted of a list of variables in order.

Firstly, every variable of the questions were defined in the means of variable 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 SPSS spread sheet. The next step was cleaning new data files to check that the input data was set to ensure that all data was accurately transcribed from the questionnaire sheet to the SPSS data view. Finally, the raw data was ready for analysis in SPSS.

For fulfilling the study aim, the investigator sequentially solved the study objectives at an organized process. The demographic data was calculated by the means of frequencies through the section A of DMQ. Descriptive analysis was also used to find out the frequency and percentage of different socio-demographic data. The prevalence of musculoskeletal symptoms among nurses in last 7 days and last 12 months was calculated by means of frequencies and percentage through the first column of section B of Dutch Musculoskeletal Questionnaire with 95% confident interval. Association between demographic factors (age, gender, daily working hour, and working types) and perceived musculoskeletal symptoms was measured by Chi- Square (χ^2) test with p value < .05 and also association between physical risk factors and perceived musculoskeletal symptoms, the investigator used chi-square test which was conducted with p value < .05.

3.7. Ethical Consideration

- Investigator received approval of proposal from the Bangladesh Health Professions Institute from the ethical committee to conduct the research.
- Participants have right to withdraw from the study at any time.
- All participants were informed about the aim of the study
- Confidentiality of personal information was strictly maintained. The information was gathered from the participants anonymously

- Investigator answered any study related questions or inquiries from the participants.
- Written permission was taken from the both study setting
- Permission was taken from the copyright authority of Dutch Musculoskeletal Questionnaire.
- Written permission from the participants was taken in consent form
- Participants were informed about aim objectives, risk, benefit, and rights in the form of information sheet.

CHAPTER 4
RESULTS

4.1. The mean, ±Standard Deviation, maximum and minimum range of characteristics of study participants

Socio-demographic factors	Mean	±SD
Age	27.92	5.401
Height	1.537	0.08176
Weight	54.15	9.522
BMI	22.933	3.859
Experience	5.99	4.57
Working hour	6.97	1.55
Monthly income	11372.38	4005.20

±SD= Standard Deviation

Table 2: The mean, ±SD, maximum and minimum range of characteristics of study participants

This table provides information on the characteristics of study participants regarding age, height, weight, experience, working hour and monthly income. There were 89 women and 16 men. Most of them were married. Their main working types were patient handling, medicine provide, and caring of the patients. They work in 3 shifts like morning; evening and night by turn each shift for 2 days. The mean age of the participant was 27.92; ±SD was 5.401, maximum and minimum age was 50 and 22. The mean height of the participant was 1.537; ±SD was 0.08176, maximum and minimum height was 1.74 m and 1.22 m. The mean weight of the participant was 54.15; ±SD was 9.522, maximum and minimum weight was 78 kg and 36 kg. The mean BMI of the participant was 22.933; ±SD was 3.859, maximum and minimum BMI was 40.31 and 15.37. The mean working hour of the participant was 6.97; ±SD was 1.55, maximum and minimum working hour was 18 hours and 6 hours. The mean monthly income of the participant was 11372.38; ±SD was 4005.20, maximum and minimum monthly income was 20000 taka and 5000 take.

4.2. Characteristics of socio-demographic factors in the study participants

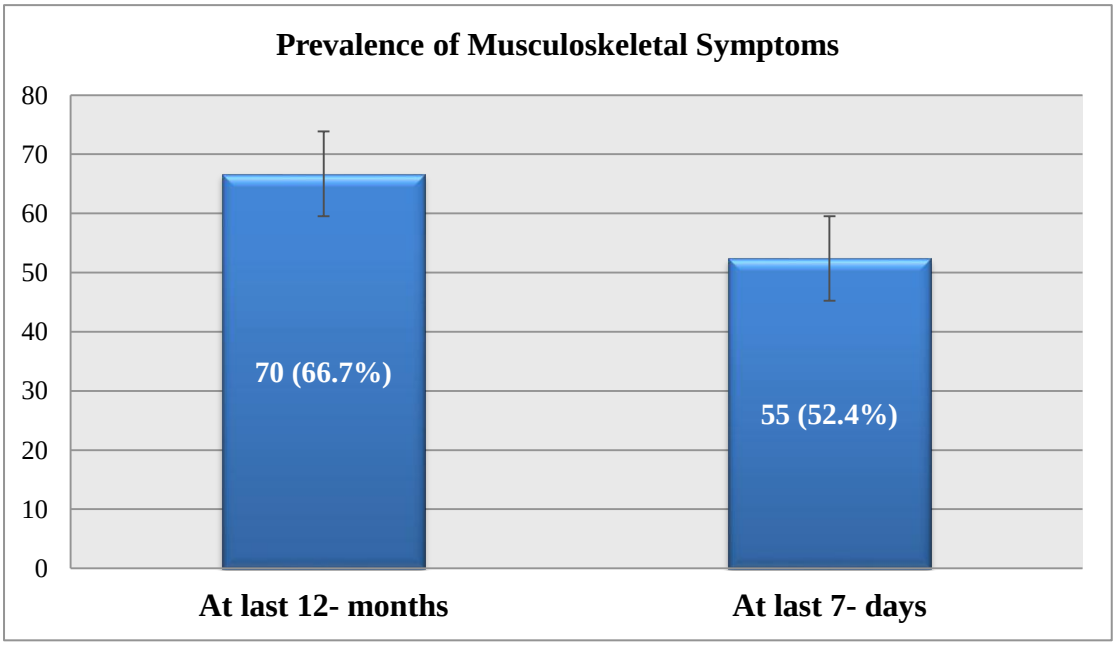
Socio-demographic factors	Frequency N(105)	Percentage (%)
Age		
23-29	75	69.4
30-36	22	20.4
37-43	5	4.6
44-50	3	2.8
Gender		
Male	17	15.7
Female	88	81.5
Marital status		
Married	73	67.6
Unmarried	32	29.6
Duration of experience		
1 year -9 years	79	73.1
10 years-18 years	22	20.4
19 years-27 years	4	3.7
Working hours		
6 hours	54	50.0
8 hours	40	37.0
More than 8 hours	11	10.2
BMI		
15 - 21	42	38.9
22 - 28	58	53.7
29 - 35	4	3.7
36 - 42	1	0.9
Monthly income		
7000-12000	62	57.4
13000-18000	39	36.1
19000-24000	4	3.7

Table 2: Characteristics of socio-demographic factors of the study participants

Table 2 shows that socio-demographic factors were categorized to identify the frequency and percentage of these factors by using descriptive analysis. The socio-demographic factors were categorized including age has 4 categories with the distance of 7 years in each age range, gender like male & female, marital status like married & unmarried, working hours like 6 hours, 8 hours and more than 8 hours, BMI has 4

categories with the distance of 7 in each range and at last the monthly income has 3 categories with the distance of 6 thousand taka in each range.

