



MUSCULOSKELETAL PROBLEMS OF SPINAL CORD INJURY PATIENT DURING VOCATIONAL TRAINING INCRP

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“MUSCULOSKELETAL PROBLEMS OF SPINAL CORD INJURY PATIENT DURING VOCATIONAL TRAINING IN CRP”

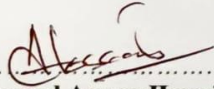
Submitted by **Habiba Sultana**, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT)



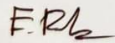
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Declaration

I declare that the work presented here is my own. All sources used have been cited here appropriately. Any mistakes and inaccuracies is my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent from the Department of Physiotherapy, Bangladesh Health Professions Institute (BHPI).

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Acronyms

ASIA: American Spinal Injury Association

BHPI: Bangladesh Health Professions Institute

CRP: Center for the Rehabilitation of the Paralyzed

IRB: Institutional Review Board

MSDs: Musculoskeletal disorders

NGO: Non-governmental Organization

ROM: Range of Motion

SCI: Spinal Cord Injury

SPSS: Statistical Package of Social Science

VR: Vocational Rehabilitation

WHO: World Health Organization

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Abstract

Purpose: To find out common musculoskeletal problems among spinal cord injury patient during vocational training. **Objectives:** To evaluate the musculoskeletal problem in body function, activities and participation and to figure out the risk factor of Musculoskeletal problems while taking vocational training. **Methodology:** The cross-sectional study was chosen to carry out this study among 59 participants who were selected who has completed rehabilitation services from CRP and were in the vocational training. Data was selected by using of socio-demographic questionnaire and structured questionnaire. The study was conducted by using quantitative descriptive data analysis which focused through different bar diagrams, pie charts and tables. **Result:** Among the 59 participants, 84.7% were male; respondents mean age 30.66; 50.8% were married and more than 50% respondents had complete A injury. 47.5% were complete tetraplegia; 42.4% respondents had store management training. 94.9% respondents were reported that they experienced musculoskeletal problems in their vocational activities. This study showed objectives were to identify the musculoskeletal problems among the SCI people who were currently in their vocational training period who completed rehabilitation from Centre for the Rehabilitation of the Paralysed (CRP). To gather suggestions from persons with SCI about workplace activity and musculoskeletal problem. **Conclusion:** The result of the study demonstrates that spinal cord injured persons who were in their vocational training are more prone to develop musculoskeletal problem. So awareness, treatment and prevention of complications and proper care can help to survive and in participating in a new job while coming back to social reintegration and new work.

Keywords: Spinal cord injury, vocational training, musculoskeletal problem.

1.1 Background

To the mankind spinal cord injury (SCI) is one of the most devastating conditions (Rathore et al., 2008). Razzak (2013) stated that within a few seconds, SCI may happen but in the last period of lifetime the devastating effects could be stayed. The mortality rates of this condition associated with historically, ever today in high-income countries. Spinal cord injury can be viewed often productive and can be successfully overcome the personal and social challenge. This change reflects good medical practice, which means that people can survive, live and improve after injury. Now a day people with spinal cord injury carry to anticipate not just a long life, but also a fuller and more productive life, better than they have had in previous generations (WHO, 2013).

Spinal cord injury affects different parts of the body, such as body structure and function, resulting in restricted mobility, and may reduce community participation and production and life (Ottomanelli & Lind, 2009). In low-income countries, the incidence of spinal cord injury is four times that of high-income countries (Hansen et al., 2007). In most low-income countries, patients with spinal cord injuries have little access to support services after they are discharged from the hospital. Life-threatening complications often occur, but they are not obvious. (Michael & Roth, 2012).

Every year, an estimated 11,000 SCIs occur in U.S and in Europe, the incidence is from 10.4 per million per year to 29.7 per million per year.(Moghimian et al., 2015).In Asia, the incidence rates of SCI range from 12.06 -61.6 per million, while the average age range of affected persons is 26.8 -56.6 years (Chen et al.,2013). According to the World Health Organisation (WHO), between 20-40 people per million of population acquire spinal injury each year. Approximately 60% of cases occurred in people 16-40 years of age (Fehlings et al., 2014).

Spinal cord injury, whether traumatic or not, is sudden, destructive, and debilitating neurological diseases throughout history (Quadir et al., 2017). The incidence of spinal cord injury has increased over time, with 15-40 cases per million (Fehlingh et al.,

2014) with male predominant and tend to affect low socioeconomic groups (Quadir et al., 2017).

Spinal Cord Injury brings impairment of person independence and physical function, as well as take in many musculoskeletal complications because of the injury. There was a strong relationship between functional status and whether the injury was complete or not complete, along with the level of the injury. Spinal cord injury (SCI) was often followed by complications, which lead to the critical effect that loss of motor, sensory and, quality of life and social participation (Haisma et al., 2007).

Spinal cord injury patients often face life-threatening complications (Islam et al., 2011), requiring proper management and professional rehabilitation to reintegrate into the community. Rehabilitation medicine is an integral part of recovery work after illness or injury, but other rehabilitation disciplines are essential as well. Vocational rehabilitation programs play an important role in the return to work of people in poor health, while encouraging reconsideration of the workplace (Finger et al., 2012).

Unemployment is the most serious problem for spinal cord injury patients (Ashekin, 2013). However, the employment rate of spinal cord injury patients after receiving vocational rehabilitation is increasing day by day. Today, vocational training plays an important role in preventing disability and increasing participation in work (Kvam & Eide, 2014). Vocational training is the process that enables people with spinal cord injuries to obtain, maintain, or return to work or useful occupations after illness or disability (Ottomanelli et al., 2015). Vocational training is described as “anyone who helps people with health problems to stay, return or continue working” (Waddell et al., 2008). The purpose of this statement is to summarize job support or job retention in all departments (Phillips et al., 2014). Vocational training and rehabilitation helps people overcome and cope with disabilities (Waddell et al., 2008). The International Labor Organization (ILO) refers to vocational rehabilitation as a process that enables persons with disabilities to be fully employed and propose ideas for the individual to reintegrate into society (Escorpizo et al., 2010). Vocational training is defined as a multidisciplinary intervention in the process related to returning to work or preventing dismissal (Gobelet et al., 2007).

The Madhab Memorial Vocational Training Institute (MMVTI), part of the NGO Rehabilitation Center for the Paralyzed, specifically plans to provide vocational

training and rehabilitation to the disabled through employment. After completing the assessment, a multidisciplinary team consisting of physicians, therapists, social workers, consultants, and other professionals will comprehensively consider the trainee's physical and financial status, education, family, and other factors, and combine the requirements and skills of training to carry out apprenticeship training. Take care of support, interest, mobility, family environment and personal needs (Nuri et al., 2012).

People with spinal cord injury have musculoskeletal problems during their vocational training that are similar to the general population but more frequent and possibly more severe for paraplegic patients because they use their upper extremities for weight bearing, mobility, and in awkward or extreme positions. These Musculoskeletal problems threatens the independence that people with a spinal cord injury (SCI) have worked so hard to achieve. Pain, fall, pressure ulcers, fractures, spasticity, are the common complications after SCI. Loss of work because of serious disability in the patient after SCI, which brings psychosocial and economic problems (Nas et al., 2015).

Spinal cord injury (SCI) is one of the most serious injuries of the musculoskeletal system which most cases brings about permanent disability and the unexpected occurrence of the injury and experiencing a new life situation result in a decrease in the quality of life in individuals with SCI and its direct consequences entail dramatic changes in the function of a person, thus affecting virtually every dimension of life. (Pokaczajlo et al.,2016). Complications had a considerable impact on those with SCI. A high incidence of complications was associated with a lower level of health-related aspects, such as physical capacity, activities and functional outcome (Haisma et al., 2007).Start of active rehabilitation may interfered by complications, can form unsatisfactory set-back during rehabilitation, and frequently lead to re-hospitalization and complications were an important cause of mortality following SCI (Haisma et al., 2007).

Decrease in mobility and spasticity after SCI leads to progressive joint contracture. In addition, people with SCI are not immune to developing osteoarthritis, although the pattern of joint degeneration in people with SCI is most likely different from normal, as stress on the joints is different for people who sit. wheelchair or for biomechanical

abnormalities with compensatory standing. and walking (Lo et al., 2019).Patients with SCI can learn about their proper lifestyle through vocational training. This study focuses on musculoskeletal problems that occur in activities of daily living while receiving vocational training form CRP by the SCI patient.

1.2 Rationale

Nowadays Spinal cord Injury is the most commonly occurring disabling condition in all developing and developed countries in the world. It is also increasing day by day for different reasons in Bangladesh. Injuries that affect the spinal cord and associated physical and psychological damage are important health problems in Bangladesh as they carry high morbidity and mortality rates.

SCI is a life-changing event that makes the people losing their mobility power in maximum case and make dependent on assistive device, but it depends on the extent and severity of injury. So the treatment varies from patient to patient to reintegrate them into their community. Greater community reintegration improves one's quality of life. It not only restore quality of life, but also decrease mortality rate in spinal cord injury. Greater community reintegration can achieve by receiving vocational training. Vocational rehabilitation is not a matter for healthcare alone. It is a combination of both healthcare and restore capacity for work that helps a person with spinal cord injury to participate in the community. Social support and life satisfaction can also achieve by vocational rehabilitation . In Bangladesh there are only a very few research studies in this area among SCI people. This study will be helpful to measure the musculoskeletal problem arise during vocational training of people with spinal cord injury.

Return to work is regarded as one of the most significant outcomes of reintegration in society following a spinal cord injury. It gives people a social status of life and makes them more financially autonomous (Schonherr et al., 2005). As a result patients become more benefited.

Spinal cord injury patient feel some musculoskeletal problems or disorders which affect their life style. By doing this research, the problems or disorders may be drawn out. This study may be helpful to identify the areas that need to improve. And patient will try to enhance these facts during the vocational training program in CRP. Thus the research may help the patients aware about the arising problems during their training. The research will also aware the medical professional about the arising musculoskeletal disorders among SCI patient specially during vocational training and thus it will enhance them to take further measures to minimize these disorders.

1.3 Research question

What are the common musculoskeletal problems found among spinal cord injury patient during vocational training?

1.4 Study objectives

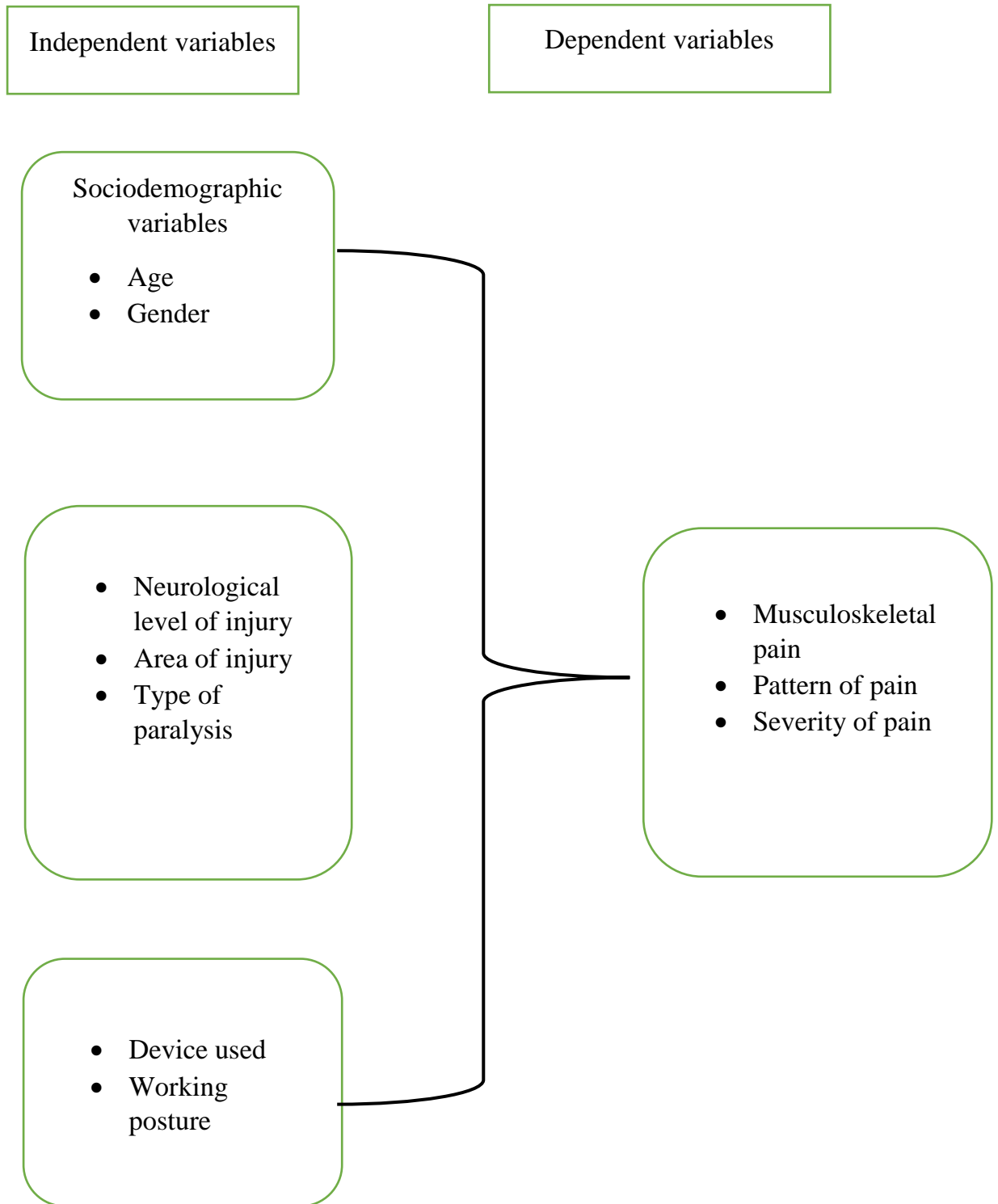
1.4.1 General objective

To find out common musculoskeletal problems among spinal cord injury patient during vocational training.

1.4.2 Specific objectives

1. To investigate the socio demographic information.
2. To find out the Musculoskeletal problem in body function, activities and participation during vocational training.
3. To establish different body parts involved with musculoskeletal disorders and the risk associated with such disorders.
4. To evaluate the nature of pain (Haefeli et al., 2005).
5. To know about association in between musculoskeletal problems and sociodemographic information and clinical information (age, gender, type of paralysis, area of injury, work position).

1.5 Conceptual framework:



1.6 Operational definition

Spinal cord injury: When the spinal cord is damaged following trauma to the spine or disease process than it is called spinal cord injury which resulting in either temporary or permanent change in its normal motor, sensory, or autonomic functions.

Paraplegia: The term paraplegia means impairment of motor and/ or sensory function in the thoracic, lumber and sacral segments of the spinal cord which is secondary to the damage of neural elements within the spinal canal.

Tetraplegia: Paralysis of the arms, legs and trunk of the body below the level of an associated injury to the spinal cord.

Complete lesion: Absence of sensory and motor functions in the lowest sacral segments.

Incomplete lesion: An incomplete lesion is the term used to describe partial damage to the spinal cord. With an incomplete lesion, some sensory and/or motor function remains at the lowest sacral segments.

Skeletal level: The level of vertebra where injury occurred.

Neurological level: The level of nerve root from which both motor and sensory functions are intact.

Vocational training: Also known as Vocational Education and Training and Career and Technical Education, provides job-specific technical training for work in the trades.

Musculoskeletal: The word musculoskeletal is related to the involvement of muscles, tendons, ligaments and bones

A Spinal cord injury is damage to any part of the spinal cord or nerves at the end of the spinal canal. This frequently causes permanent changes in strength, sensation and other body functions below the site of the injury (Mayo Clinic, 2015). Injury in the spinal cord breaks up the signals and interrupting whole body (Mediline Plus, 2014). This often results in long-term changes in strength, sensation, and other bodily functions beneath the injury site (Mayo Clinic, 2015).