4.3. Prevalence of Musculoskeletal symptoms in overall at last 12 months and 7 days

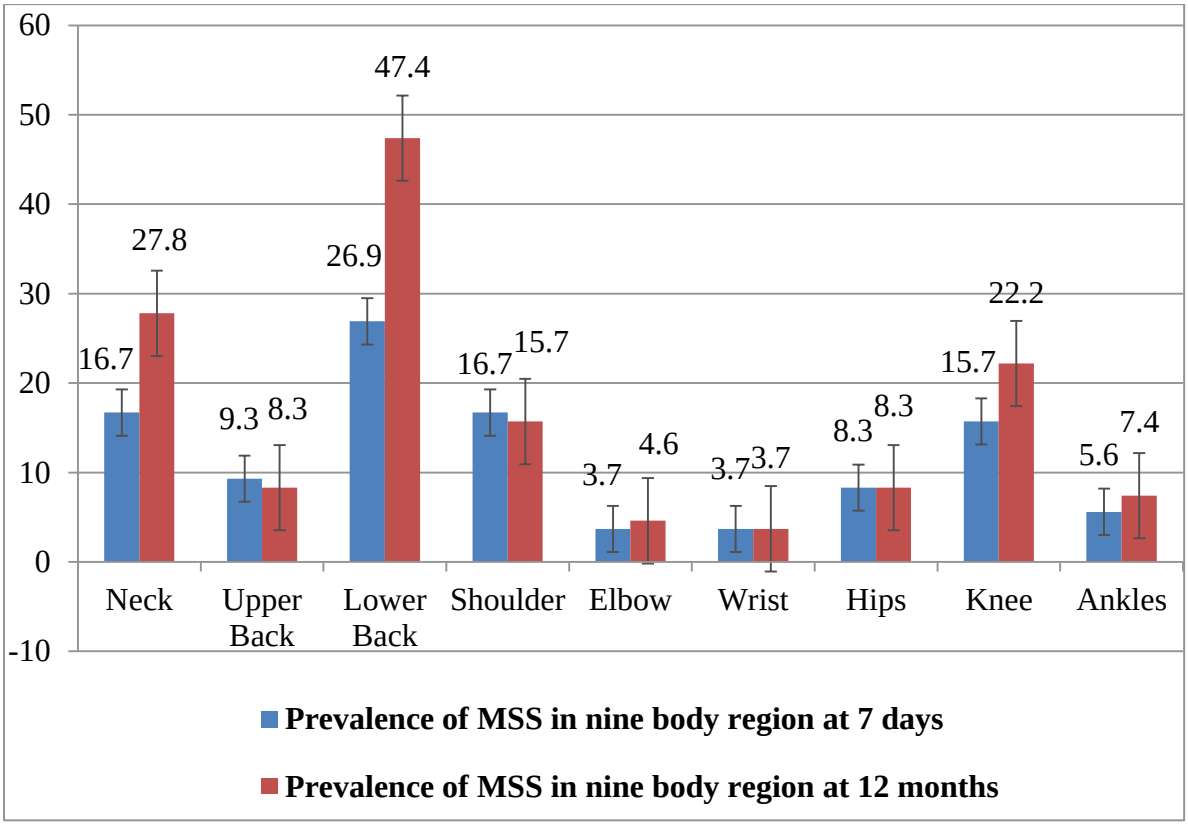


I= 95% Confidence Interval

Figure 1: Prevalence of Musculoskeletal symptoms in overall at last 12 months and 7 days

Figure 2 shows that prevalence of musculoskeletal symptoms in overall at last 12 months and 7 days. In this study, the investigators found that the high prevalence of musculoskeletal symptoms at last 12 months and at last 7 days was overall 66.7% (95%CI 57.685%, 75.714%) and 52.4% (95% CI 44.858%, 61.952%).

4.4. Prevalence of musculoskeletal symptoms in nine body region at last 7 days and 12 months



I= 95% Confidence Interval

Figure 2: Prevalence of Musculoskeletal symptoms in nine body region at last12 months and 7 days

Figure 1 shows that prevalence of musculoskeletal symptoms in nine body region at last 7 days and 12 months. In this study, the investigators found that the high prevalence of musculoskeletal symptoms at last 7 days was lower back 26.9% (95%CI 18.44%, 35.36%), neck and shoulder 16.7% (95% CI 9.58%, 23.81%), knee 15.7% (95% CI 8.74%, 22.65%). On the other hand, the high prevalence of musculoskeletal symptoms at last 12 months was lower back 47.2% (95% CI 36.66%, 56.74%), neck 27. 8% (95% CI 19.24%, 36.36%), knee 22.2% (95% CI 14.26%, 30.13%). But the lowest prevalence of musculoskeletal symptoms both at last 7 days and 12 months in wrist was 3.7% (95% CI -5.53%, 12.93%) because repetitive work is less common in nursing profession.

Figure 1 also shows that shows that the most commonly affected body parts is lower back and the prevalence is 47.2% (95% CI 36.66%,second neck 27. 8% (95% CI 19.24%, 36.36%),and third knee 22.2% (95% CI 14.26%, 30.13%).

4.5. Association between socio- demographic factors and musculoskeletal symptoms last 12 months

Socio- demographic factors	At least pain in one region last 12 months			
	Yes n (%)	No n (%)	x^2- value	P-value
Age			8.501	.037
23-29	44 (58.7)	44 (41.3)		
30-36	19 (86.4)	5 (13.6)		
37-43	5 (100.0)	----		
44-50	2 (66.7)	1 (33.3)		
Gender			0.877	.349
Male	13 (76.5)	4 (23.5)		
female	57 (64.8)	31 (35.2)		
Marital status			3.798	.051
Married	53 (72.6)	20 (27.4)		
Unmarried	17 (53.1)	15 (46.9)		
Duration of experience			5.513	.064
1 year- 9 years	48 (60.8)	31 (39.2)		
10 years-18 years	18 (81.8)	4 (18.2)		
19 years-27 years	4 (100.0)	----		
Working hours			8.420	.015
6 hours	29 (53.7)	25 (46.3)		
8 hours	32 (80.0)	8 (20.0)		
More than 8 hours	9 (81.8)	2 (18.2)		
BMI			2.012	.570
15 – 21	25 (59.5)	17 (40.5)		
22 - 28	41 (70.7)	17 (29.3)		
29 - 35	3 (75.0)	1 (25.0)		
36 - 42	1 (100.0)	---		
Monthly income			9.682	.008
7000-12000	34 (54.8)	28 (45.2)		
13000-18000	33 (84.6)	6 (15.4)		
19000-24000	3 (75.0)	1 (25.0)		

*** X^2 =Chi-square test**
n = Number of participant

Table 3: Association between socio- demographic factors and musculoskeletal symptoms at last 12 months.

Here the participants' numbers were 105. The percentage and frequency of musculoskeletal symptoms at least one body region last 12 month was investigated by using descriptive analysis among the eight socio-demographic factors. In this study, the investigator found that there was significant association between perceived musculoskeletal symptoms at last 12 months and age (.037), working hours (.015), and monthly income (.008). But no significant association between at least pain in one region last 12 month and gender (.349), marital status (.051), duration of occupation (.064) and BMI (.570). [See table 3]

4.6. Association between work-related physical risk factors and musculoskeletal symptoms last 12 months

Work-related physical risk factors	At least pain in one region last 12 months			
	Yes n (%)	No n (%)	X^2-value	P-value*
Carry heavy loads			1.636	.201
Yes	20 (76.9)	6 (23.1)		
No	50 (63.3)	29 (36.7)		
Bend trunk slightly			0.547	.460
Yes	65 (67.7)	31 (32.3)		
No	5 (55.6)	4 (44.4)		
Twist trunk slightly			0.313	.576
Yes	42 (63.6)	16 (36.4)		
No	35 (68.9)	19 (31.1)		
Bend trunk for long periods			1.934	.164
Yes	34 (72.9)	12 (26.1)		
No	36 (61.0)	23 (39.0)		
Bend neck in forward for long periods			0.933	.334
Yes	37 (71.2)	15 (28.8)		
No	33 (62.3)	20 (37.7)		
Make short repetitive movement in trunk			7.560	.006
Yes	56 (74.7)	19 (25.3)		
No	14 (46.7)	16 (53.3)		
Make short repetitive movement in neck			0.179	.673
Yes	41 (65.1)	22 (34.9)		
No	29 (69.0)	13 (31.0)		
Often reach with arms			3.269	.071
Yes	35 (56.3)	24 (40.7)		
No	35 (76.1)	11 (23.9)		
Hold arms above shoulder			0.935	.333
Yes	31 (62.0)	19 (38.0)		
No	39 (70.9)	16 (29.1)		
Frequent movements arms, hand, or fingers			5.600	.018
Yes	64 (71.1)	26 (28.9)		
No	6 (40.0)	9 (60.0)		
Stand for long period of time			0.795	.372
Yes	46 (63.9)	26 (36.1)		
No	24 (72.7)	9 (27.3)		
Sit for long period of time			2.857	.091
Yes	24 (57.1)	18 (42.9)		
No	46 (73.0)	17 (27.0)		

*** X^2 =Chi-square test**
n = Number of participant

Table 4: Association between work-related physical risk factors and musculoskeletal symptoms last 12 months.

The total participant number was 105. There were 12 work-related physical risk factors. The percentage and frequency of musculoskeletal symptoms at least one body region last 12 month was investigated by using descriptive analysis among those work-related physical risk factors. In this study, there were significant association between at least one region pain in last 12 months and make short repetitive movement in trunk (.006), frequent movements arms, hand, or fingers (.018) for developing musculoskeletal symptoms. [See table 4].

CHAPTER 5
DISCUSSION

The situation of musculoskeletal disorders in developing country like Bangladesh has presented through this cross-sectional study. In Bangladesh, many nurses are suffering from musculoskeletal symptoms. This study has completed among 105 nurses from selected areas and it was investigated that the prevalence of musculoskeletal symptoms in nine body region last 7 days and last 12 months. The high prevalence of musculoskeletal symptoms both last 7 days and 12 months was lower back. But the lowest prevalence of musculoskeletal symptoms both at last 7 days and 12 months was wrist.

By Munabi *et al.* (2014), where 598 participants from 741 reported musculoskeletal pain in any one region of their bodies last 12 months and the prevalence was 80.8%. Overall the most common sites of musculoskeletal disorders were; the lower back (61.9%), feet and ankles (38.1%), knees (37.1%), neck (36.9%), upper back (35.8%), and the shoulders (32.6%).

A study on the incidence of musculoskeletal complaints was conducted in a public general hospital in Juarez, Mexico, information on musculoskeletal pain during the past 12-month period was collected from 387 nurses .The single body regions with highest percentage of complaint were both legs (6.2%) and the neck (4.9%), while the lower back was third (2.1%). The overall highest percentage of complaints was for legs (16.6%), the lower back (15.4%), and upper back (11.6%) (Mejia *et al.* 2009).

The Netherlands by Engels *et al*. (1996), where the percentages of nurses with complaints about the neck, shoulders or upper arms and elbows or forearms were 27%, 22%, and 3%. Lagerstrom *et al*. (1995), surveyed 821 hospital nurses in Sweden, with prevalence of self-reported ongoing musculoskeletal symptoms in the neck, shoulders, low back, hands, and knees of 48%, 53%, 56%, 22%, and 30% because of repetitive task, manual handling, and sustained working posture.

In the study of India the total number of participant 627 where 205 participants reported musculoskeletal pain in any one region of their bodies last 12 months (Majumdar and Pal, 2014). This study shows that 67.0% of nurses suffered from low back pain (Majumdar and Pal, 2014).

In this study, investigator found that the most commonly affected body parts were lower back and the prevalence was 47.2%, second neck 27.8% and third knee 22.2%. Andoa *et al.* (2000), found that the most commonly affected body parts was low back and the prevalence was 54.7%, second neck 42.8%, and third knee 31.3% . The study of Osun State at Nigeria, the most commonly affected body part was lower back and though the prevalence 70.3% was relatively high from this study (Ajibade, 2013). As many international studies have shown that musculoskeletal symptoms of the lower back is usually the most common body site affected but the study among Korean Hospital Nurses, low back pain was the second most common affected body part and the percentage was 72.4% among 330 nurses (Smith *et al.* 2005).

In this study, it was investigated that there was significant association between at least pain in one region last 12 months and age, working hours, and monthly income. But no significant association between at least pain in one region last 12 month and gender, marital status, duration of occupation, and BMI. In Mexico, a study was conducted among 387 nurses; there were association with some demographic factors including gender, working hours, shifting time, job category, and the presence of musculoskeletal pain/discomfort resulted in an overall highest incidence for both sexes (76%), the highest incidence (82%) in the night shift and working hours more than 8 hours and the percentage of job category was also 82% (Mejia *et al.* 2009). Age, height, and body mass index were not only taken into account as potential risk factors but also found to be associated with arm or neck complaints (Engels *et al.* 1996). In the study of Fabunmi, Oworu and Odunaiya, (2008) it was investigated that nurses with age range between 20 – 50years represented a great evidence of musculoskeletal disorders. In another study of Nigeria showed that there was high prevalence rate of musculoskeletal disorders in the terms of years of experience (Ajibade, 2013).