Among worldwide incidence of spinal cord injury, males are most common than females, children also included (Nas et al., 2015). According to WHO estimate, males are most at risk in young adulthood between 20-29 years and older age greater than 70 years. On the other hand, females are most at risk in adolescence between 15-19 years and older age greater than 60 years. Studies report male-to-female ratios of at least 2:1 among adults, sometimes much higher (WHO, 2013). In developing countries, such as India, male female ratio of SCI is 4.2:1 and common age group of 20-49. Epidemiological scenario of SCI are different from western countries with major cause being fall. Among the causes of injury, 53% patients had a fall from height and 28% suffered from road traffic accidents. Fall of heavy object overhead and back (10.7%), fall with heavy object overhead (3.0%) and fall following electric shock (4.0%) were uncommon causes (Mathur et al., 2015). In another neighboring country Nepal, there is no reliable estimate of incidence and prevalence of SCI. One estimate indicate yearly incidence of traumatic SCI in Nepal is 300-5000, and prevalence 1500- 25000 (Scovil et al., 2007).

Reliable information on epidemiology for traumatic SCI is not available for many in the globe. Despite this, it is clear that incidence, prevalence and traumatic etiology are quite different in the region from the region and some trends are clear (Cripps et al., 2011). A non-traumatic spinal cord injury caused by inflammation, cancer, arthritis, infections or disk degeneration. The other most common causes of spinal cord injury are- motor vehicle accidents, falls, acts of violence, sports and recreation injuries (Mayo Clinic, 2015). In Bangladesh farmers and laborers carry their products during

their sowing and transport them from local crop storage or from multiple vehicles. (Hoque et al. 2012). The coolies (labors who undertake heavy load) of Bangladesh carries a burden of about 50-100 kg (Mahbub et al., 2006). The common causes of SCI in Bangladesh are fall while carrying heavy load on head, road traffic accidents, falling from a height, fall of a heavy object onto the head or neck, bull attack and diving into shallow water (Razzak et al., 2011).

ASIA first published an international classification of spinal cord injury in 1982, called the International Standards for Neurological and Functional Classification of Spinal Cord Injury. Spinal cord injury are graded as neurologically “Complete” or “Incomplete” depending on sacral sparing, which refers to the preservation of light contact or pin prick sensation at S4-5 Dermatome, Deep Anal Pressure, or Voluntary Anal Sphincter Contraction in the most Caudal Sacral Segments(Burns et al.,2011).

- A = Complete. No sensory or motor function is preserved in the sacral segments S4–S5.
- B = Sensory incomplete. Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4–S5.
- C = Motor incomplete. Motor function is preserved at the most caudal sacral segments on voluntary anal contraction or the patient meets the criteria for sensory incomplete status (sensory function preserved at the most caudal sacral segments [S4–S5] by LT, PP, or DAP), and has some sparing of motor function more than three levels below the ipsilateral motor level on either side of the body. More than half of the key muscles below the neurological level have a muscle grade less than 3.
- D = Motor incomplete. Motor function is preserved below the neurological level, and at least half of the key muscles below the neurological level have a muscle grade of 3 or more.
- E = Normal. Complete return of all motor and sensory function, but one may still have abnormal reflexes (American Spinal Injury Association,2019).

A spinal cord injury linked to a wide range of health, which can limit the participation and limitations of activities. An important aspect of SCI's optimal management is to understand the depth and impact of SCI on health and everyday living activities. To gain greater understanding, people's experience of health problems is examined in a

gradual way (Lohne, 2009). Spinal cord injury (SCI) is a relatively rare disorder, this effects can be devastating. The injury is usually associated with the negative effect on the health and wellbeing of the person, as well as the threat of social mobilization and functional independence, social and occupational activities, which results in the permanent paralysis of voluntary muscles and loss of sensation below the lesion (Middleton et al., 2007).

According to the report of WHO, rehabilitation is “a set of actions that assist individuals who understanding or are likely to experience disability to accomplish and maintain optimal functioning and communication with their environment” (Barnes, 2011). Vocational training, leisure activities and sports following spinal cord injury (SCI) is considered to be an important goal of rehabilitation. Rehabilitation covers three disparate areas: physical, social and economic. Physical rehabilitation includes health education provided to users and their family members for avoidance of further complications from SCI. Social rehabilitation is carried out through home visits to provide support to person with SCI in order to integrate them into family life, social activities, health care and education. Economic rehabilitation is provided throughout vocational training (Momin, 2005).

Vocational training programs play an important role in bringing persons with a health condition returning to work while encouraging the reconsideration of the workplace (Finger et al., 2012). Vocational training is a multi-disciplinary approach which main aim is to improvized participation in work and provided in various settings, services and activities to work people with health related disability, limitation or restrictions with work program (Escorpizo et al., 2010). In the initial stage of a full medical rehabilitation program, a multidisciplinary vocational rehabilitation approach has been introduced through a medical evaluation of the geographical rehabilitation system. Vocational rehabilitation teams will be involved in discipline of physiotherapy, occupational therapy, psychology, psychiatry, job counseling, job training, job education and others depending on the vocational rehabilitation agency in certain countries (Gobelet et al., 2007). People with spinal cord injury when complete a long-term multidisciplinary medical rehabilitation program then vocational training usually starts as an outgoing or community-based activity (Johnston et al., 2016).

People who suffer from traumatic spinal cord injury, returns to work have been difficult after injury (Murphy, 2013). Persons sustaining spinal cord injury or disease usually undergo extensive multidisciplinary rehabilitation with the aim of optimal participation in the community, including return to work. Work participation generates income and is beneficial for other reasons, including self-esteem and quality of life (Cotner et al., 2018). Employment rates among people with an average of 34% (range, 15%–76%) and an average full-time employment rate of 21%, are well below those among the general population (Bloom et al., 2018). Determinants for working participation following SCI have been described and include the following factors favoring employment: demographic characteristics at time of injury (being young, male, married), injury-related factors (less time since injury, lower level of injury/impairment, higher functional status, and less medical complications), employment-related determinants (higher education, involved employer, and office work), psychosocial (motivation, receiving social and environmental support), and rehabilitation-related factors (vocational rehabilitation) (Ferdiana et al., 2014). Barriers for vocational training in SCI include lack of transportation, lack of benefits, having no time off for health-related concerns or difficulty accessing health care, and others in the workforce about the capabilities of persons with disabilities (Ferdiana et al., 2014).

Vocational rehabilitation, defined as a “multi-professional evidence-based approach that is provided in different settings, services, and activities to working age individuals with health-related impairments, limitations, or restrictions with work functioning, and whose primary aim is to optimize work participation” (Escorpizo et al., 2011). Vocational training could be helpful to optimize working participation outcomes and prompt involvement with is important (Hilton et al., 2017). It is known that availability of job placement services by a vocational counselor, including provision of information on appropriate jobs, contributes to successful work participation (WHO, 2013). Combining these factors would logically lead to earlier integration of vocational training into the rehabilitation process.

The goal of vocational training services is to assist people with disabilities to successfully obtain and maintain competitive employment in a field of interest, in order to support increased autonomy and full participation in society (Bolton et al., 2000). From other studies we know that the chances to resume work are restricted for

patients with chronic diseases and disabilities (Schonherr et al., 2005). Factors related to the success of vocational training are age, education level, realistic expectations, pre injury type of job, type of lesion and disease-specific problems and disabilities. The actual number of persons with disabilities in Bangladesh is still not known, various reports suggest a figure between 10 and 20 million (WHO, 2013). While 50% of the disabilities are preventable, the current Government (GO) and Non government (NGO) services in Bangladesh are inadequate, and little is being done to support persons with disabilities to return to work (Hansen et al, 2007). CRP has urbanized an advance that provides treatment and rehabilitation to the person with SCI of Bangladesh. When persons with SCI are incapable to return to their previous employments, they involve new skills to be capable to take part in financial activities. Physiotherapy plays an momentous role to regenerate the person with SCI, it is a most significant part of rehabilitation and focuses on improving the persons' functional performance and abilities and rehabilitation following SCI.

Musculoskeletal disorders (MSDs) are described as disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs (Kakosy & Németh, 2003). Musculoskeletal problems of spinal cord injury patients during vocational training are common. There are a number of intrinsic and extrinsic factors have been implicated in the aetiology of these musculoskeletal problems. Repetitive movement, awkward postures, and high force levels as the three primary risk factors that have been associated with MSDs. They are caused or aggravated by repeated movements and prolonged awkward or forced body postures (Patel et al., 2018). It has been suggest that the majority of people with SCI have musculoskeletal problems during their lifetime. For example, shoulder pain, neck and back pain are reported in up to three-quarters of the spinal cord injury (SCI) population. Spinal cord injury (SCI) results in loss of motor, sensory and autonomic functions below the level of the lesion with a range of completeness and incompleteness of neurological injury. Cervical injuries result in tetraplegia and thoracic/lumbar injuries result in paraplegia. It is well known clinically that there are multiple sequelae to the musculoskeletal system directly due to or related to SCI level, completeness and duration of injury. Loss of motor and sensation function directly result to loss of muscle mass and muscle atrophy, as well as low bone mineral density. (Ciciliot et al., 2013).

According to the study of Anthony, after spinal cord injury most of the patients felt pain or had complained pain (Chiodo et al., 2007). As the cause of re-hospitalization in patients with SCI, pain as the highest incidences of medical complications. Pain was connected with psychosocial factors such as depression, anger and negative cognition (Perry et al., 2009). The quality of life and physical function of patients with SCI was also affected chronic pain (Haisma et al., 2007). According to a study of New Delhi approximately 45% patients suffers with pain (Vijayakumar & Sing, 2004). Most patients reported musculoskeletal pain, or had spasticity at each assessment (Haisma et al., 2007). In the rates ranging from 63% to 91% at 1-year post injury following a SCI, pain has been found to be dominant. About 2–4 of those individuals reporting pain in the first year, up to 71% had reported that pain interfered with daily activities (Donnelly et al., 2005). Pain among the spinal cord injury patients can categorize into musculoskeletal pain and neuropathic pain. Aching and throbbing type are described as musculoskeletal pain and sharp, shooting and burning sensation were considered as neuropathic pain. According to a study on pain, average 25% pain were musculoskeletal origin, 15% referred pain and 5% report central cord pain. About 64%-80% patients were reported pain and among them 38% characterized the pain as severe pain (Vijayakumar & Sing, 2004).

Musculoskeletal problems are put into different categories according to pain location. One category is upper limb disorders which include any injury or disorder located from the fingers to shoulder or neck. Another category of musculoskeletal pain disorder is lower limb disorders which include injury and disorders from hip to toes. (Health and Safety Executive, 2011). When the patient feels pain in upper extremities, shoulder (75%), wrists (53%), hands (43%) and 35% in elbows may involve (Chiodo et al., 2007). MSDs can affect the body muscles, joints, tendons, ligaments, and nerves. Most work-related MSDs develop over time and are caused either by the work itself or by the employees' working environment. Employment is an essential part for the earning in the life of every human being, but it can become a health hazard if it is job is not carried out in an inappropriate way. The severity of Musculoskeletal problems can vary. Primary metabolic dysfunction related to autonomic dysfunction in SCI also results to heightened bone loss in the acute phase and is persistent throughout life which increases risk for fractures (Dionyssiotis et al., 2013) and can likewise result to abnormal ossifications and bony growths (Genet et

al., 2015). Many of the musculoskeletal issues arise from repetitive stress to muscles, ligaments, tendons and joints particularly in the upper extremities (Bossuyt et al., 2018) but also occurs in the lower extremities in those who have ability to stand or walk(Awai et al., 2016).Decreased mobility and spasticity after SCI lead to progressive joint contractures. Impaired sensation may also contribute to unintended trauma to both upper and lower extremities that adds further risk to musculoskeletal injury (Bossuyt et al., 2018).

Neck and shoulder pain are very common following spinal cord injury. The pain may arise from neck, shoulder girdle or glenohumeral joint. It may arise from the remote site of the pathology and refer pain to the shoulder or neck. Over time, approximately 50 percent of these patients are afflicted by shoulder pain. It occurs in both paraplegic and tetraplegic patients. In paraplegic patients, the cause of the pain is repeated moves and overuse of upper limbs to carry out daily activities (Kentaret al., 2018).In quadriplegic patients, the major cause of this pain is lack of muscle balance and lack of active moves in the shoulder .Shoulder pain can negatively affect mobility, participation in social activities and quality of life (Bossuyt et al.,2018).

Wrist pain following spinal cord injury is a common phenomenon in the patient with paraplegic patients those who use manual wheelchair (Dalyan et al.,1998). Neck, middle back and low back painall are common in the SCI population .Low Back pain is a common problem in people with paraplegia. Low Back Pain (LBP) is defined as the tender, hurt or ache anywhere in the back region and from time to time all way to the buttocks and legs. Worldwide, Low back Pain is incident by 50% to 80% of people at least once in their life. It is the third main reason for Hospital visit (Deksisa , 2015). Low back pain is extremely prevalent musculoskeletal disorder worldwide and it is worsening day by day due to the increasing and ageing world's population. Many studies have highlighted that LBP is associated with lower socioeconomic status, low educational status, obesity, previous episode of LBP, physical factors including demanding jobs requiring lifting and carrying heavy objects, working in a same position and posture for prolonged period of time, and psychosocial factors such as anxiety, depression, dissatisfaction on job, performing monotonous tasks, poor relationship and support within the colleagues in workplace, lack of job control and mental stress (Bindra et al., 2015).There may also be found buttock pain, chest pain and some sort of neck pain. The buttock pain is usually occurred as a result of long

time sitting in a same position without taking lift, chest pain, neck pain are due to abnormal posture as like kyphotic (Boninger et al., 2003).

Due to the loss of bone density after SCI, the risk of a fracture, or broken bone, is increased significantly. The way a person moves and performs normal daily activities changes after SCI, and may result in abnormal stresses in the neck, back, and arms, leading to potential fractures. About 14% of people with SCI get fractures five years after injury. This increases to 28% after 10 years and 39% after 15 years. The frequency of fractures increases with age and completeness of injury, and is higher in women than men. Although most fractures are in the lower extremities and result from falls from bed or wheelchair during transfer and fractures often occur from only a mild slip (Escobedo et al., 2008).

Loss of range of motion is probably the most common musculoskeletal problem following spinal cord injury (SCI). Range of motion is very important for seating, transferring, and other functional activities (Dalyan et al., 1998). The causes of decreased range of motion are numerous, although the most common cause is staying in the same position for prolonged periods of time, such as sitting, decreasing flexibility; arthritis-people with joint problems commonly lose range of motion (Goldstein et al., 1997).

Contractures develop very quickly in persons with SCI. The common contractures are flexion contractures which develop in the elbow, fingers (in tetraplegia) and hip, knee and ankle. Shoulder adductor contractures add on to disability to the upper limb, Shoulder involvement can lead to pain and stiffness in fingers known as shoulder hand syndrome (Tharion et al, 2009).Spinal cord injury (SCI) results in long-term complications and had a negative impact on patients' lifestyles in different levels such as their social and family relationships, education, employment, and financial status. In young adults SCI occurs most when they were in their primary and are experiencing a productive life and social role (Botticello et al., 2012).A recent study report that, musculoskeletal complications were high during vocational rehabilitation, had mostly occurred (Haisma et al. 2007). About 74.7% of patients with spinal cord injury were mostly committed pain, spasticity, contractures and heterotopic ossifications (Nair et al. 2005).

3.1 Study design

This study aimed to find out the Musculoskeletal problems of spinal cord injury patients during their vocational training. For that reason quantitative research model in the form of a cross sectional type of study design was used to perform the study. A quantitative research design was used so that there were used large number of participants and therefore to collect data. The researcher collected data from CRP Madhab Memorial Vocational Training Institute and CRP-Ganakbari through a structured questionnaire.

3.2 Settings

The researcher selected the CRP Madhab Memorial Vocational Training Institute which is situated in Manikganj, about 39 km away from CRP Head Office at Savar and CRP-Ganakbari and which is situated 15 km away from CRP Head Office at Savar for data collection. At first researcher developed a standard questionnaire and then selected the spinal cord injury patient during their vocational training as sample for data collection.

3.3 Study sampling and population

A population is the total group or set of events or totality of the observation on which research is carried out. The study populations were all the Spinal cord injury patients, who were taking vocational training. The sample population or sample is a relatively small subset of population that is selected to represent or stand in for the population. A sample is the researcher defined subgroup of the population. The researcher chooses spinal cord injury patients during vocational training from CRP Madhab Memorial Vocational Training Institute and CRP-Ganakbari as a sample population to carry out this study.

3.4 Sampling technique

Sampling refers to the process of selecting the subjects/individual. The researcher selected the convenience type sampling technique to draw out the sample from the population. It is the simplest which occupies low cost and researcher had a freedom to use whomever they find. The Researcher had selected this technique as it is the easiest and quickest method of sample selection.

3.5 Sample size

The equation of sample size calculation is given below-

$$n = \left\{ \frac{Z \left(1 - \frac{\alpha}{2}\right)}{d} \right\}^2$$
$$= \left\{ \left(\frac{1.96}{0.05} \right) \right\}^2 \times 0.5 \times 0.5$$

$$= 384$$

Here,

$$Z \left(1 - \frac{\alpha}{2}\right) = 1.96$$

P (prevalence) = 50% (Geyh et al., 2010)

And, $q = (1-p)$

$$= (1-0.5)$$

$$= 0.5$$

$$d = 0.05$$

The actual sample size for this study was calculated as 384

Actual sample size for the study was 384. Generally survey needs large number of sample that will represent whole population. But due to limitation of different conditions at least 59 samples were taken to make the study. As it was educational research and the study was cross-sectional survey the number of the study sample was 59.

3.6.1 Inclusion criteria:

- People living with SCI who completed active rehabilitation.
- SCI people who were continuing their vocational training.
- Both male and female participants.
- Age ranges from 16 years and above.

3.6.2 Exclusion criteria:

- SCI patients who were at their active rehabilitation phase.
- People living with SCI who completed their vocational training.
- SCI patients who have cognitive problem.

3.7 Informed consent

Written consent (appendix) was given to all participants prior to completion of the questionnaire. The researcher explained to the participants about his or her role in this study. The researcher received a written consent form every participant including signature. So the participant assured that they could understand about the consent form and their participation was on voluntary basis. The participants were informed clearly that their information would be kept confidential. The researcher assured the participants that the study would not be harmful to them. It was explained that there might not a direct benefit from the study for the participants but in the future cases like them might get benefit from it. The participants had the rights to withdraw consent and discontinue participation at any time. Information from this study was anonymously coded to ensure confidentiality and was not personally identified in any publication containing the result of this study.

3.8 Data Collection Tools

- Record or Data collection form
- Informed Consent
- Structured questionnaire

3.9 Data Collection Procedure

At the very beginning researcher clarified that, the participant had the right to refuse to answer of any question during completing questionnaire. They could withdraw from the study at any time. Researcher also clarified to all participants about the aim

of the study. Participants were ensured that any personal information would not be published anywhere. Researcher took permission from each volunteer participant by using a written consent form. After getting consent from the participants, structured questionnaire was used to identify the complain and collect demographic information. Questions were asked according to the Bangla format. For conducting the interview, the researcher conducted a face to face interview and asked questions. Physical environment was considered strictly. Stimuli that can distract interviewee were removed to ensure adequate attention of interview. Interviewee was asked questions alone as much as possible with consent as sometimes close relatives can guide answer for them. The researcher built a rapport and clarified questions during the interview. Face to face interviews were the most effective way to get full cooperation of the participant in a survey. Face to face interviews were also effective to describe characteristics of a population. Face to face interviews was used to find specific data which describes the population descriptively during discussion. According to the participants' understanding level, sometimes the questions were described in the native language so that the patients can understand the questions perfectly and answer accurately. All the data were collected by the researcher own to avoid the errors.

3.10 Data Analysis

Descriptive statistics were used to analyze data. Descriptive statistics refers methods of describing a set of results in terms of their most interesting characteristics. Data were analyzed with the software named Statistical Package for the Social Science (SPSS) version 20.0. The variables were labeled in a list and the researcher established a computer based data definition record file that consist of a list of variables in order. The researcher put the name of the variables in the variable view of SPSS and defined the types, values, decimal, label alignment and measurement level of data. The next step was cleaning new data files to check the inputted data set to ensure that all data has been accurately transcribed from the questionnaire sheet to the SPSS data view. Then the raw data were ready for analysis in SPSS. Data were collected on frequency and contingency tables. Measurements of central tendency were carried out using the mean plus standard deviation (SD) for variables. For the study of the association of numeric variables chi squared test were used.

Data were analyzed by descriptive statistics and calculated as percentages and presented by using table, bar graph, pie charts etc. Microsoft office Excel 2016 was used to decorating the bar graph and pie charts.

Chi-square Test

Chi-square test is the most popular discrete data hypothesis testing method. It is a non-parametric test of statistical significance for bivariate tabular analysis with a contingency table. In this study chi-square test was done to measure the association between two discrete variables. It was used to test the statistical significance of results reported in bivariate tables.

The Chi-square is denoted by χ^2 . The chi square formula is

$$\chi^2 = \sum (O_i - E_i)^2 / E_i$$

where,

- O_i = Observed value
- E_i = Expected value

Chi square is the sum of the squared differences between observed (O_i) and the expected (E_i) data divided by expected (E_i) data in all possible categories.

Level of significance

The researcher had used 5% level of significant to test the association. If the p value for the calculated χ^2 is $p < 0.05$ concluded that there was significant association between the two variables. The χ^2 value and the level of significance were presented through the following table

Table 1: Example of χ^2 value and level of significance.

Area of Injury	Neck pain		Chi-Square	P-value
	Yes	No		
Cervical region	6	2	25.26	0.00
Thoracic region	3	33		
Lumber region	0	13		
Thoraco-lumber	1	1		

3.11 Ethical consideration

The researcher took permission initially from the supervisor of the research project and from the course coordinator before conducting the study. The necessary information has been approved by the ethical committee of CRP and the researcher was permitted to do this research. Also the necessary permission was taken from the in-charge of the rehabilitation division of CRP. The participants were explained about the purpose and goal of the study before collecting data from the participants. Pseudonyms were used in the notes, transcripts and throughout the study. It was ensured to the participants that the entire field notes, transcripts and all the necessary information will be kept in a locker to maintain confidentiality and all information will be destroyed after completion of the study. The participants were also assured that their comments will not affect them about any bad thing.

4.1 Socio-demographic information

Table 2 Socio-demographic information of the respondents:

Variables	n(%)	Variables	n(%)
Age			
15 to 24 years	20(33.9%)	Farmer	13(22.0%)
25 to 34 years	19(32.2%)	Garments worker	15(25.4%)
35 to 44 years	12(20.3%)	Day laborer	14(23.7%)
45 to 54 years	5(8.5%)	Immigrants	2(3.4%)
55 to 64 years	3(5.1%)	Housewife	1(1.7%)
Gender			
Male	50(84.7%)	Teacher	2(3.4%)
Female	9(15.3%)	Student	9(15.3%)
Marital Status			
Married	30(50.8%)	Monthly income	
Unmarried	29(49.2%)	Lower than 5000BDT	31(52.5%)
Educational Status			
Not completed primary education	9(15.3%)	More than 5000BDT to 10000BDT	15(25.4%)
Completed Primary education	16(27.1%)	More than 10000BDT to 15000BDT	4(6.8%)
Completed secondary education	16(27.1%)	More than 15000BDT	9(15.3%)
Completed higher secondary education	7(11.9%)	Family Type	
Completed graduation or above	11(18.7%)	Nuclear family	33(55.9%)
Previous Occupational Status			
Rickshaw puller	3(5.1%)	Extended family	26(44.1%)
Residential Area			
		Rural	53(89.8%)
		Urban	6(10.2%)

Participants age:

There were 59 participants living with SCI who responded in this study. Mean age among them was 30.66. Standard deviation of age was 11.09. Among the participants 33.9% (n=20) were in 15 to 24 years old, 32.2% (n=19) were in 25 to 34 years old, 20.3% (n=12) were in 35 to 44 years old, 8.5% (n=5) were in 45 to 54 years old, 5.1% (n=3) were in 55 to 64 years old.

Participants gender:

Out of 59 respondents living with SCI, 84.7% (n=50) were male and 15.3% (n=9) were female.

Marital Status:

Among the participants, 50.8% (n=30) were married and 49.2% (n=29) were unmarried.

Educational Status:

Among the 59 participants, 27.1% (n=16) completed primary education, same percentages (n=16) were seen who completed secondary education, 18.7% (n=11) completed graduation and above, 15.3% (n=9) were not completed primary education and 11.9% (n=7) participants completed higher secondary education.

Previous Occupational Status:

Out of 59 participants living with SCI, 25.4% (n=15) were garment workers, 23.7% (n=14) were day laborer, 22% (n=13) were farmers, 15.3% (n=9) were students, 5.1% (n=3) were rickshaw pullers, 3.4% (n=2) were immigrants, 3.4% (n=2) were teachers and 1.7% (n=1) were housewife.

Family Monthly Income:

The majority of the participants (52.5%, n=31) had monthly family income less than 5000BDT. 25.4% (n=15) had monthly family income more than 5000BDT to 10000BDT, 6.8% (n=4) had monthly family income more than 10000BDT to 15000BDT and 15.3% (n=9) had monthly family income more than 15000BDT.

Family types:

Family types Among the participants, 55.9% (n=33) had extended family and 44.1% (n=26) had nuclear family.

Living area:

Out of 59 participants living with SCI, 89.8% (n=53) were living in rural area and only 10.2% (n=6) were living in urban area.

4.2 Spinal cord injury related Information

4.2.1 Causes of Injury

Among the 59 participants, majority (44.1%, n=26) had fall from height causes, 30.5% (n=18) had motor vehicle injury, 10.2% (n=6) had bull attack, 8.5% (n=5) had injury while caring heavy load, 6.8% (n=4) had injury fall of heavy object on back.

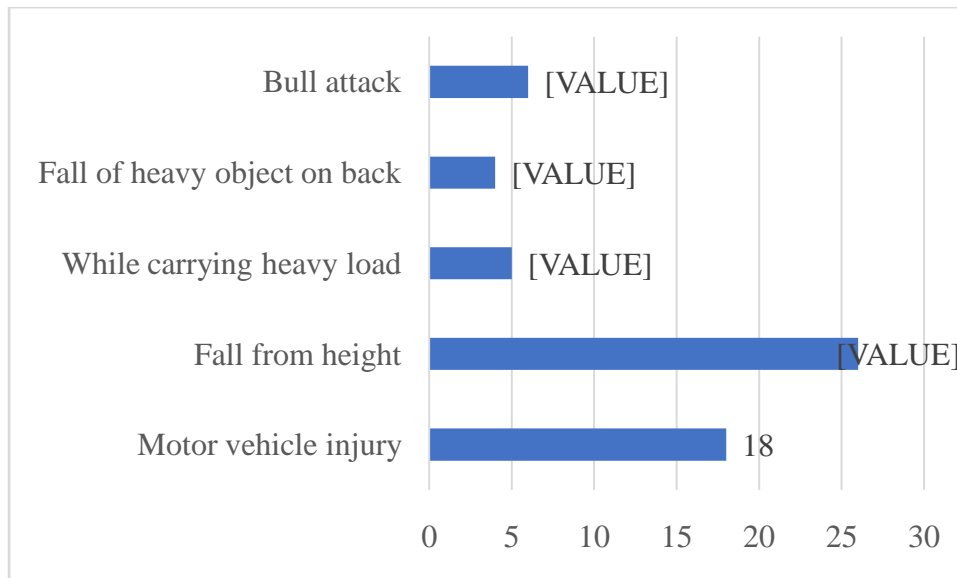


Figure 1: Causes of injury

4.2.2 Structure got injured

Out of 59 participants, 61% (n=36) had injury on thoracic region, 22% (n=13) had injury on lumbar region, 13.6% (n=8) had injury on cervical region and 3.4% (n=2) had injury on thoraco-lumbar region.

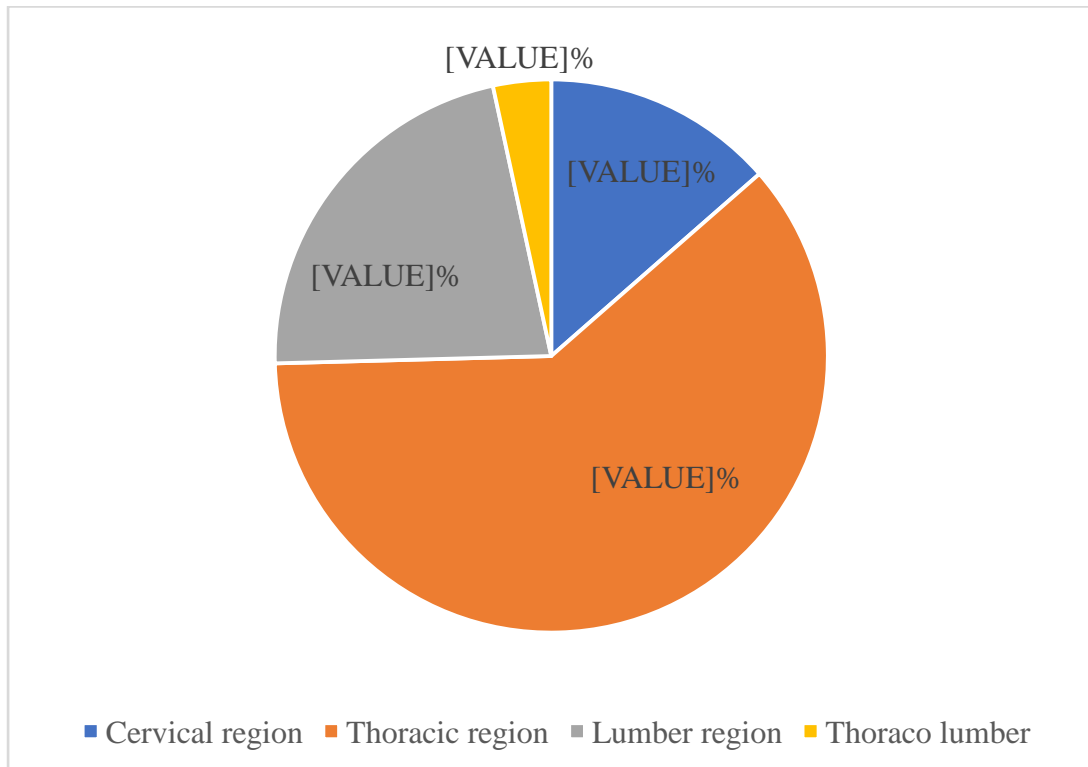


Figure2: Structure got injured

4.2.3 ASIA Diagnosis level

Among the 59 respondents, 50.8% (n=30) had complete A, 25.4% (n=15) had incomplete B, 15.3% (n=9) had incomplete D, 5.1% (n=3) had incomplete C and 3.4% (n=2) had normal E.

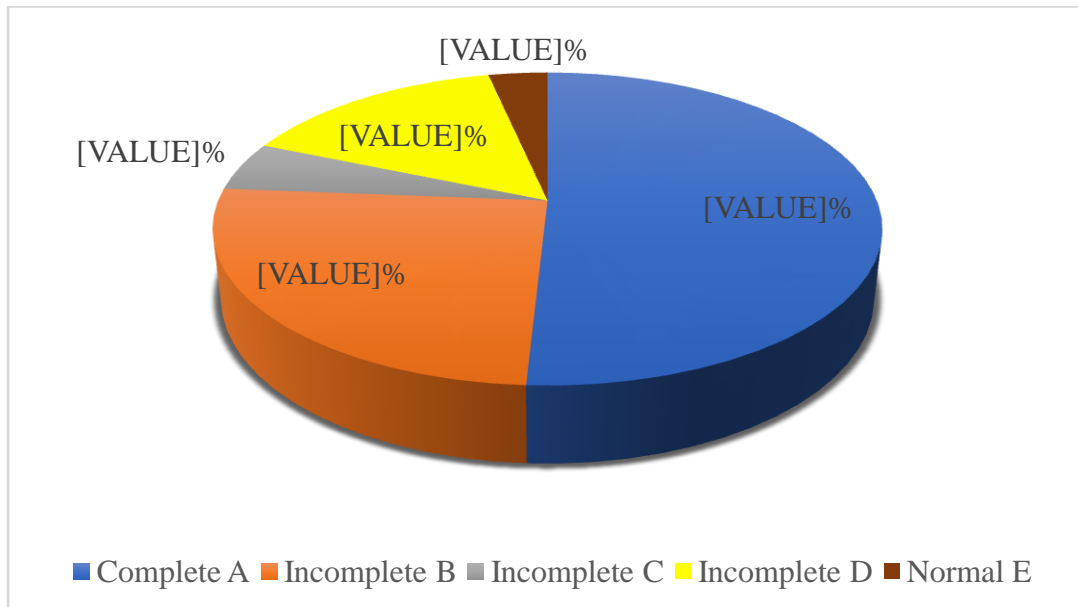


Figure3: ASIA Diagnosis level

4.2.4 Type of paralysis

Out of 59 participants living with SCI, 47.5% (n=28) had complete paraplegia, 35.6% (n=21) had incomplete paraplegia, 10.2% (n=6) had incomplete tetraplegia, 3.4% (n=2) had complete tetraplegia and 3.4% (n=2) had SCI without neurological deficit.