In another study which was conducted in Japan, there were significant association between demographic factors like age and duration of employment where the prevalence of low back pain was 69.7%. The average age was 25.2 years (Smith *et al.* 2003). In the study of Lagerstrom *et al.* (2000), age was also associated with neck and shoulder pain as a musculoskeletal symptom. On the other hand, in another study sample, there were no significant associations between musculoskeletal symptoms

and the demographic items of workplace, age and duration of employment in present ward, height, Body Mass Index (BMI), and marital status (Andoa *et al.* 2000).

This study also investigated that the association between work-related physical risk factors and musculoskeletal symptoms. There were significant association between at least one region pain in last 12 months and make short repetitive movement in trunk and frequent movements arms, hand, or fingers for developing musculoskeletal symptoms. A study was conducted in Korea among the hospital nurses that physical exertion, bending or twisting; manual handling of patients were shown the high physical risk factor for musculoskeletal symptoms (Smith *et al.* 2005). It was also identified in another study that moving, lifting heavy loads, awkward posture, static posture, applying pressure with hands or fingers, and intensive physical efforts were significantly associated with musculoskeletal disorders in different body regions. Similarly, physical demands investigated in this study, awkward posture was most frequently and strongly associated with self-reported musculoskeletal disorders in different body regions (Choobineh, Rajaeefard and Neghab, 2006). In the hospital of Mexico, Musculoskeletal complain among nurses in shoulders and neck happened for awkward postures and repetitive movements such as waist-bending and waist-twisting, and complaints of lower back and lower leg pain also happened for duration of standing, waist-bending and weight-lifting (Mejia *et al.* 2009).

A cross-sectional study in Uganda, this study demonstrated that working in bent and twisted postures were significantly associated with musculoskeletal disorders (Munabi *et al.* 2014). Engels *et al.* (1996) found strong associations between arms or neck complaints by working in the same position for a long time seemed and leg complaints by standing in same position for a long period of time. By Andoa *et al.* (2000), another study shows that patient handling tasks, awkward posture, bending forward, or half sitting postures and asymmetric lifting were regarded as a risk factor for back disorders.

CHAPTER 6
CONCLUSION

6.1. Limitations

There were some limitations in this study. Though here some limitations, investigator tried her best to prepare this project. The limitations are given below:

- The overall sample size was relatively small & the place were selected by the convenient method & samples were chosen only two areas from CRP hospital and also the other Enam Medical College hospital.
- Limited contextual study regarding musculoskeletal symptoms

6.2. Recommendations

- It is recommended that future similar research should be conducted in this area with large number of sample size.
- It is necessary to identify the postural risk level and also to identify the psychological risk factors for developing Musculoskeletal Symptoms among nursing professionals.

6.3. Conclusion

Nursing profession is a very remarkable profession in the world. Nursing is also very hard work because they need to require great physical effort during patient handling, standing for long time, repetitive movement of arms hands & fingers. For this reason musculoskeletal symptoms are most common physical problem to them. It was suggested that musculoskeletal pain among hospital nurses may have associations with some actual tasks and items related to work postures, work control, and work organization. It was identified that the prevalence of musculoskeletal symptoms within nine body regions like neck, upper back, lower back, shoulder, elbow, hips, knee, ankles. And the prevalence of lower back was the heights.

In Bangladesh, at before there is no any study to identify the prevalence of musculoskeletal symptoms and also physical risk factors among nurses. The aim of the study is to identify the prevalence of musculoskeletal symptoms last 7 days and 12 months and its' associated risk factors among nurses in selected areas of Bangladesh. By this study, it has already identified.

Now a days work related musculoskeletal disorders is the greatest problem in the world among the working population. At a same time, nursing profession is at risk to become different musculoskeletal disorders. Because there are some factors likely job related stress with psychological and physical factors. So in future, further similar study is required in this sector to find out the prevalence of musculoskeletal symptoms among the large number of nurses and also to identify job related stress like psychological factors.

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Appendix 1

Permission letter from BHPI for conducting study

Date: 05-08-2014
To
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.

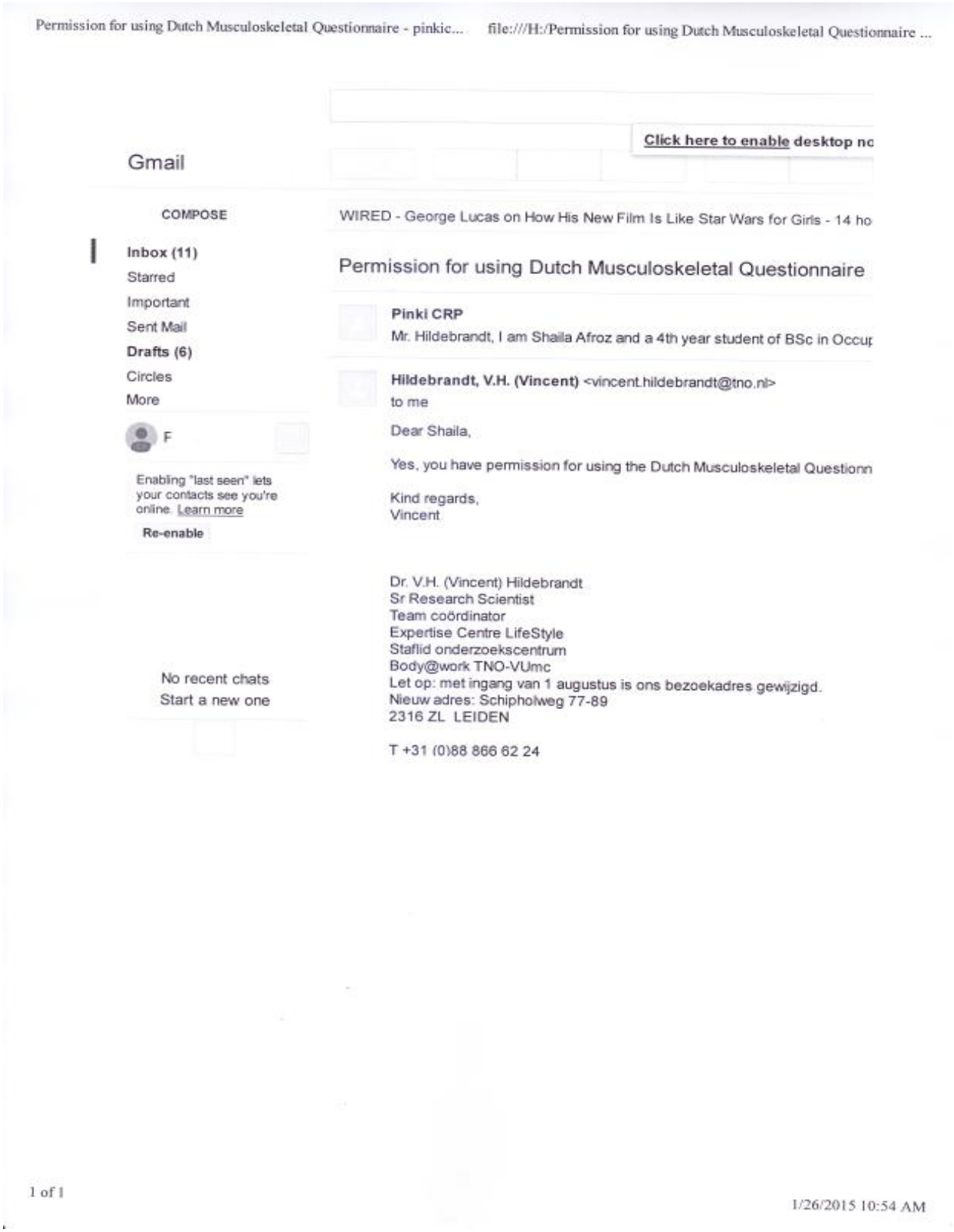
Sir,
With due respect and humble submission to state that I am a 4th year student of B.Sc. in occupational Therapy of Bangladesh Health Professions Institute, the academic institute of Centre for the Rehabilitation of the Paralyzed (CRP). I am sincerely seeking permission to conduct my research project as the partly fulfillment of the requirements of degree of B.Sc. in Occupational Therapy. The title of my research is, **"Prevalence of musculoskeletal symptoms and the risk factors among the nurses from selected areas in Bangladesh"**. The aim of the study is to identify the prevalence of musculoskeletal symptoms and the risk factors among nurses in selected areas of Bangladesh.
So, I therefore pray and hope that you would be kind enough to grant me the permission of conducting the research and will help me to complete a successful study as a part of my course.

You're obediently,
Shaila Afroz
.....
Shaila Afroz,
4th year, B.Sc in occupational Therapy,
Bangladesh Health Professions Institute (BHPI)
CRP-Chapain, Savar, Dhaka-1343

Approved by	Signature and Comments
Head of the Department Nazmun Nahar Assistant professor & Head of the Department, Department of Occupational Therapy BHPI,CRP-Chapain ,Savar,Dhaka-1343	As per supervisor's comment it may allow her to conduct this study. 12.08.14
Research supervisor Shamima Akter Lecturer in Occupational Therapy Department of occupational therapy BHPI,CRP-Chapain ,Savar,Dhaka-1343	The study proposal has been approved to carry on 08.08.14

Appendix 2

Permission letter for using Dutch Musculoskeletal Questionnaire



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Permission for using Dutch Musculoskeletal Questionnaire

Pinki CRP
Mr. Hildebrandt, I am Shaila Afroz and a 4th year student of BSc in Occup

Hildebrandt, V.H. (Vincent) <vincent.hildebrandt@tno.nl>
to me

Dear Shaila,

Yes, you have permission for using the Dutch Musculoskeletal Questionn

Kind regards,
Vincent

Dr. V.H. (Vincent) Hildebrandt
Sr Research Scientist
Team coördinator
Expertise Centre LifeStyle
Staflid onderzoekscentrum
Body@work TNO-VUmc
Let op: met ingang van 1 augustus is ons bezoekadres gewijzigd.
Nieuw adres: Schipholweg 77-89
2316 ZL LEIDEN

T +31 (0)88 866 62 24

1 of 1 1/26/2015 10:54 AM

Appendix 3A

Permission letter for data collection

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

তারিখ ঃ ১৯.১০.২০১৪

প্রতি
নার্সিং সুপারিনটেনডেন্ট
নার্সিং ষ্টেশন
মেডিকেল কেয়ার উইং
সিআরপি, সাভার, ঢাকা।

বিষয় ঃ রিসার্চ প্রজেক্ট (dissertation) প্রসঙ্গে।

জনাব,

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন অকুপেশনাল থেরাপি কোর্সের ছাত্রী সায়লা আফরোজকে তার রিসার্চ সংক্রান্ত কাজের জন্য আগামী ২০.১০.২০১৪ তারিখ থেকে ৩০.১১.২০১৪ তারিখ পর্যন্ত সময়ে আপনার নিকট প্রেরন করা হলো।

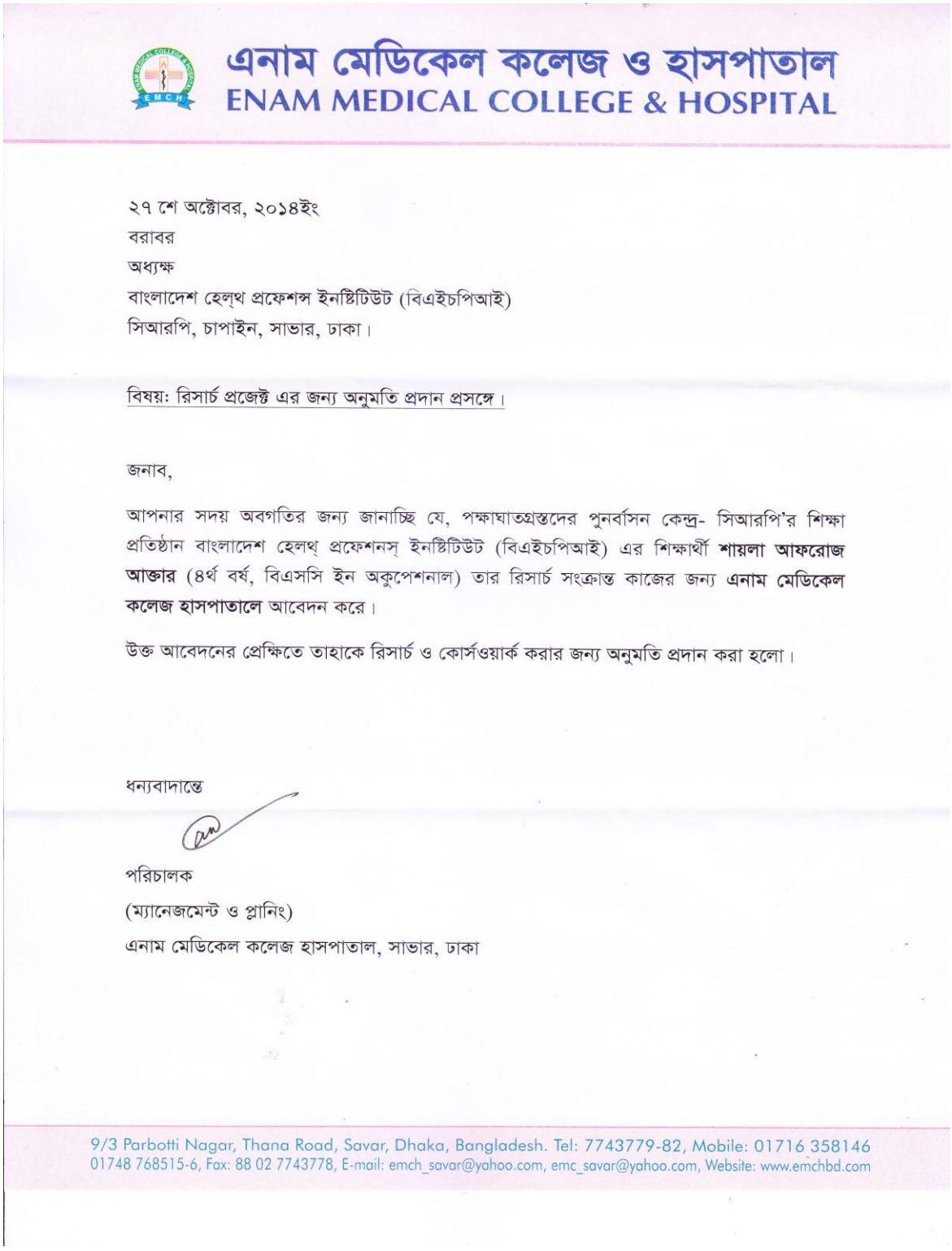
তাই তাকে সার্বিক সহযোগীতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