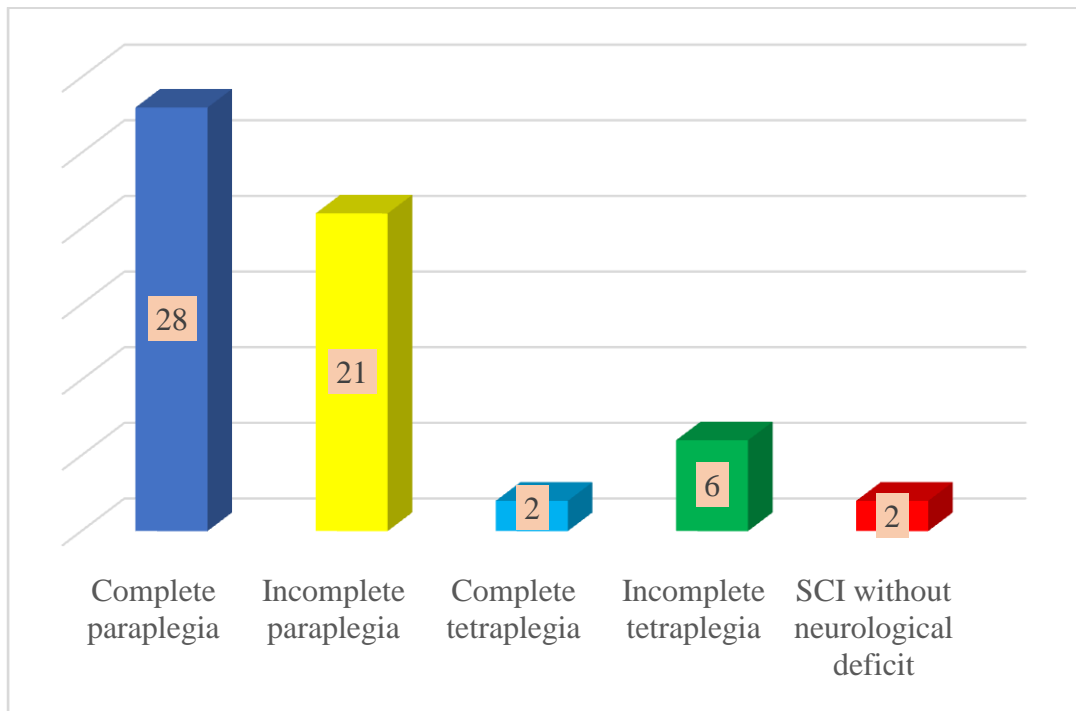


Figure4: Type of paralysis

4.2.5 Devices currently being used

Among the 59 respondents living with SCI, 79.7% (n=47) participants used wheelchair, 5.1% (n=3) used walking frame, 5.1% (n=3) had used crutch, 5.1% (n=3) had used stick and 5.1% (n=3) had no devices.

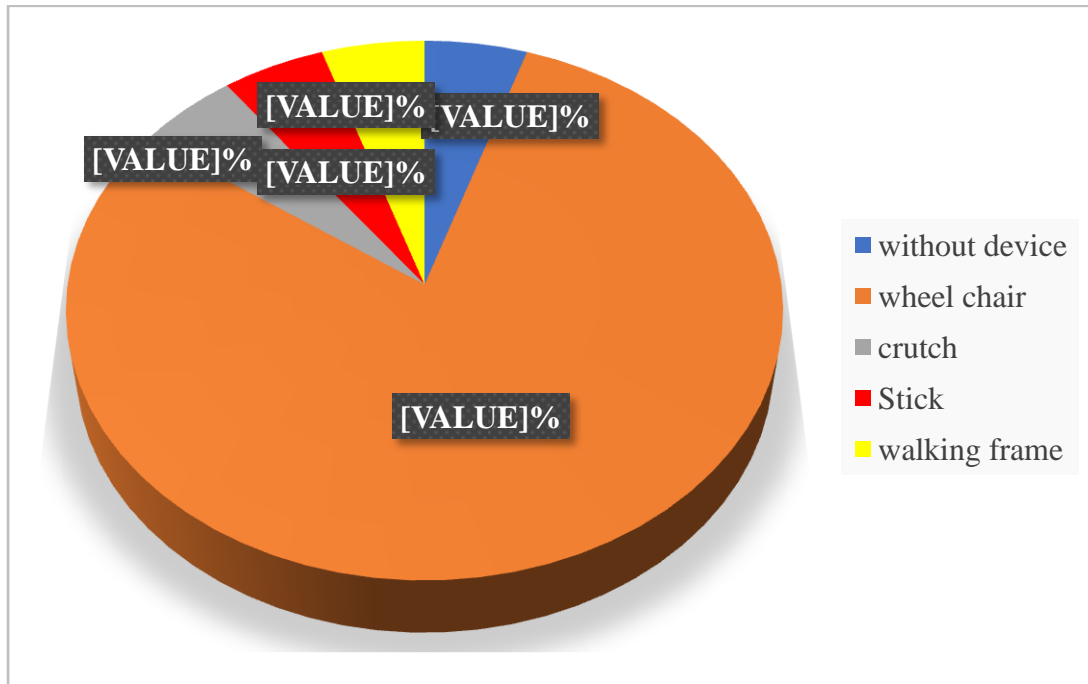


Figure5: Devices currently being used

4.3 Symptoms & Risk indicator related questions

4.3.1 Type of vocational training received

Among the 59 respondents living with SCI, 42.4% (n=25) had store management training, 32.2% (n=19) had electrical training, 15.3% (n=9) had tailoring training and 10.2% (n=6) had computer training.

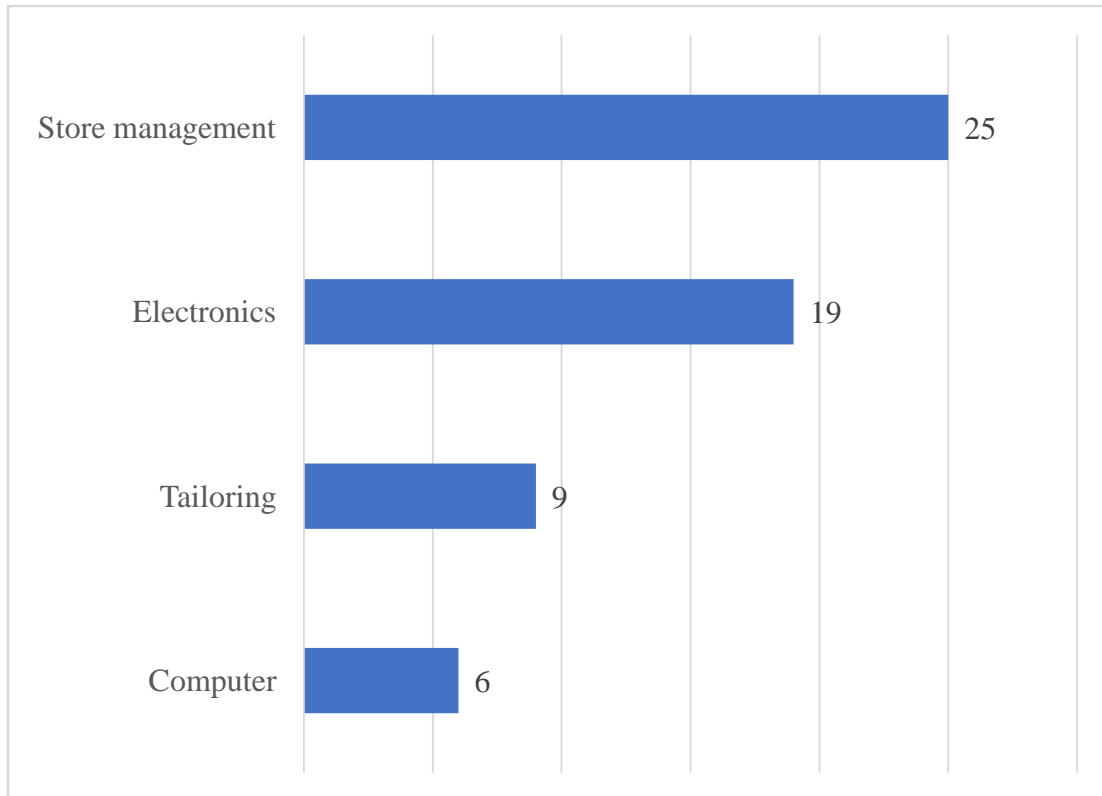


Figure6: Type of vocational training received

4.3.2 Posture maintained during training

Among the participants 96.6% (n=57) reported that they maintained sitting posture during working hour and only 3.4% (n=2) reported maintained standing posture.

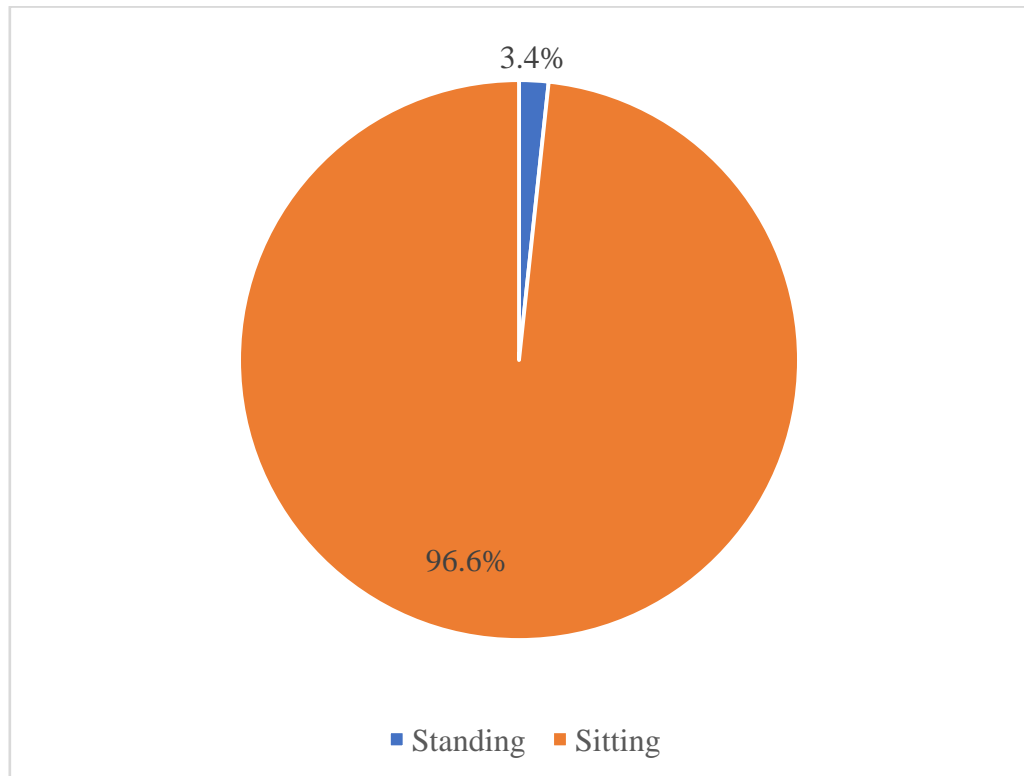


Figure 7: Posture maintained during training

4.3.3 Participants experienced work-related musculoskeletal disorders in any part of body

Among respondents, 94.9% (n=56) participants complained that they had experienced work-related musculoskeletal disorders in any part of body and 5.1%(n=3) had no experienced work-related musculoskeletal disorders in any part of the body.

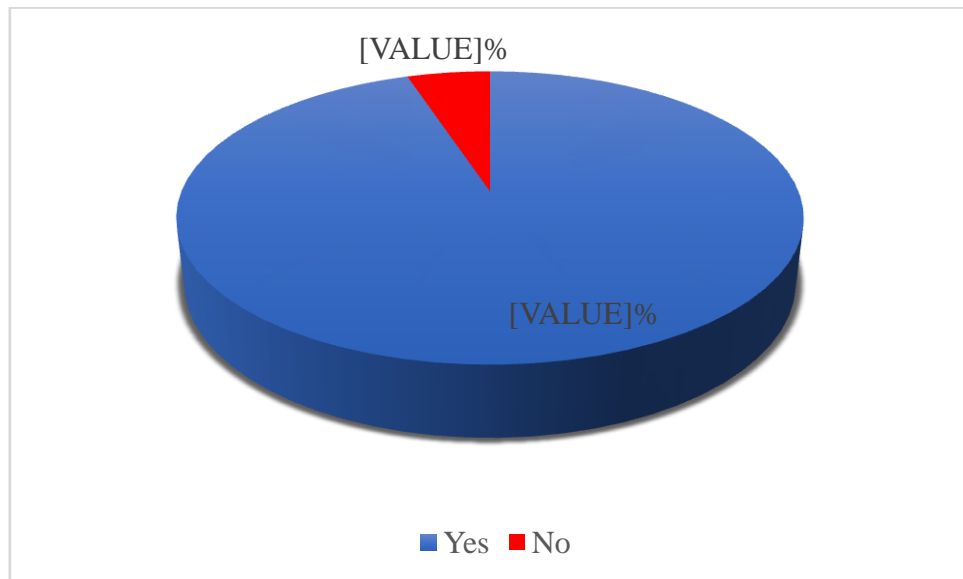


Figure8: Participants experienced work-related musculoskeletal disorders in any part of body

4.3.4 Participants felt tightness or (decreased JROM) contracture of any joint

Among the 59 respondents, 58% (n=34) participants had felt tightness or (decreased JROM) contracture of any joint and 42% (n=25) had no tightness or (decreased JROM) contracture of any joint.

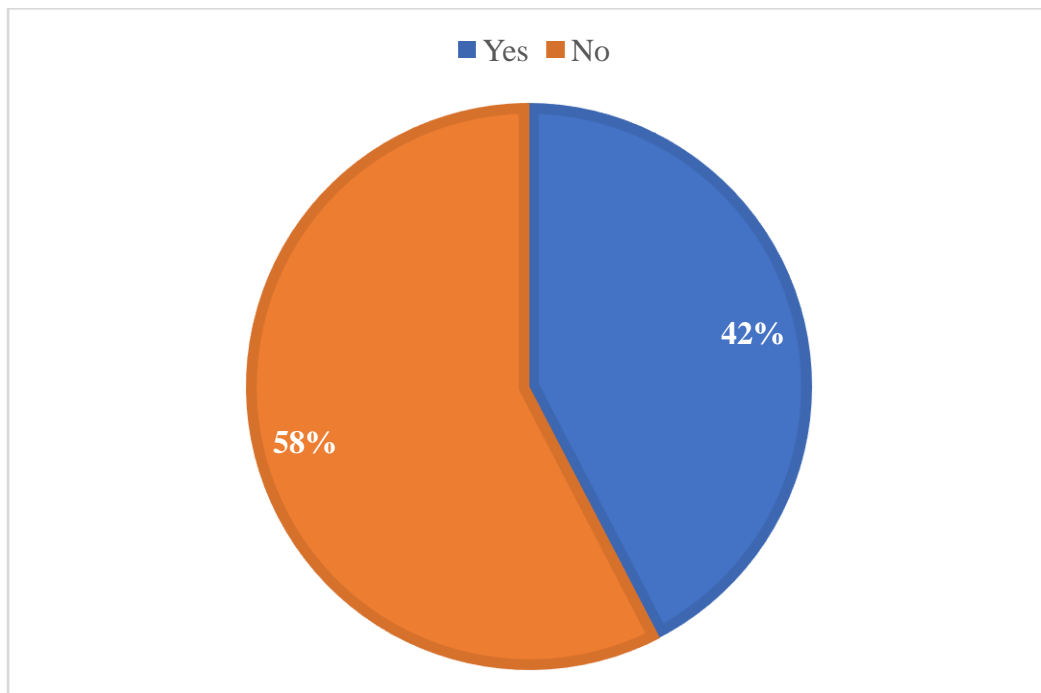


Figure 9: Participants felt tightness or (decreased JROM) contracture of any joint

4.3.5 Experienced pain

Among the participants, 31.0% (n=39) had back pain, 23.0% (n=29) had buttock pain, 17.5% (n=22) had shoulder pain, 7.9% (n=10) had neck pain, 7.1% (n=9) had wrist pain, 4.8% (n=6) had ankle pain, 4% (n=5) had elbow pain, 2.4% (n=3) had knee pain and 2.4% (n=3) also had chest pain.

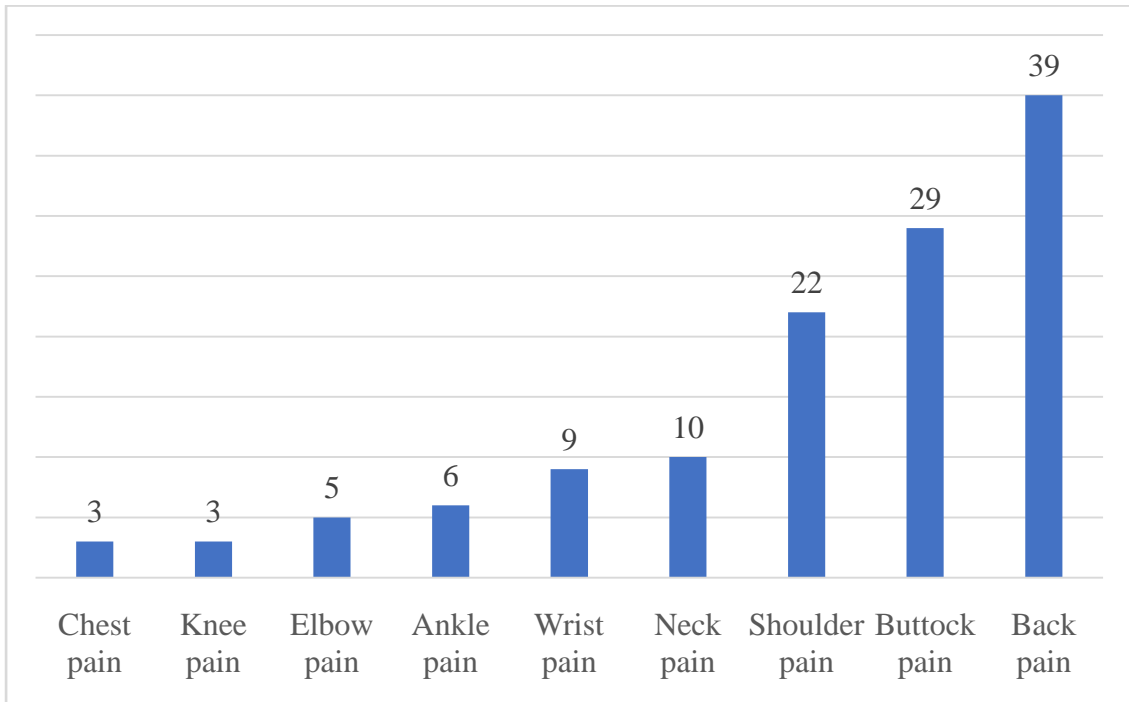


Figure10: Experienced pain

4.3.6 Pain severity experienced by the participants

Among the participants 52.5% (n=31) participants had mild pain, 45.8% (n=27) had moderate pain and 1.7% (n=1) had severe pain.

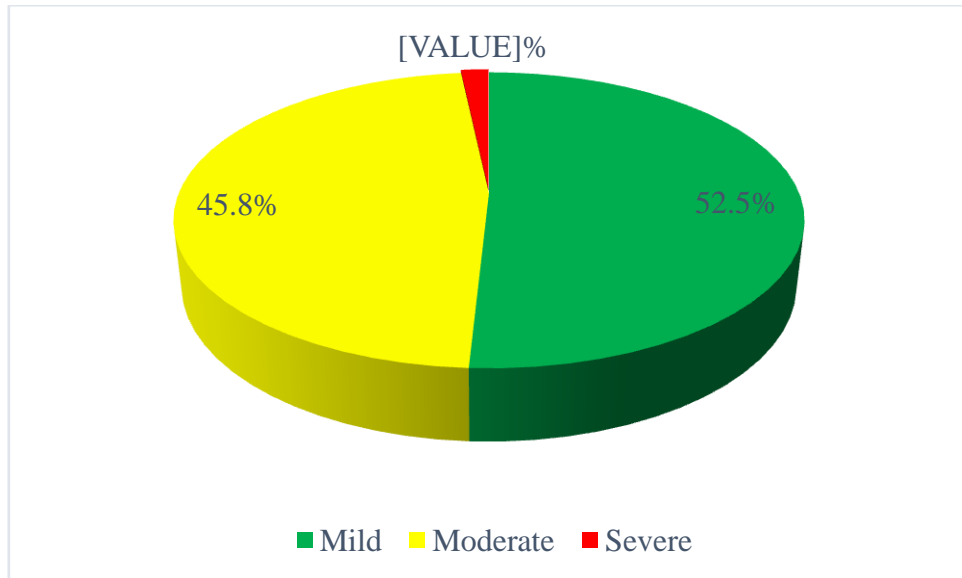


Figure11: Pain severity experienced by the participants

4.3.7 Pattern of pain experienced by the participants

Among the participants, 57.6% (n=34) respondents had temporary pain, 23.7% (n=14) had pain during movements and 18.6% (n=11) participants had continuous pain.

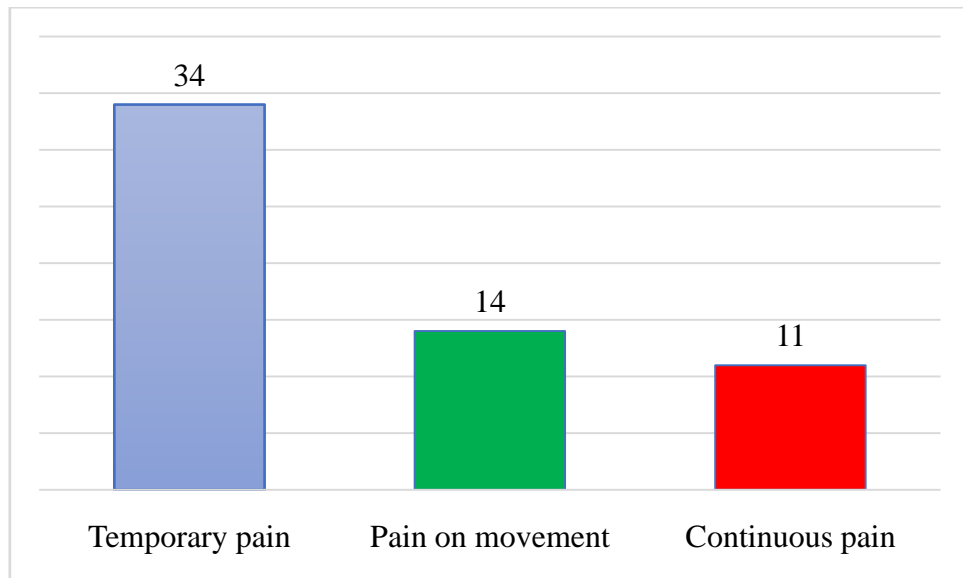


Figure12: Pattern of pain experienced by the participants

4.3.8 Fracture after injury

Among the participants, most of the participants (98%, n=58) had told they had no fracture after injury and 2% (n=1) participants had fracture after injury.



Figure13: Fracture after injury

4.3.9 Ankle swelling during work

Among the participants, 61% (n=36) respondents had ankle swelling problem during work and 39% (n=23) respondents reported that they had no ankle swelling.

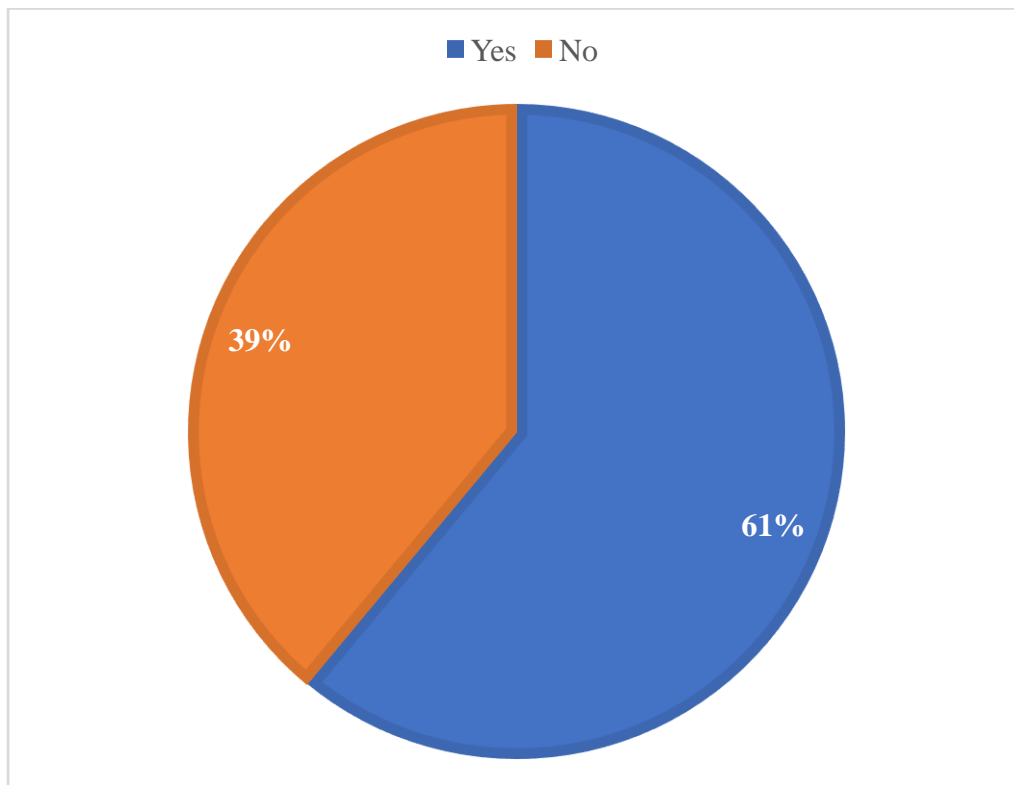


Figure14: Ankle swelling during work

4.3.10 Felt physical discomfort during work

Among the participants 75% (n=44) respondents did not have any complain to feel discomfort during work, while 25% (n=15) respondents had complained about felt discomfort during work.

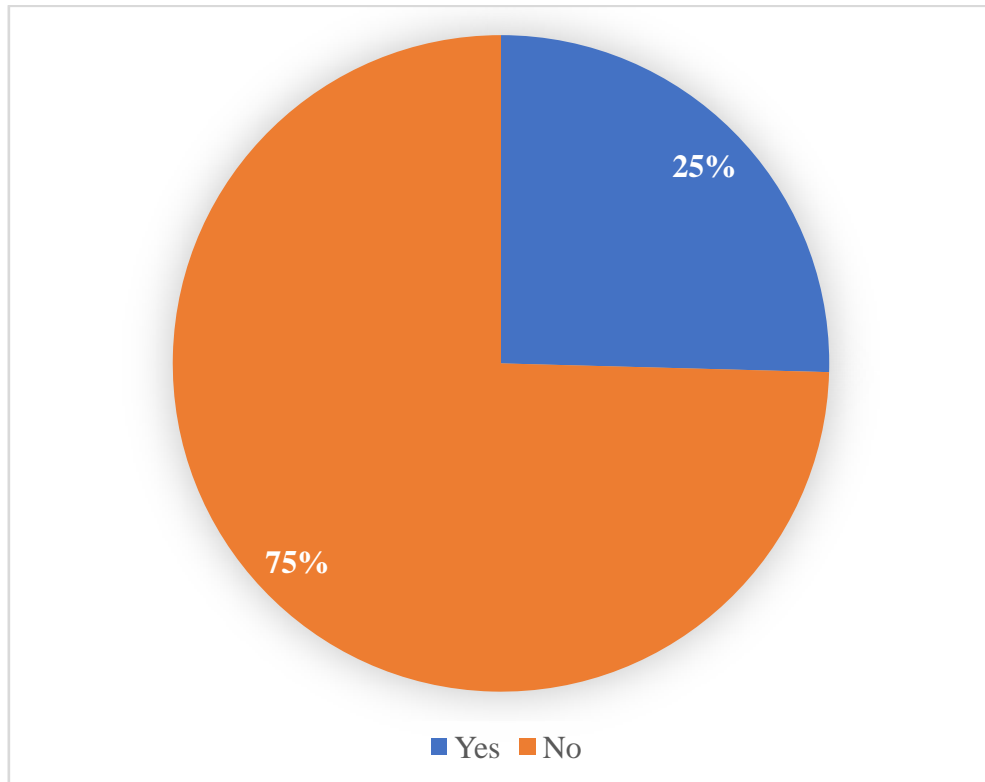


Figure15: Felt physical discomfort during work

4.4 Association between variables

4.4.1 Association between gender and shoulder pain

Table 3: Association between gender and shoulder pain

Gender	Shoulder pain		Chi-Square	P value
	Yes	No		
Male	15	35	7.45	0.006
Female	7	2		

This study found an association in between gender and shoulder pain among 59 participants living with SCI. The chi- square value of this association was 7.45 and P value was 0.006. $P < 0.05$ is significant.

4.4.2 Association between gender and ankle swelling-

Table 4: Association between gender and ankle swelling

Gender	Ankle swelling		Chi-Square	P value
	Yes	No		
Male	30	20	0.143	0.706
Female	6	3		

This study found no association in between gender and ankle swelling among 59 participants living with SCI. The chi- square value of this association was 0.143 and P value was 0.706.

4.4.3 Association between age and back pain-

Table 5: Association between age and back pain

Age	Back Pain		Chi-Square	P value
	Yes	No		
15 to 24 years	15	5	2.03	0.730
25 to 34 years	11	8		
35 to 44 years	7	5		
45 to 54 years	4	1		
55 to 64 years	2	1		

This study found no association in between age and back pain among 59 participants living with SCI. The chi- square value of this association was 2.03 and P value was 0.730.

4.4.4 Association between age and buttock pain-

Table 6: Association between age and buttock pain

Age	Buttock Pain		Chi-Square	P value
	Yes	No		
15 to 24 years	14	16	6.63	0.157
25 to 34 years	6	13		
35 to 44 years	5	7		
45 to 54 years	3	2		
55 to 64 years	1	2		

This study found no association in between age and buttock pain among 59 participants living with SCI. The chi- square value of this association was 6.63 and P value was 0.157.

4.4.5 Association between area of injury and feeling joint tightness-

Table 7: Association between area of injury and feeling joint tightness

Areaof Injury	Feeling joint tightness		Chi-Square	P-value
	Yes	No		
Cervical region	2	6	4.62	0.20
Thoracic region	19	17		
Lumber region	3	10		
Thoraco-lumber	1	1		

This study found no association in between areaof injury and feeling joint tightness among 59 participants living with SCI. The chi- square value of this association was 4.62 and P value was 0.20.

4.4.6 Association between area of injury and feeling back pain-

Table 8: Association between area of injury and feeling back pain

Areaof Injury	Back pain		Chi-Square	P-value
	Yes	No		
Cervical region	1	7	16.13	0.001
Thoracic region	30	6		
Lumber region	7	6		
Thoraco-lumber	1	1		

This study found an association in between area of injury and back pain among 59 participants living with SCI. The chi- square value of this association was 16.13 and P value was 0.001(P<0.05).

4.4.7 Association between neurological level of injury and feeling neck pain-

Table 9: Association between neurological level of injury and feeling neck pain

Neurological Level of Injury	Neck Pain		Chi-Square	P-value
	Yes	No		
Complete A	4	26	2.72	0.61
Incomplete B	2	13		
Incomplete C	1	2		
Incomplete D	2	7		
Normal E	1	1		

This study found no association in between Neurological Level of Injury and Feeling Neck Pain among 59 participants living with SCI. The chi- square value of this association was 2.72 and P value was 0.61.