নাজমুন নাহার
সহকারী অধ্যাপক ও বিভাগীয় প্রধান
অকুপেশনাল থেরাপি বিভাগ
বিএইচপিআই।

Appendix 3B

Permission letter for data collection



এনাম মেডিকেল কলেজ ও হাসপাতাল
ENAM MEDICAL COLLEGE & HOSPITAL

২৭ শে অক্টোবর, ২০১৪ইং
বরাবর
অধ্যক্ষ
বাংলাদেশ হেল্‌থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই)
সিআরপি, চাপাইন, সাভার, ঢাকা।

বিষয়: রিসার্চ প্রজেক্ট এর জন্য অনুমতি প্রদান প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র- সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেলথ্ প্রফেশনস্ ইনষ্টিটিউট (বিএইচপিআই) এর শিক্ষার্থী **শায়লা আফরোজ আক্তার** (৪র্থ বর্ষ, বিএসসি ইন অকুপেশনাল) তার রিসার্চ সংক্রান্ত কাজের জন্য **এনাম মেডিকেল কলেজ হাসপাতালে** আবেদন করে।

উক্ত আবেদনের প্রেক্ষিতে তাহাকে রিসার্চ ও কোর্সওয়ার্ক করার জন্য অনুমতি প্রদান করা হলো।

ধন্যবাদান্তে

পরিচালক
(ম্যানেজমেন্ট ও প্লানিং)
এনাম মেডিকেল কলেজ হাসপাতাল, সাভার, ঢাকা

9/3 Parbotti Nagar, Thana Road, Savar, Dhaka, Bangladesh. Tel: 7743779-82, Mobile: 01716 358146
01748 768515-6, Fax: 88 02 7743778, E-mail: emch_savar@yahoo.com, emc_savar@yahoo.com, Website: www.emchbd.com

Appendix 4A

Information Sheet and Consent Form in English

Information Sheet

I am Shaila Afroz, a 4th student of the Bachelor of Science in Occupational Therapy of Bangladesh Health Professions Institute (BHPI), the academic institute of Centre for the Rehabilitation of the Paralysed (CRP), Chapain, Savar, Dhaka-1343. For the fulfillment of requirements for the Bachelor Degree, it is compulsory to conduct a research project in 4th year. I would like to invite you to take part in my study. The research title is **"Prevalence of musculoskeletal symptoms and its associate risk factors among the nurses from selected areas in Bangladesh"**. The aim of the study is to identify the prevalence of musculoskeletal symptoms and its associate risk factors among nurses in selected areas of Bangladesh.

Your participation in this study is voluntary. You are not forced to participate at all. If you want to withdraw from the study, you can do that at any time without any hesitation. You will not be harmed/injured or disadvantaged by the study. Only your personal details (not including your identity such as name) and answers of the questionnaire will be documented and used for the study purpose. You will not be paid for your participation.

The investigator will maintain confidentiality of all proceedings. Without your permission, the data provided by you will never be used.

Consent Form

I am a participant of this research study and I know about the objectives of the study clearly. I have a right to drop out from the study at any time and for this I am not responsible to answer any question to anyone. This research would be given safe and will not cause any harm. In present and future, this research is not responsible for any medical intervention.

I definitely know that confidentiality of all records will be highly maintained and will not be identified in any publication that may result from the study. The information will be showed by the investigator, supervisor and by another occupational therapy student who will aid in selecting relevant portions of the document by helping the investigator for taking the information.

I give my consent by knowing all those information clearly.

Investigator's Signature: _____ Date: _____

Participant's Signature: _____ Date: _____

Appendix 4B

Dutch Musculoskeletal Questionnaire in English

Part A: Demographic Question

1. Age
2. Gender
3. Height
4. Weight
5. Educational background
6. Marital status
7. Duration of occupation
8. Daily working hour
9. Monthly income
10. Working types
11. Working shift

Part B: Prevalence

1. Have you had any trouble (pain, discomfort) from your following body parts in the past 7 days:

Neck	Yes / No
Upper back	Yes / No
Lower back	Yes / No
Shoulders	Yes / No
Elbows	Yes / No
Wrists/hands	Yes / No
Hips/thighs	Yes / No
Knees	Yes / No
Ankles/feet	Yes / No

2. Have you had any trouble (pain, discomfort) from your following body parts in the past 12 months:

Neck	Yes / No
Upper back	Yes / No
Lower back	Yes / No
Shoulders	Yes / No

Elbows	Yes / No
Wrists/hands	Yes / No
Hips/thighs	Yes / No
Knees	Yes / No
Ankles/feet	Yes / No

Part C: Job Tasks Factors

Back pain

1. Is your back pain associated with your work?
   Yes / No
2. Is your back pain associated with leisure time activities?
   Yes / No
3. Did your back pain start during your current work?
   Yes / No
4. Did you take any sick leave during the past 12 months due to back pain?
   Yes / No
5. Did you take any Consultation with doctors, physiotherapist, and occupational therapy during the past 12 months due to back pain?
   Yes / No

Neck pain

1. Is your neck pain associated with your work?
   Yes / No
2. Is your neck pain associated with leisure time activities?
   Yes / No
3. Did your neck pain start during your current work?
   Yes / No
4. Did you take any sick leave during the past 12 months due to neck pain?
   Yes / No
5. Did you take any Consultation with doctors, physiotherapist, and occupational therapy during the past 12 months due to neck pain?
   Yes / No