4.4.8 Association between neurological level of injury and severity of pain-

Table 10: Association between neurological level of injury and severity of pain

Neurological Level of Injury	Severity of Pain		Chi-Square	P-value
	Yes	No		
Complete A	15	15	19.79	0.01
Incomplete B	8	7		
Incomplete C	1	1		
Incomplete D	6	3		
Normal E	1	1		

This study found an association in between neurological level of injury and severity of pain among 59 participants living with SCI. The chi- square value of this association was 19.79 and P value was 0.01 ($P < 0.05$).

4.4.9 Association between type of paralysis and feeling neck pain-

Table 11: Association between type of paralysis and feeling neck pain

Type of Paralysis	Neck Pain		Chi-Square	P-value
	Yes	No		
Complete paraplegia	3	25	9.36	0.53
Incomplete paraplegia	2	19		
Complete tetraplegia	1	1		
Incomplete tetraplegia	3	3		
SCI without neurological deficit	1	1		

This study found no association in between Type of Paralysis and Feeling Neck Pain among 59 participants living with SCI. The chi- square value of this association was 9.36 and P value was 0.53.

4.4.10 Association between technical training received and feeling joint tightness-

Table 12: Association between technical training received and feeling joint tightness

Technical training received	Joint Tightness		Chi-Square	P-value
	Yes	No		
Computer	1	5	2.51	0.47
Electronics	9	10		
Tailoring	5	4		
Store management	10	15		

This study found no association in between technical training Received and Feeling Joint Tightness among 59 participants living with SCI. The chi- square value of this association was 2.51 and P value was 0.47.

4.4.11 Association between technical training received and feeling shoulder pain-

Table 13: Association between technical training received and feeling shoulder pain

Technical training received	Shoulder Pain		Chi-Square	P-value
	Yes	No		
Computer	2	4	8.24	0.04
Electronics	7	12		
Tailoring	7	2		
Store management	6	19		

This study found an association in between technical training received and feeling shoulder pain among 59 participants living with SCI. The chi- square value of this association was 8.24 and P value was 0.04 ($P < 0.05$).

4.4.12 Association between technical training received and feeling wrist pain-

Table 14: Association between technical training received and feeling wrist pain

Technical training received	knee Pain		Chi-Square	P-value
	Yes	No		
Computer	1	5	0.56	0.91
Electronics	3	16		
Tailoring	2	7		
Store management	3	22		

This study found no association in between Technical training Received and Feeling Wrist Pain among 59 participants living with SCI. The chi- square value of this association was 0.56 and P value was 0.91.

4.4.13 Association between technical training received and severity of pain-

Table 15: Association between technical training received and severity of pain

Technical training received	Severity of Pain		Chi-Square	P-value
	Yes	No		
Computer	1	5	10.66	0.10
Electronics	11	8		
Tailoring	6	2		
Store management	12	13		

This study found no association in between technical training received and severity of pain among 59 participants living with SCI. The chi- square value of this association was 10.66 and P value was 0.10.

4.4.14 Association between technical training received and pattern of pain-

Table 16: Association between technical training received and pattern of pain

Technical training received	Pattern of Pain		Chi-Square	P-value
	Yes	No		
Computer	3	2	3.49	0.75
Electronics	12	3		
Tailoring	4	1		
Store management	15	5		

This study found no association in between technical training received and pattern of pain among 59 participants living with SCI. The chi- square value of this association was 3.49 and P value was 0.75.

4.4.15 Association between technical training received and ankle swelling-

Table 17: Association between technical training received and ankle swelling

Technical training received	Ankle Swelling		Chi-Square	P-value
	Yes	No		
Computer	3	3	0.47	0.92
Electronics	12	7		
Tailoring	6	3		
Store management	15	10		

This study found no association in between technical training received and ankle swelling among 59 participants living with SCI. The chi- square value of this association was 0.47 and P value was 0.92.

4.4.16 Association between work position and feeling knee pain-

Table 18: Association between work position and feeling knee pain

Work position	Knee Pain		Chi-Square	P-value
	Yes	No		
Standing	1	1	8.65	0.003
Sitting	2	55		

This study found an association in between work position and feeling knee pain among 59 participants living with SCI. The chi- square value of this association was 8.65 and P value was 0.003 ($P < 0.05$).

5.1 discussion

The aim of the study was to find the socio-demographic information (i.e., age, sex, marital status, education, occupation, family income, living area), injury related information and musculoskeletal problems among the spinal cord injured patient during vocational training in CRP.

Musculoskeletal disorders are joint tightness, shoulder pain, elbow pain, wrist pain, back pain, fracture, neck pain, buttock pain, knee pain, ankle pain, ankle joint swelling, discomfort due to technical problem.

There were 59 participants living with SCI were responded in this study. Mean age among them was 30.66. Standard deviation of age was 11.09. Among the participants 33.9% (n=20) were in 15 to 24 years old, 32.2% (n=19) were in 25 to 34 years old, 20.3% (n=12) were in 35 to 44 years old, 8.5% (n=5) were in 45 to 54 years old, 5.1% (n=3) were in 55 to 64 years old. So it was found that biggest sample contains in age range 31-40 years and lowest sample range was 51-70 years. Among the study of Bangladeshi most common age group between 25-29 years in spinal cord injured patients (Islam et al., 2011).

From this study were found that females were 15.3% (n=9), whereas males were 84.7% (n=50). This study was found, male participants higher than the female participants. According to Razzak (2013) found that, among 56 participants 84% were male and 16.0% were female. Like other developing countries, men are in general more exposed to the outer world and involved in manual and often more risky jobs in Bangladesh (Ahmed et al., 2017).

Among the participants, 50.8% (n=30) were married and 49.2% (n=29) were unmarried. Marital status in India shows that about 57% of the marriages and 44% were unmarried (Tasiemski et al., 2013).

In the present study, out of 59 participants living with SCI, 47.5% (n=28) had complete paraplegia, 35.6% (n=21) had incomplete paraplegia, 10.2% (n=6) had incomplete tetraplegia, 3.4% (n=2) had complete tetraplegia and 3.4% (n=2) had SCI without neurological deficit. In Pakistan 46% patients had incomplete paraplegia,

43.3% had complete paraplegia, 4.8% had incomplete tetraplegia, and 5.9% had no neurological deficit (Rathore et al., 2007).

The type of vocational training that found at study setting were Computer, Tailoring, Electronics and store management. Among respondents, 94.9% (n=56) participants complained that they had experienced work-related musculoskeletal disorders in any part of body and 5.1%(n=3) had no experienced work-related musculoskeletal disorders in any part of the body. Spinal Cord-induced musculoskeletal problems was extremely high in this study. In another study, there was 92% prevalence of musculoskeletal problems in a patient with SCI (Linsenmeyer et al., 2006). In this study, researcher found association between area of injury and feeling neck pain, and back pain where other studies suggests that higher level of injury causes more musculoskeletal pain specially neck pain and upper limb pain among the SCI people, because SCI people had to do the upper limb activity mostly. The study also found association between neurological level of injury and severity of pain where complete A injury people living with SCI had more severity of pain complain than others. Researcher also found significant association in between type of paralysis and back pain where complete paraplegia respondents had more back pain complain than others. From this study, researcher also found significant association in between type of paralysis and buttock pain where complete paraplegia respondents had more pain at buttock.

In the study among the participants, 31.5% (n=40) had back pain, 22.8% (n=29) had buttock pain, 17.3% (n=22) had shoulder pain, 7.9% (n=10) had neck pain, 7.1% (n=9) had wrist pain, 4.7% (n=6) had ankle pain, 3.9% (n=5) had elbow pain, 2.4% (n=3) had knee pain and 2.4% (n=3) also had chest pain. Back, shoulder, buttock and neck pain was experienced for the majority of the SCI subjects and most of the time they complained mildly to moderate level of pain. On the other hand, previous studies have shown that among 451 participant, 61% had shoulder pain, 33% had elbow pain, 19% wrist pain (Kentar at al.,2018). In another study among few of the 88 subjects reported that they had experienced shoulder pain before becoming a wheelchair user(8%), whereas 59 subjects (67%) reported a history of shoulder pain since becoming a wheelchair users.(Marie et al., 2008). In another study 750 participant were included as sample and it was found that 73% participants have low back pain(Kovacs,2018).

5.2 Limitation of the study

100% accuracy will not be possible in any research so that some limitation may exist.

Regarding this study, there were some limitations or barriers to consider the result of the study. The participants were also assured that their comments may not affect them about any bad thing limitations or barriers to consider the result of the study as below:

- The first limitation of this study was small sample size. It was taken only 59 samples.
- A very few researches have done on a few of musculoskeletal disorders. So there was little evidence to support the result of this project study in the context of Bangladesh.
- Another major limitation was time. The time period was very limited to conduct the research project on this topic. As the study period was short so the adequate number of sample could not arrange for the study.
- As the study was conducted at Centre for the Rehabilitation of the paralysed (CRP) which may not represent the whole country.

6.1 Conclusion

Spinal cord injury is known as one of the most devastating condition of mankind. Spinal cord injured person can survive, even after the most serious cord injuries, return to a healthy, happy and productive life possible. The patients lose some of the functional ability after the SCI. And due to this functional losses they were experiencing various musculoskeletal problems. If musculoskeletal problems is minimized, vocational training plays an important role in participating in a new job while coming back to social reintegration and new work.

This study comprehends about the musculoskeletal problems among patients with spinal cord injury during their vocational training from CRP in terms of health and medical complications, transportation, mobility aid related barriers, accessibility of workplace, disability discrimination, qualifications and working experience and workplace modification including the physical, mental, social and environmental condition. A structured questionnaire was used for the study. After conducting the study the finding was that, after completing vocational training their quality of life improved but still they were facing some problems. If musculoskeletal problem is subsided vocational training the participants can lead a good quality of physical, mental and environment health condition. Most of them they lead a poor quality of social status. Physical and medical complications barriers hinder them mostly from their all kind of workplace participation whereas lack of inaccessibility in workplace and workplace modification issue are the most experience barrier to improve their musculoskeletal pain condition. So, if these problems are minimized or overcoming strategies are developed and implicate, these people with spinal cord injury can work in their workplace life successfully. At last we can realize that people living with spinal cord injury can suffer from musculoskeletal problems in and that hamper their activity of daily living.

6.2 Recommendations

The aim of the study was to find out common musculoskeletal disorders among spinal cord injury patient during vocational training. I recommended the following things:

- Should take more samples for generating the result and try to make more valid and reliable.
- Should take more samples for pilot study to establish the accuracy of the questionnaire.
- Should take more time.
- But research would need to be carried out considering proof of hypothesis.
- Further study should be carried out on female participants.

REFERENCES

Ahmed, N., Quadir, M. M., Rahman, M. A., & Alamgir, H., (2017). Community integration and life satisfaction among individuals with spinal cord injury living in the community after receiving institutional care in Bangladesh. *Disability and Rehabilitation*, 1-8.

American Spinal Injury Association. 2019. International Standards for Neurological Classification of SCI (ISNCSCI) Worksheet - American Spinal Injury Association. [online] Available at: <<https://asia-spinalinjury.org/international-standards-neurological-classification-sci-isncsci-worksheet/>> [Accessed 15 November 2021].

Ashekin, A., (2013). Challenges Related To Employment Experienced By the Persons With Tetraplegia. [online] Library.crp-bangladesh.org. Available at: <<http://library.crp-bangladesh.org:8080/xmlui/handle/123456789/48>> [Accessed 15 November 2021].

Awai, L., Curt, A., (2016). Locomotor Recovery in Spinal Cord Injury: Insights Beyond Walking Speed and Distance. *Journal of neurotrauma*, 33(15):1428-1435

Barnes, C., (2011). Understanding disability and the importance of design for all. *Journal of accessibility and design for all*, 1(1): 55-80.

Bindra, S., K. Sinha, A. G., & Benjamin, A. I. (2015). Epidemiology of low back pain in Indian population: A review. *International journal of Basic and Applied Medical Sciences*, 5(1), 166-179. Retrieved from http://www.cibtech.org/JMEDICAL-SCIENCES/PUBLICATIONS/2015/Vol_5_No_1/29-JMS-029-BINDRA-EPIDEMIOLOGY-REVIEW.pdf on 2nd August, 2018

Bloom, J., Dorsett, P., McLennan, V., (2018). Investigating employment following spinal cord injury: Outcomes, methods, and population demographics. *Disability Rehabilitation*. doi:10.1080/09638288.2018.1467968.

Bolton, B.F., Bellini, J.L. and Brookings, J.B., (2000). Predicting client employment outcomes from personal history, functional limitations, and rehabilitation services. *Rehabilitation Counseling Bulletin*, 44(1): 10–21.

Boninger, M.L., Cooper, R.A., Fitzgerald, S.G., Lin, J., Cooper, R., Dicianno, B., Liu, B., (2003). Investigating neck pain in wheelchair users, *American Journal of Physical Medicine & Rehabilitation*, 82:197-202, viewed 13 Aug 2011, <http://journals.lww.ajpmr/toc/2003>

Bossuyt, F.M., Arnet, U., Brinkhof, M.W.G., Eriks-Hoogland, I., Lay, V., Muller, R., (2018). Shoulder pain in the Swiss spinal cord injury community: Prevalence and associated factors. *Disability Rehabilitation*, 40(7):798-805. doi: 10.1080/09638288.2016.1276974.

Botticello, A.L., Chen, Y. and Tulsy, D.S., (2012). Geographic variation in participation for physically disabled adults: the contribution of area economic factors to employment after spinal cord injury. *Social Science & Medicine*, 75(8):1505-1513.

Chang, F.H., Coster, W.J. and Helfrich, C.A., (2013). Community participation measures for people with disabilities: a systematic review of content from an International Classification of Functioning, Disability and Health perspective. *Archives of Physical Medicine Rehabilitation*, 94:771–781

Chen, Y., Tang, Y., Vogel, L., DeVivo, M., (2013). Causes of Spinal Cord Injury. *Topics in Spinal Cord Injury Rehabilitation*, 19(1):1-8.

Chiodo, A.E., Scelza, W.M., Kirshblum, S.C., Wuermsler, L.A., Ho, C.H. and Priebe, M.M., (2007). Spinal cord injury medicine. 5. Long-term medical issues and health maintenance. *Archives of Physical Medicine and Rehabilitation*, 88(3):76-83.

Chyuan, J.Y.A., Du, C.L., Yeh, W.Y and Li, C.Y., (2005). A cross-sectional study of musculoskeletal disorders in relation to work movement characteristics among hotel food service employees in Taiwan. *Taiwan Journal of Public Health*, 21:140-149.

Ciciliot, S., Rossi, A.C., Dyar, K.A., Blaauw, B., Schiaffino, S., (2013). Muscle type and fiber type specificity in muscle wasting. *The international journal of biochemistry & cell biology*, 45(10):2191- 2199.

Cotner, B.A., Ottomanelli, L., O'Connor, D.R., Njoh, E.N., Barnett, S.D., Miech, E.J., (2018). Quality of life outcomes for veterans with spinal cord injury receiving individual placement and support (IPS). *Top Spinal Cord Injury Rehabilitation*, 24(4):325-335. Doi: 10.1310/sci 17-00046.

- Cripps, R.A., Lee, B.B., Wing,P., Weerts,E., Mackay,J., Brown,D., (2011).A global map for traumatic spinal cord injury epidemiology: towards a living data repository for injury prevention.Spinal Cord, 49(4):493-501.
- Dalyan, M., Sherman, A., Cardenas, D.D., (1998). Factors associated with contractures in acute spinal cord injury, Spinal Cord, 36, 405-408.
- Dionyssiatis,Y.,(2013).Spinal cord injury-related bone impairment and fractures: an update on epidemiology and physiopathological mechanisms. Journal of musculoskeletal & neuronal interactions,11(3):257-265.
- DeksisaAbebe, A.,(2015). Prevalence of Low Back Pain and Associated Risk Factors Among Adama Hospital Medical College Staff, Ethiopia. European Journal of Preventive Medicine, 3(6), 188. doi:10.11648/j.ejpm.20150306.1
- Donnelly, C. and Eng, J.J., (2005). Pain following spinal cord injury: the impact on community reintegration. Spinal Cord, 43:278-282. 64
- Escorpizo, R., Ekholm, J., Gmünder, H. P., Cieza, A., Kostanjsek, N., &Stucki, G., (2010). Developing a core set to describe functioning in vocational rehabilitation using the International Classification of Functioning, Disability, and Health (ICF). Journal of Occupational Rehabilitation, 20(4), 502-511.
- Escobedo, E.M., Hunter, J.C., Hollister, M.C., Patten, R.M., Goldstein, B., (2008). Pain and spinal cord injury.Northwest Regional Spinal Cord Injury System, Department of Rehabilitation Medicine, University of Washington.
- Fehlings, M., Singh, A., Tetreault, L., Kalsi-Ryan, S., Nouri, A., (2014). Global prevalence and incidence of traumatic spinal cord injury. ClinEpidemiol 6: 309–331.
- Ferdiana, A., Post, M.W., Hoekstra, T., Van Der Woude, L.H., Van Der Klink, J.J., Bültmann,U.,(2014). Employment trajectories after spinal cord injury: Results from a 5-year prospective cohort study. Arch Phys Med Rehabilitation, 95(11):2040–2046. doi:10.1016/j.apmr.2014.04.021
- Finger, M. E., Escorpizo, R., Glassel, A., Gmünder, H. P., Lückenkemper, M., Chan, C., &Stucki, G., (2012). ICF Core Set for vocational rehabilitation: results of an international consensus conference. Disability and rehabilitation, 34(5): 429- 438.

- Genet, F., Kulina, I., Vaquette, C., (2015). Neurological heterotopic ossification following spinal cord injury is triggered by macrophage-mediated inflammation in muscle. *The Journal of pathology*, 236(2):229-240.
- Gobelet, C., Luthi, F., Al-Khodairy, A. and Chamberlain, M.A., (2007). Vocational rehabilitation: a multidisciplinary intervention. *Disability and Rehabilitation*, 29(17):1405–10.
- Goldstein, B., Young, J., Escobedo, E.,(1997). Rotator cuff repairs in individuals with paraplegia, *American Journal of Physical Medicine & Rehabilitation* 76, 316-322, viewed 21 Aug 2011, <http://journals.lww.ajpmr/toc/1997>.
- Geyh, S., Fellinghauer, B.A., Kirchberger, I., and Post, M.W., (2010). Cross cultural validity of four quality of life scales in persons with spinal cord injury. *Health and Quality of life outcomes*, 8(1):1-16.
- Haisma, J.A., Van Der Woude, L.H., Stam, H.J., Bergen, M.P., Sluis, T.A., Post, M.W. and Bussmann, J.B., (2007). Complications following spinal cord injury: occurrence and risk factors in a longitudinal study during and after inpatient rehabilitation. *Journal of Rehabilitation Medicine*, 39(5):393-398.
- Hansen, C.H., Mahmud, I. and Bhuiyan, A.J., (2007). Vocational reintegration of people with spinal cord lesion in bangladesh- an observational study based on a vocational training project at CRP. *Asia Pacific Disability Rehabilitation Journal*, 18(1):63-75.
- Health and Safety Executive. *Musculoskeletal Disorders, Annual Report for Great Britain*; 2011, 2012.
- Hilton, G., Unsworth, C.A., Murphy, G.C., Browne, M., Olver, J., (2017). Longitudinal employment outcomes of an early intervention vocational rehabilitation service for people admitted to rehabilitation with a traumatic spinal cord injury. *Spinal Cord*, 55(8):743–752. doi:10.1038/sc.2017.24
- Hoque, M.F., Hasan, Z., Razzak, A.T.M.A. and Helal, S.U., (2012). Cervical spinal cord injury due to fall while carrying heavy load on head: a problem in Bangladesh. *Spinal Cord*, 50:275-277

- Haefeli, M. and Elfering, A., (2005). Pain assessment. *European Spine Journal*. [online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3454549/>
- Islam, M., Hafez, M. and Akter, M., (2011). Characterization of spinal cord lesion in patients attending a specialized rehabilitation center in Bangladesh. *Spinal Cord*, 49(7):783-786.
- Johnston, D. A., Ramakrishnan, K., Garth, B., Murphy, G., Middleton, J. W., & Cameron, I. D. (2016). Early access to vocational rehabilitation for inpatients with spinal cord injury: A qualitative study of staff perceptions. *Journal of Rehabilitation Medicine*, 48(9):776-780.
- Kakosy, T., Németh, L., (2003). Musculoskeletal disorders caused by hand-arm vibration. *Global Occup Health Network*, 4(winter):3-6.
- Kentar, Y., Zastrow, R., Bradley, H., Brunner, M., Pepke, W., Bruckner, T., (2018). Prevalence of upper extremity pain in a population of people with paraplegia. *Spinal Cord*, 56(7):695-703. doi: 10.1038/s41393-018-0062-6.
- Kvam, L. and Eide, A. H., (2015). Gender differences in the importance of participation associated with injured workers/persons perceived barriers to returning to work in the context of vocational rehabilitation. *Disability and Rehabilitation Journal*, 37:78-75.
- Kovacs, F.M., Seco, J., Royuela, A., Barriga, A., Zamora, J., (2018). Prevalence and factor associated with a higher risk of neck and back pain among permanent wheelchairs users: a cross sectional study. *Spinal cord*, 56(4):392
- Lo, J., Chan, L., Flynn, S., (2019). A Systematic Review of the Incidence, Prevalence, Costs, and Activity/Work Limitations of Amputation, Osteoarthritis, Rheumatoid Arthritis, Back Pain, Multiple Sclerosis, Spinal Cord Injury, Stroke, and Traumatic Brain Injury in the United States. *Archives of physical medicine and rehabilitation*.
- Lohne, V., (2009). The incomprehensible injury—interpretations of patients' narratives concerning experiences with an acute and dramatic spinal cord injury. *Scandinavian Journal of Caring Sciences*, 23(1):67-75.

- Linsenmeyer, T. A., Boder, D. R., Creasey, G. H., Green, B. G., Groah, S. L., Joseph, A. J., (2006). Bladder management for adults with spinal cord injury: A clinical practice guideline for health care providers . *Spinal Cord*,29:527-73.
- Mahbub, M.H., Laskar, M.S., Sheikh, F.A., Altaf, M.H., Inoue, M., Yokoyama, K., Wakui, T. and Harada, N., (2006). Prevalence of cervical spondylosis and musculoskeletal symptoms among coolies in a city of Bangladesh. *Journal of Occupational Health*. 48: 69–73.
- Mathur, N., Jain, S., Kumar, N., Srivastava, A., Purohit, N. and Patni, A., (2015). Spinal cord injury: scenario in an Indian state. *Spinal Cord*, 53(5):349-352.
- Mayo Clinic (2015). Diseases and Conditions Spinal cord injury Definition. Available at: Mediline Plus (2014). Spinal Cord Injuries. Available at: <http://www.nlm.nih.gov/medlineplus/spinalcordinjuries.html> [accessed on 8/01/15].
- Middleton, J., Tran, Y. and Craig, A., (2007). Relationship between quality of life and selfefficacy in persons with spinal cord injuries. *Archives of Physical Medicine and Rehabilitation*, 88(12):1643-1648.
- Moghimian, M., Kashani, F., Cheraghi, M. A., & Mohammad nejad, E., (2015). Quality of life and related factors among people with spinal cord injuries in Tehran, Iran. *Archives of Trauma research*, 4(3).
- Momin, A.K.M., (2005). An evaluation of the impact of medical services provided by general hospitals compared with services aligned to a social model perspective at a spinal cord injury centre in Bangladesh. *The social model of disability: Europe and the majority world*, 163-179.
- Murphy,G., (2013). Vocational Decision-Making and Rehabilitation Following Paediatric Traumatic Spinal Cord Injury: An Illustrative Case Study Analysis.*Journal of Case Report and Study*,1(1): 101.
- Marie, A., Saraste, H., Norrbrink, C., (2008). Shoulder pain in persons with thoracic spinal cord injury: prevalence and characteristics. *National Library of Medicine*, 40(4):277-83.
- Michael, M., Roth, K., (2012). Against all odds: a qualitative study of rehabilitation of persons with spinal cord injury in Afghanistan. *Spinal cord*, 50(12):864-8.

- Nuri, M. R. P., Hoque, M. T., Waldron, S. M., & Akand, M. M. K., (2012). Impact assessment of a vocational training program for persons with disabilities in Bangladesh. *Disability, CBR & Inclusive Development*, 23(3):76-89.
- Nas, K., Yazmalar, L., Sah, V., Aydin, A., Ones, K., (2015). Rehabilitation of spinal cord injuries. *World Journal of Orthopedics*, 6(1): 8–16.
- Nair, K.P.S., Taly, A.B., Maheshwarappa, B.M., Kumar, J., Murali, T., Rao, S., (2005). Nontraumatic spinal cord lesions: a prospective study of medical complications during in-patient rehabilitation. *Spinal cord*, 43,558–564.
- Ottomanelli, L. and Lind, L.M., (2009). Review of critical factors related to employment after spinal cord injury: implications for research and vocational services. *Journal of Spinal Cord Medicine*, 32: 503–531.
- Patel, R.M., Gelber, J.D., Schickendantz, M.S., (2018). The Weight-Bearing Shoulder. *The Journal of the American Academy of Orthopaedic Surgeons*, 26(1):3-13.
- Perry, K.N., Nicholas, M.K. and Middleton, J., (2009). Spinal cord injury- related pain in rehabilitation: A cross- sectional study of relationships with cognitions, mood and physical function. *European Journal of Pain*, 13(5):511-517
- Pokaczajlo, J., Tasiemski, T., & Urbanski, P. (2016). Relationship between spinal cord injury-related knowledge and health-related quality of life in persons with spinal cord injury. *Advances in Rehabilitation*, 30(2), 27-38.
- Quadir M, Sen K, Sultana M, Ahmed M, Taoheed F, et al. (2017) Demography, diagnosis and complications of spinal cord injury patients in a rehabilitation center of Bangladesh. *Int J Neurorehabilitation* 4: 244.
- Rathore, M.F., Rashid, P., Butt, A.W., Malik, A.A., Gill, Z.A., Haig, A.J., (2007). Epidemiology of spinal cord injuries in the 2005 Pakistan earthquake. *Spinal cord*, 45(10):658-63.
- Rathore, M.F.A., Hanif, S., Farooq, F., Ahmad, N. and Mansoor, S.N., (2008). Traumatic spinal cord injuries at a tertiary care rehabilitation institute in Pakistan. *JPMA. The Journal of the Pakistan Medical Association*, 58(2):53.

Razzak, A.T.M.A., (2013). Early care following traumatic spinal cord injury (TSCI) in a rehabilitation centre in Bangladesh-an analysis. *Disability, CBR & Inclusive Development*, 24(2):64-78.

Sci.washington.edu. 2021. Common musculoskeletal problems after SCI: Contractures, osteoporosis, fractures, and shoulder pain. [online] Available at: <<https://sci.washington.edu/info/forums/reports/musculoskeletal.asp>> [Accessed 15 November 2021].

Scovil, C.Y., Ranabhat, M.K., Craighead, I.B. and Wee, J., (2012). Follow-up study of spinal cord injured patients after discharge from inpatient rehabilitation in Nepal in 2007. *Spinal Cord*, 50(3):232-237.

Schonherr, M.C., Grothoff, J.W., Mulder, G.A., Elisma, W.H.,(2005).Participation and satisfaction after spinal cord injury: Results of a vocational and leisure outcome study.*Spinal Cord*, 43(4):241-8.

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

Tasiemski, T., Priebe, M.M., and Wilski, M., (2013). Life satisfaction and life values in people with spinal cord injury living in three Asian countries: A multicultural study. *The Journal of Spinal Cord Medicine*, 36(2):118-26

Tharion, G., Nagarajan, G., Bhattacharji, S., (2009). Guidelines for care of persons with spinal cord injury in the community, department of physical medicine and rehabilitation and low cost effective care unit, Christian Medical College, Vellore, India.

Vijayakumar, S. and Singh, U., (2004). Prevalence of medical complications vis-a-vis psycho-social complications in spinal cord injury patients. *Indian Journal of Physical Medicine Rehabilitation*, 15:38-44

Waddell, G., Burton, A. K., & Kendall, N. A., (2008). Vocational rehabilitation– what works, for whom, and when? (Report for the Vocational Rehabilitation Task Group).

World Health Organization, & International Spinal Cord Society. (2013). International perspectives on spinal cord injury. World Health Organization.

Appendix

মৌখিক অনুমতিপত্র

(অংশগ্রহনকারীকে পড়ে শোনাতে হবে)

আসসালামুয়ালাইকুম/ নমস্কার,

আমিহাবীবাসুলতান্না আমি, এইগবেষণাপ্রকল্পটিবাংলাদেশহেলথপ্রফেশনসইনস্টিটিউট(বিএইচপিআই)-এপরিচালনাকরছিআমারওর্থ
বর্ষবিএসসিইনফিজিওথেরাপীকোর্সেরঅধিভুক্ত।আমারঅধ্যয়নেরশিরোনামটিহল-“সিআরপিতেবৃত্তিমূলকপ্রশিক্ষণেরসময়মেরুদণ্ডেরইনজুরিররোগীরপেশীগুলিরসমস্যা।”
মেরুদণ্ডেরআঘাতেরবিষয়েকিছুব্যক্তিগতএবংঅন্যান্যসম্পর্কিততথ্যসম্পর্কেআমিজনতেচাইএইফর্মটিতেউল্লিখিতকয়েকটিপ্রশ্নেরউত্তরআপনাকেদিতেহবেএটিপ্রায় ২০-
২৫ মিনিটসময়নেবে।

আমিআপনাকেঅবগতকরছিযে

,এটিআমারঅধ্যয়নএরঅংশএবংযাঅন্যকোনওউদ্দেশ্যব্যবহারকরাহবেনা।এইগবেষণায়আপনারঅংশগ্রহণবর্তমানকর্মস্থলেকোনপ্রকারপ্রভাবফেলবেনা।আপনারপ্রদত্তসমস্ত
তথ্যেরগোপনীয়তাবজায়থাকবেএবংআপনারপ্রতিবেদনেরঘটনাপ্রবাহেএটিনিশিতকরাহবে

আপনিএইঅধ্যয়নেরসময়যেকোনওসময়কোনওনেতিবাচকপরিণতিছাড়াইনিজেকেপ্রত্যাহারকরতেপারেন।সাক্ষাত্কারেরসময়আপনিপছন্দকরেননাবাউত্তরচাননাএমনকোন
ওনির্দিষ্টপ্রশ্নেরউত্তরনাদেওয়ারওঅধিকারআপনাররয়েছে।

আপনারযদিঅংশগ্রহনকারীহিসাবেকোনওপ্রশ্নথাকেতবেআপনিআমাকেঅথবাআমারসুপারভাইজারবাংলাদেশহেলথইনস্টিটিউট (বিএইচপিআই), সাতার,
ঢাকাতেযোগাযোগকরতেপারেন।

সাক্ষাতকারশুরুকরার আগেআপনারকোনপ্রশ্নআছে?

সুতরাং, আমিআপনারঅনুমতিতেএইসাক্ষাত্কারশুরুকরতেপারি?

হ্যাঁ না

অংশগ্রহনকারীদেরস্বাক্ষরএবংতারিখ _____

উপাত্তসংগ্রহকারীরস্বাক্ষরএবংতারিখ _____

গবেষকেরস্বাক্ষরএবংতারিখ _____

Verbal Consent Statement

(Please read out to the participants)

Assalamualaikum/Namasker,

My name is Habiba Sultana, I am conducting this study as a part of my academic work of B. Sc. in Physiotherapy under Bangladesh Health Professions Institute (BHPI), which is affiliated to University of Dhaka. My study title is —**Musculoskeletal problems of spinal cord injury patient during vocational training in CRP.** I would like to know about some personal and other related information regarding Spinal cord injury. You will need to answer some questions which are mentioned in this form. It will take approximately 20-25 minutes. I would like to inform you that this is a purely academic study and will not be used for any other purpose. All information provided by you will keep in a locker as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous and also all information will be destroyed after completion of the study. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me and/or Mst Fatema Akter, Assistant Professor of Physiotherapy, Bangladesh Health Professions Institute (BHPI), Savar, Dhaka.

Do you have any questions before I start? Yes / No

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

Yes..... No.....