Shoulder pain

1. Is your shoulder pain associated with your work?
   Yes / No
2. Is your shoulder pain associated with leisure time activities?
   Yes / No
3. Did your shoulder pain start during your current work?
   Yes / No
4. Did you take any sick leave during the past 12 months due to shoulder pain?
   Yes / No
5. Did you take any Consultation with doctors, physiotherapist, and occupational therapy during the past 12 months due to shoulder pain?
   Yes / No

Part D: Work-Related Physical Factors

1. Do you often have in your work to lift or carry heavy loads (more than 5 kg)?
   Yes / No
2. Do you often have in your work:
   -To bend slightly with your trunk? Yes / No
   -To twist slightly with your trunk? Yes / No
   -To bend and twist simultaneously with your trunk? Yes / No
3. Do you often have in your work:
   -To bent your trunk for long periods? Yes / No
   -To twist your trunk for long periods? Yes / No
   -To bent and twist your trunk for long periods? Yes / No
4. Do you often have in your work
   -To bent your neck in forward for long periods? Yes / No
   -To twist your neck for long periods? Yes / No
5. Do you in your work to make short repetitive movement with your trunk?
   Yes / No
6. Do you often have in your work to make short repetitive movement with your neck? Yes / No
7. Do you often have in your work to:

-Reach with your arms or hands? Yes / No

-Hold your arms at or above shoulder? Yes / No

-Make frequent movements with your arms, hand, or fingers? Yes / No

8. Do you often have to stand for long period of time in your work? Yes / No
9. Do you often have to sit for long period of time in your work? Yes / No

Appendix 5A

Information Sheet and Consent Form in Bangla

তথ্য পত্র

আমি শায়লা আফরোজ, পক্ষাঘাত গ্রস্থদের পুনর্বাসন কেন্দ্র (সি আর পি) এর একটি শিক্ষা প্রতিষ্ঠান, বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বি এইচ পি আই), চাপাইন, সাভার, ঢাকা-১৩৪৩, এর অকুপেশনাল থেরাপীতে অধ্যায়নর স্তাতক শ্রেণীর একজন ৪র্থ বর্ষের ছাত্র। স্তাতক ডিগ্রীর পরিপূর্ণতার প্রয়োজনে ৪র্থ বর্ষে একটি গবেষণা কর্ম পরিকল্পনা পরিচালনা করা বাধ্যতামূলক। আমি আমার গবেষণায় অংশগ্রহণ করার জন্য আপনাকে আমন্ত্রণ জানাচ্ছি । গবেষণার শিরোনামটি হলো "বাংলাদেশের নির্বাচিত কিছু এলাকার সেবিকাদের পেশী ও অস্থি সম্বন্ধীয় সমস্যার প্রাদুর্ভাবের হার এবং এই কাজ সম্পর্কিত ঝুকিসমূহ" এবং এই গবেষণার লক্ষ্য হলো বাংলাদেশের সেবিকাদের পেশী ও অস্থি সম্বন্ধীয় সমস্যার প্রাদুর্ভাবের হার এবং এই কাজ সম্পর্কিত ঝুকিসমূহের কারন খুঁজে বের করা ।

এই গবেষণায় আপনার অংশগ্রহণ ঐচ্ছিক। যদি আপনি এই গবেষণা থেকে নিজেকে প্রত্যাহার করতে চান, আপনি যে কোন সময় কোন দ্বিধা ছাড়াই তা করতে পারেন । এই গবেষণার দ্বারা আপনি ক্ষতি গ্রস্থ বা অসুবিধাপ্রাপ্ত হবেন না । একমাত্র আপনার ব্যক্তিগত বিবরণ (নাম ছাড়া) ও প্রশ্নপত্রের উত্তরসমূহের দলিল রাখা এবং ব্যবহার করা হবে এই গবেষণার উদ্দেশ্যে । আপনার অংশগ্রহণের জন্য আপনাকে আর্থিক সুবিধা প্রদান করা হবে না । গবেষক গবেষণা চলাকালীন প্রতিটি ধাপে গোপনীয়তা বজায় রাখবেন । আপনার অনুমতি ছাড়া, আপনি যে তথ্যাবলী দিয়েছেন তা কখনোই ব্যবহার করা হবে না ।

সম্মতিপত্র

এই গবেষণাতে আমি একজন অংশগ্রহনকারী এবং আমি পরিস্কার ভাবে এই গবেষনার উদ্দেশ্য সম্পর্কে অবগত । আমার যে কোন সময় এই গবেষণা থেকে নিজেকে সরিয়ে আনার অধিকার আছে । এজন্য আমি প্রশ্নের উত্তর প্রদান করার জন্য কারো কাছে দায়বদ্ধ না । এই গবেষণাটির সাথে আমার কোন সম্পৃক্ততা নেই এবং আমার চিকিৎসার সাথে বর্তমানে ও ভবিষ্যতে কোনভাবে সম্পৃক্ত না ।

আমি আরও অবগত আছি যে, এই কথোকথন থেকে নেওয়া সমস্ত তথ্যাবলি নিরাপদে এবং গোপন রাখা হবে। আমার নাম ও ঠিকানা কোথাও প্রকাশ করা হবে না । শুধুমাত্র গবেষণাকারী এবং তার সমন্বয়কারী এই তথ্যাবলি দেখার ক্ষমতা রাখেন । আমি এই গবেষণাকারীর এবং তার গবেষণার সমন্বয়কারীর সাথে এই গবেষণার পদ্ধতি সম্পর্কে অথবা যে কোন প্রশ্নের উত্তর জানার জন্য কথা বলতে পারব ।

আমি উপরোক্ত তথ্যগুলো ভালোভাবে জেনে নিজ ইচ্ছায় এই গবেষণায় অংশগ্রহন করছি ।

গবেষকের স্বাক্ষর: তারিখ:

অংশগ্রহনকারীর স্বাক্ষর: তারিখ:

Appendix 5B

Dutch Musculoskeletal Questionnaire in Bengali

অংশ ক: জনসংখ্যাতাত্তিক প্রশ্নাবলী Cord no.-

১. বয়স
২. লিঙ্গ
৩. উচ্চতা
৪. ওজন
৫. শিক্ষাগত যোগ্যতা
৬. বৈবাহিক অবস্থা
৭. চাকরির স্থায়িত্ব কাল
৮. দৈনিক কাজের সময়সীমা
৯. মাসিক আয়
১০. কাজের ধরন
১১. কাজের সময়

অংশ খ: স্বাস্থ্য

১. বিগত ৭ দিনে, আপনি কি নিম্নে উল্লেখিত শরীরের কোন অংশে কোন ধরনের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করেছেন?