Signature of the Participant and date _____

Signature of the Data collector and date _____

Signature of the researcher and date _____

প্রশ্নাবলী/প্রশ্নমালা

শিরোনামঃ মেরুদণ্ডে আঘাতপ্রাপ্ত রোগীদের সিআরপিতে কারিগরি প্রশিক্ষণের সময় পেশীবহুল সমস্যা

সাক্ষাত্কারের সময়সূচী		
পর্ব- I: রোগীর আর্থ-সামাজিক অবস্থার তথ্যাবলী		
১.১	সনাক্তকরন সংখ্যাঃ	
১.২	ঠিকানাঃ	মোবাইল নম্বরঃ
১.৩	অনুমতি নেওয়া হলঃ হ্যা <input type="checkbox"/> না <input type="checkbox"/>	
১.৪	বয়সঃ _____ বছর	
১.৫	লিঙ্গঃ <input type="checkbox"/> পুরুষ <input type="checkbox"/> মহিলা	০১ ০২
১.৬	ধর্ম	<input type="checkbox"/> মুসলিম <input type="checkbox"/> হিন্দু <input type="checkbox"/> খ্রিস্টান <input type="checkbox"/> বৌদ্ধ ০১ ০২ ০৩ ০৪
১.৭	বৈবাহিক অবস্থা	<input type="checkbox"/> বিবাহিত <input type="checkbox"/> অবিবাহিত ০১ ০২
১.৮	শিক্ষাগত যোগ্যতাঃ	<input type="checkbox"/> নিরক্ষর <input type="checkbox"/> প্রাথমিক <input type="checkbox"/> উচ্চবিদ্যালয় <input type="checkbox"/> এসএসসি <input type="checkbox"/> এইসএসসি <input type="checkbox"/> ডিগ্রী এবং অন্যান্য ০১ ০২ ০৩ ০৪ ০৫ ০৬

১.৯	পেশা	<input type="checkbox"/> রিকশাচালক <input type="checkbox"/> কৃষক <input type="checkbox"/> কারখানা / গার্মেন্টসকর্মী <input type="checkbox"/> দিনমজুরা <input type="checkbox"/> বিদেশে চাকরী <input type="checkbox"/> গৃহিনী <input type="checkbox"/> শিক্ষক <input type="checkbox"/> ছাত্র <input type="checkbox"/> নির্দিষ্ট অন্যান্য): _____	০১ ০২ ০৩ ০৪ ০৫ ০৬ ০৭ ০৮ ০৯
১.১০	মাসিক পরিবারের আয়: _____ (আনুমানিক টাকা)		
১.১১	পরিবারের ধরন	<input type="checkbox"/> অণুপরিবার <input type="checkbox"/> যৌথপরিবার	০১ ০২
১.১২	আবাসিক এলাকা	<input type="checkbox"/> গ্রামীণ <input type="checkbox"/> নগর	০১ ০২

দ্বিতীয়খণ্ড: মেরুদণ্ডের আঘাতের সম্পর্কিত প্রশ্নাবলী

ক্রমিক নং	প্রশ্ন	উত্তর	কোড
২.১	আঘাত প্রাপ্তের তারিখঃ		
২.২	ভর্তির তারিখঃ		

২.৩	আঘাতের কারণ	<input type="checkbox"/> মোটর গাড়ির আঘাত <input type="checkbox"/> উচ্চতা থেকে পড়া <input type="checkbox"/> ভারী বোঝা বহন করার সময় পড়ে <input type="checkbox"/> ক্রীড়া সম্পর্কিত <input type="checkbox"/> পিছনে ভারী বস্তুর পতন <input type="checkbox"/> অন্যান্য কারণে	০১ ০২ ০৩ ০৪ ০৫ ০৬
২.৪	মেরুদন্ডের কোন অংশে আঘাত পেয়েছেন	<input type="checkbox"/> গ্রীবাদেশীয় অংশ <input type="checkbox"/> বক্ষদেশীয় অংশে <input type="checkbox"/> কটীদেশীয় অংশে <input type="checkbox"/> বক্ষ এবং কটীদেশীয় অংশে <input type="checkbox"/> শ্রোণী দেশীয় অংশে	০১ ০২ ০৩ ০৪ ০৫
২.৫	স্নায়ুতন্ত্রীঅবস্থা (এশিয়ারস্কেল অনুযায়ী)	<input type="checkbox"/> সম্পূর্ণ A=1 <input type="checkbox"/> অসম্পূর্ণ B=2 <input type="checkbox"/> অসম্পূর্ণ C=3 <input type="checkbox"/> অসম্পূর্ণ D=4 <input type="checkbox"/> স্বাভাবিক E=5	০১ ০২ ০৩ ০৪ ০৫
২.৬	রোগ-নির্দিষ্ট পদ: মেরুদন্ডের আঘাত	<input type="checkbox"/> সম্পূর্ণ প্যরাপ্লেজিয়া <input type="checkbox"/> অসম্পূর্ণ প্যরাপ্লেজিয়া <input type="checkbox"/> সম্পূর্ণ টেট্রাপ্লেজিয়া <input type="checkbox"/> অসম্পূর্ণ টেট্রাপ্লেজিয়া <input type="checkbox"/> স্বাভাবিক ঘাটতি ছাড়াই এসসিআই	০১ ০২ ০৩ ০৪ ০৫
২.৭	নিশ্চিতপক্ষাঘাতেরধরন	<input type="checkbox"/> সম্পূর্ণ A <input type="checkbox"/> অসম্পূর্ণ B,C,D,E	০১ ০২

২.৮	যন্ত্র:	<input type="checkbox"/> হুইল চেয়ার	০১
		<input type="checkbox"/> ক্রাচ	০২
		<input type="checkbox"/> হাঁটার লাঠি	০৩
		<input type="checkbox"/> হাঁটার ফ্রেম	০৪
		<input type="checkbox"/> অন্যান্য _____	০৫

তৃতীয় খণ্ড: লক্ষন এবংঝুকি সূচক সম্পর্কিত প্রশ্ন

৩.১	আপনি কি ধরনের কারিগরি প্রশিক্ষন সিআরপি থেকে গ্রহন করছেন?	<input type="checkbox"/> কম্পিউটার	০১
		<input type="checkbox"/> ইলেকট্রনিক্স	০২
		<input type="checkbox"/> টেইলারিং	০৩
		<input type="checkbox"/> দোকান ব্যবস্থাপনা	০৪
		<input type="checkbox"/> অন্যান্য _____	০৫
৩.২	কাজ করার সময় কোন অবস্থানে থাকেন?	<input type="checkbox"/> দাঁড়িয়ে	০১
		<input type="checkbox"/> বসে	০২
		<input type="checkbox"/> সামনেবেঁকে	০৩
		<input type="checkbox"/> অন্যান্য _____	০৪
৩.৩	প্রশিক্ষনের সময়		
৩.৪	আপনি কি কখনও আপনার শরীরের কোনও অংশে কাজের সাথে সম্পর্কিত পেশীবহল ব্যাধি অনুভব করেন?	<input type="checkbox"/> হ্যাঁ	০১
		<input type="checkbox"/> না	০২

৩.৫	আপনি কি কাঁধে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.৬	আপনি কি কনুইতে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.৭	আপনি কি কজিতে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.৮	আপনি কি ঘাড়ের কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.৯	আপনি কি কটীদেশীয় অংশে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১০	আপনি কি বুকে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১১	আপনি কি নিতম্বে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১২	আপনি কি হাটুতে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১৩	আপনিকি গোড়ালিতে কোনও ব্যথা অনুভব করেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১৪	কোন ধরনের ব্যাথা অনুভব করে থাকেন?	<input type="checkbox"/> হালকা <input type="checkbox"/> সহনীয় <input type="checkbox"/> তীব্র	০১ ০২ ০৩

৩.১৫	ব্যাথার নমুনা	<input type="checkbox"/> সাময়িক <input type="checkbox"/> টানা <input type="checkbox"/> নড়াচড়া করার সময়.	০১ ০২ ০৩
৩.১৬	আপনি কি কোন সন্ধি জোড়তা অথবা আটসাঁট অনুভব করেছেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১৭	আঘাত পরবর্তী সময়ে আপনার কোনও অংশ ভেঙ্গেছিল?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১৮	আপনার কোনও জয়েন্টে ফোলা ভাবআছে?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২
৩.১৯	আপনার ডিভাইসের প্রযুক্তিগত সমস্যার কারণে আপনি কি অন্যকোন সমস্যা / অস্বস্তি অনুভব করেছেন?	<input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না	০১ ০২

Questionnaire

Title: Musculoskeletal problems of spinal cord injury patient during vocational training in CRP

Interview Schedule

Part- I: Patient's Socio-demographic Information

1.1	Identification number:		
1.2	Address:	Contact no:	
1.3	Consent Taken: <input type="checkbox"/> Yes <input type="checkbox"/> No		
1.4	Age: Yrs.		
1.5	Sex:	<input type="checkbox"/> Male <input type="checkbox"/> Female	01 02
1.6	Religion:	<input type="checkbox"/> Muslim <input type="checkbox"/> Hindu <input type="checkbox"/> Christian <input type="checkbox"/> Buddhist <input type="checkbox"/> Others	01 02 03 04 05
1.7	Marital status:	<input type="checkbox"/> Married <input type="checkbox"/> Unmarried	01 02
1.8	Educational level:	<input type="checkbox"/> Illiterate <input type="checkbox"/> Primary School <input type="checkbox"/> Secondary School <input type="checkbox"/> S.S.C <input type="checkbox"/> H.S.C <input type="checkbox"/> Graduate & Other	01 02 03 04 05 06

1.9	Occupation before injury	<input type="checkbox"/> Rickshaw puller <input type="checkbox"/> Farmer <input type="checkbox"/> Factory/garments worker <input type="checkbox"/> Day laborer. <input type="checkbox"/> Job at abroad <input type="checkbox"/> Housewife <input type="checkbox"/> Teacher <input type="checkbox"/> Student <input type="checkbox"/> Other (Specify):_____	01 02 03 04 05 06 07 08 09
1.10	Monthly Family Income: _____(Approximately taka)		
1.11	Family Type:	<input type="checkbox"/> Nuclear Family <input type="checkbox"/> Extended Family	01 02
1.12	Residential Area:	<input type="checkbox"/> Rural <input type="checkbox"/> Urban	01 02

Part-II: Spinal cord injury related Information

(To be collected from Record/ Care provider/Clinical examination)

QN	Questions	Responses/Answers	Code
2.1	Date of injury:		
2.2	Date of admission:		

2.3	Causes of injury:	<input type="checkbox"/> Motor Vehicle Injury <input type="checkbox"/> Fall From Height <input type="checkbox"/> Fall while carrying heavy Load <input type="checkbox"/> Sports related <input type="checkbox"/> Fall of heavy object on back <input type="checkbox"/> Other (Please Specify)	01 02 03 04 05 06
2.4	Skeletal Level of injury:	<input type="checkbox"/> Cervical <input type="checkbox"/> Thoracic <input type="checkbox"/> Lumber <input type="checkbox"/> Thoraco lumber <input type="checkbox"/> Sacral	01 02 03 04 05
2.5	Neurological level by ASIA:	<input type="checkbox"/> Complete A <input type="checkbox"/> Incomplete B <input type="checkbox"/> Incomplete C <input type="checkbox"/> Incomplete D <input type="checkbox"/> Normal E	01 02 03 04 05
2.6	Disease-specific items: Spinal cord injury	<input type="checkbox"/> Complete paraplegia <input type="checkbox"/> Incomplete paraplegia <input type="checkbox"/> Complete tetraplegia <input type="checkbox"/> Incomplete tetraplegia <input type="checkbox"/> SCI without neurological deficit	01 02 03 04 05
2.7	Device:	<input type="checkbox"/> without device <input type="checkbox"/> Wheelchair <input type="checkbox"/> Crutch <input type="checkbox"/> Walking stick <input type="checkbox"/> Walking frame <input type="checkbox"/> Others	01 02 03 04 05 06

Part III: Symptoms & Risk indicator related questions

(To be provided by the patient/attendant)

3.1	What type of vocational training are you taking from CRP?	<input type="checkbox"/> Computer <input type="checkbox"/> Electronics <input type="checkbox"/> Tailoring <input type="checkbox"/> Shop management <input type="checkbox"/> Others	01 02 03 04 05
3.2	Which posture do you maintained during training?	<input type="checkbox"/> Standing <input type="checkbox"/> Sitting <input type="checkbox"/> Forward bending <input type="checkbox"/> Other	01 02 03 04
3.3	Training hours?	_____hours.	
3.4	Have you ever experienced work-related musculoskeletal disorders in any part of your body?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.5	Have you felt tightness or (decreased JROM) contracture of your any joint?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.6	Have you felt any pain on your shoulder?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.7	Have you felt any pain on your elbow?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.8	Have you felt any pain on your wrist?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.9	Have you felt pain on your neck?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02

3.10	Have you felt any pain on your back?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.11	Have you felt pain on your chest?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.12	Have you feel pain on your buttock?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.13	Have you feel any pain on your knee?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.14	Have you feel any pain on your ankle?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.15	What is the severity of your pain?	<input type="checkbox"/> Mild <input type="checkbox"/> Moderate <input type="checkbox"/> Severe	01 02 03
3.16	Pattern of pain	<input type="checkbox"/> Temporary <input type="checkbox"/> Continuous <input type="checkbox"/> On movement	01 02 03
3.17	Have you any fracture after injury?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.18	Have swelling in any of your joint (ankle)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02
3.19	Have you feel any other problem/discomfort due to technical problem of your device?	<input type="checkbox"/> Yes <input type="checkbox"/> No	01 02

IRB



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref: CRP/BHPI/IRB/06/2021/470

Date: 16/06/2021

To
Habiba Sultana
B.Sc. in Physiotherapy
Session: 2014-15, Student ID: 112140236
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal “**Musculoskeletal problems of spinal cord injury patient during vocational training in CRP**” by ethics committee.

Dear Habiba Sultana,
Congratulations.

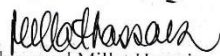
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the Principal investigator. The following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation Proposal
2	Questionnaire (English & Bengali version)
3	Information sheet & consent form.

The purpose of the study is to find out the musculoskeletal problems of spinal cord injury patient during vocational training in CRP. The study involves use of a questionnaire to explore that may take 15 to 20 minutes and there is no likelihood of any harm to the participants. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 8:30am on 1st March, 2020 at BHPI (23rd IRB Meeting).

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964-2013 and other applicable regulation

Best regards,


Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Data collection Permission letter

Permission Letter

Date: 15.06.2021
Head
Department of Physiotherapy
Centre for the Rehabilitation of the Paralysed (CRP)
Chapain, Savar, Dhaka-1343.
Through: Head, Department of Physiotherapy, BHPI.

Ref to
CRP Manikganj (MMU/11)
Sanjida Islam
20/06/21

Subject: Prayer for seeking permission to collect data for conducting research project.

Sir,

With due respect and humble submission to state that I am Habiba Sultana, a student of 4th year B.Sc in Physiotherapy at Bangladesh Health Profession Institute (BHPI). The Ethical committee has approved my research project **“Musculoskeletal problems of spinal cord injury patient during vocational training in CRP”** under the supervision of Mst Fatema Akter, Assistant Professor BHPI, Department of Physiotherapy. I want to collect data for my research project from the patients with spinal cord injury who are taking vocational training in CRP. So, I need permission for data collection from Spinal Cord Injury (SCI) unit of Physiotherapy Department at CRP (CRP, Savar, Dhaka-1343). I would like to assure that anything of the study will not be harmful for the participants.

I, therefore pray and hope that your honor would be kind enough to grant my application and give me permission for data collection and oblige thereby.

Your Faithfully,

Habiba Sultana

Habiba Sultana
4th year
B.Sc in Physiotherapy
Class Roll: 51, Session: 2014- 15
Bangladesh Health Professions Institute (BHPI)
(An academic Institution of CRP)
CRP-Chapain, Savar, Dhaka-1343.

Forward
File
15.06.2021

Recommended

Shafiq

15.06.21

Md. Shofiqul Islam
Associate Professor & Head
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343

Approved
Shafiq
SHAMMAD AMIR HOSSAIN
Senior Consultant &
Head of Physiotherapy Dept
Associate Professor, BHPI
CRP, Savar, Dhaka-1343