ঘাড়	হ্যাঁ / না
পিঠের উপরের অংশ	হ্যাঁ / না
পিঠের নিচের অংশ	হ্যাঁ / না
কাঁধ	হ্যাঁ / না
কনুই	হ্যাঁ / না
কব্জি বা হাত	হ্যাঁ / না
নিতম্বের সংযোগ বা উরু	হ্যাঁ / না
হাঁটু	হ্যাঁ / না
গোড়ালি বা পায়ের পাতা	হ্যাঁ / না

২. বিগত ১২ মাসে, আপনি কি নিম্নে উল্লেখিত শরীরেরকোন অংশে কোন ধরনের সমস্যা (ব্যাথা, অস্বস্তি) বোধ করেছেন?

ঘাড়	হ্যাঁ / না
পিঠের উপরের অংশ	হ্যাঁ / না
পিঠের নিচের অংশ	হ্যাঁ / না

কাঁধ	হ্যাঁ / না
কনুই	হ্যাঁ / না
কব্জি বা হাত	হ্যাঁ / না
নিতম্বের সংযোগ বা উরু	হ্যাঁ / না
হাঁটু	হ্যাঁ / না
গোড়ালি বা পায়ের পাতা	হ্যাঁ / না

অংশ গ: কর্ম ক্ষেত্রের প্রভাব

কোমর ব্যাথা

১. আপনার এই কোমর ব্যাথাটা কি কাজের কারনে হয়েছে? হ্যাঁ / না

২. আপনার এই কোমর ব্যাথাটা কি বিনোদনমূলক কাজ সমূহের কারনে হয়েছে? হ্যাঁ / না

৩. বর্তমানে আপনি যে কাজ করছেন এর কারনে কি আপনার কোমর ব্যাথাটা শুরু হয়েছিল? হ্যাঁ / না

৪. বিগত ১২ মাসে কোমর ব্যাথার কারনে আপনি কি কোন অসুস্থতা জনিত ছুটি নিয়েছেন? হ্যাঁ / না

৫. বিগত ১২ মাসে কোমর ব্যাথার কারনে আপনি কি ডাক্তার, ফিজিওথেরাপিস্ট এবং অকুপেশনাল থেরাপিস্টের কাছ থেকে কোন পরামর্শ নিয়েছেন? হ্যাঁ / না

ঘাড় ব্যাথা

১. আপনার এই ঘাড় ব্যাথাটা কি কাজের কারনে হয়েছে? হ্যাঁ / না

২. আপনার ঘাড় ব্যাথাটা কি বিনোদনমূলক কাজ সমূহের কারনে হয়েছে? হ্যাঁ / না

৩. বর্তমানে আপনি যে কাজ করছেন এর কারনে কি আপনার ঘাড় ব্যাথাটা শুরু হয়েছিল? হ্যাঁ / না

৪. বিগত ১২ মাসে ঘাড় ব্যাথার কারনে আপনি কি কোন অসুস্থতা জনিত ছুটি নিএছেন? হ্যাঁ / না

৫. বিগত ১২ মাসে ঘাড় ব্যাথার কারনে আপনি কি ডাক্তার, ফিজিওথেরাপিস্ট এবং অকুপেশনাল থেরাপিস্টের কাছ থেকে কোন পরামর্শ নিয়েছেন? হ্যাঁ / না

কাঁধ ব্যাথা

১. আপনার এই কাঁধের ব্যাথাটা কি কাজের কারনে হয়েছে? হ্যাঁ / না

২. আপনার কাঁধের ব্যাথাটা কি বিনোদনমূলক কাজ সমূহের কারনে হয়েছে? হ্যাঁ / না

৩. বর্তমানে আপনি যে কাজ করছেন এর কারনে কি আপনার কাঁধ ব্যাথাটা শুরু হয়েছিল? হ্যাঁ / না

৪. বিগত ১২ মাসে কাঁধ ব্যাথার কারনে আপনি কি কোন অসুস্থতা জনিত ছুটি নিএছেন? হ্যাঁ / না

৫. বিগত ১২ মাসে কাঁধ ব্যাথার কারনে আপনি কি ডাক্তার, ফিজিওথেরাপিস্ট এবং অকুপেশনাল থেরাপিস্টের কাছ থেকে কোন পরামর্শ নিয়েছেন? হ্যাঁ / না

অংশ ঘ: কাজ সম্পর্কিত শারীরিক প্রভাব

১। আপনার কাজে কি প্রায়ই ভারী কোন জিনিস (৫ কেজির বেশি) তোলা বা বহন করতে হয়? হ্যাঁ / না

২। আপনার কাজে কি প্রায়ই

- পিঠকে কিছুটা বাঁকাতে হয়? হ্যাঁ / না
- পিঠকে কিছুটা মোচড়াতে হয়? হ্যাঁ / না
- পিঠকে একই সাথে বাঁকাতে এবং মোচড়াতে হয়? হ্যাঁ / না

৩। আপনার কাজে কি প্রায়ই

- পিঠকে অনেক সময় ধরে বাঁকা করে রাখতে হয়? হ্যাঁ / না
- পিঠকে অনেক সময় ধরে মোচড়িয়ে রাখতে হয়? হ্যাঁ / না
- পিঠকে অনেক সময় ধরে বাঁকা করে এবং মোচড়িয়ে রাখতে হয়? হ্যাঁ / না

৪। আপনার কাজে কি প্রায়ই

- ঘাড়টাকে অনেক সময় ধরে সামনের দিকে বাঁকা করে রাখতে হয়? হ্যাঁ / না
- ঘাড়টাকে অনেক সময় ধরে মোচড়িয়ে রাখতে হয়? হ্যাঁ / না

৫। আপনার কাজে কি প্রায়ই আপনাকে অল্প সময় ধরে বারবার পিঠের নাড়াচাড়া করতে হয়? হ্যাঁ / না

৬। আপনার কাজে কি প্রায়ই আপনাকে অল্প সময় ধরে বারবার ঘাড়ের নাড়াচাড়া করতে হয়? হ্যাঁ / না

৭। আপনার কাজে কি প্রায়ই আপনার

- হাত বা বাহুকে দূরে নিয়ে কাজ করতে হয়? হ্যাঁ / না
- বাহুকে কাধ থেকে উপরে নিয়ে কাজ করতে হয়? হ্যাঁ / না
- হাত, বাহু বা আঙ্গুলকে বারবার নাড়াচাড়া করে কাজ করতে হয়? হ্যাঁ / না

৮। আপনার কাজে কি প্রায়ই আপনাকে অনেক সময় ধরে দাড়িয়ে থাকতে হয়? হ্যাঁ / না

৯। আপনার কাজে কি প্রায়ই আপনাকে অনেক সময় ধরে বসে থাকতে হয়? হ্যাঁ / না