

# **CHARACTERISTICS OF SHOULDER PAIN AMONG PARAPLEGIC WHEELCHAIR USER**

**Rubel Ahmad Samir**

Bachelor of Science in Physiotherapy (B.Sc. PT)

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BHPI, CRP, Savar, Dhaka- 1343



**Bangladesh Health Professions Institute (BHPI)**

Department of Physiotherapy

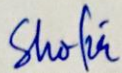
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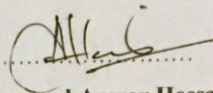
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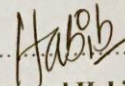
**CHARACTERISTICS OF SHOULDER PAIN AMONG PARAPLEGIC WHEELCHAIR USERS** Submitted by **Rubel Ahmad Samir**, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B. Sc. PT).



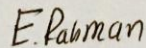
.....  
**Md. Shofiqul Islam**  
Assistant Professor  
Department of Physiotherapy  
BHPI, CRP, Savar, Dhaka  
**Supervisor**



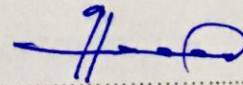
.....  
**Mohammad Anwar Hossain**  
Associate Professor & Head  
Department of Physiotherapy  
CRP, Savar, Dhaka



.....  
**Mohammad Habibur Rahman**  
Assistant Professor  
Department of Physiotherapy  
BHPI, CRP, Savar, Dhaka



.....  
**Ehsanur Rahman**  
Assistant Professor  
Department of Physiotherapy  
BHPI, CRP, Savar, Dhaka



.....  
**Md. Obaidul Haque**  
Associate Professor & Head  
Department of Physiotherapy  
BHPI, CRP, Savar, Dhaka

### Declaration

I declare that the work presented is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination information of the study. I would be bound to take written consent of my supervisor.

Signature: *Rubel Ahmad Samir*

Date: *22.02.2017*

**Rubel Ahmad Samir**

Bachelor of Science in Physiotherapy (B.Sc. PT)

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## Acronyms

<b>ASIA</b>	American Spinal Cord Injury Association
<b>BHPI</b>	Bangladesh Health Professions Institute
<b>BMRC</b>	Bangladesh Medical and Research Council
<b>CRP</b>	Center for Rehabilitation of the Paralysed
<b>IRB</b>	Institutional Review Board
<b>MRI</b>	Magnetic Resonance Imaging
<b>NSCISC</b>	National Spinal Cord Injury Statistical Center
<b>ROM</b>	Range of Motion
<b>SCI</b>	Spinal Cord Injury
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>TSCI</b>	Traumatic Spinal Cord Injury
<b>UK</b>	United Kingdom
<b>US</b>	United States
<b>VAS</b>	Visual Analogue Scale
<b>WHO</b>	World Health Organization

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## Abstract

**Purpose:** The purpose of the study was to explore the characteristics of shoulder pain among paraplegic wheelchair user patients attended at CRP.

**Objectives:** To calculate number of all paraplegia patients with shoulder pain from 10th February 2016 to 15<sup>th</sup> October 2016 among all paraplegia patients and percentage of this proportion; to explore socio demographic characteristics (age, sex, residential area) of paraplegia patients with shoulder pain; to measure the severity of shoulder pain with find out aggravating and ease factors.

**Methodology:** A cross sectional design was carried out in this study. 30 paraplegia patients were convenience selected from SCI unit of CRP, Savar, Dhaka, Bangladesh. The tools used to collect data included direct interview, a body discomfort assessment tool that consists of Visual Analogue Scale (VAS) and a questionnaire. Data was collected by mixed type questionnaire and confidentiality of information and voluntarily participation were ensured by the researcher. Data were numerically coded and captured in Microsoft Excel 13, using an SPSS 19.0 version program.

**Results:** The finding of the study was provided a baseline of information about characteristics of shoulder pain among paraplegic wheelchair user. The result of the study showed that, the severity of shoulder pain was (76.7% ) and (23.3%) was not suffered from shoulder pain among the paraplegia patients attended at CRP. The most affected age range is years of age 21-40 years of age (33.3% ). The severity of pain among the cases includes moderate pain (30% ), mild pain (53.3% ), severe pain is (0% ) and (16.7%) have no symptoms of pain. Most of the participants (70% ) pain had increased during movement whenever only (30% ) patient's pain had increased during rest.

**Conclusion:** From this study it is concluded that shoulder pain is the common problem of paraplegia wheelchair user patients. Prevention of shoulder pain is beneficial for paraplegia patients. To prevent shoulder pain, we should focus on awareness about the characteristics of shoulder pain among paraplegia patients and greater attention to be given to other risk factors such as history of shoulder injury and perception of health status after spinal cord injury.

**Key word:** Shoulder pain, Characteristics, Paraplegia etc.

**Background**

Patients who have been suffering from spinal cord injury they need appropriate management and specialized rehabilitation because they often face life threatening complications. For the treatment the patients of SCI are going into the different hospital without having enough facilities for their treatment. In Bangladesh there is only one non-government organization is Centre for the Rehabilitation of the Paralyzed, which has conducted a rehabilitation program for the last 32 years through which the patients can improve their life style (Islam et al., 2011).

Most traumatic spinal cord (SCIs) are caused by contusion or bruising of the spinal cord as a result of fracture or dislocation of the spine. Individuals with an SCI experience paralysis, abnormal sensation, autonomic dysfunction and compromised bowel, bladder, sexual and/or respiratory function at or below the level of injury (Devivo et al., 2011).

Spinal cord injury (SCI) is one of the most common type of injury and generally a distressing disorder that can cause loss of physical, psychological, and social functioning (Gurcay et al., 2010).

It is the major cause of paralysis that changes the person's lifestyle which is almost always occurs suddenly & unexpectedly (Smith et al., 2013).

Spinal cord injury is a recurrent cause of mortality, and it results in a high level of single disability, which is reflected in radical changes in lifestyle (Kawanishi et al., 2013).

It is a significant public health problem and one of the most expensive occupational health problems and one of the disability oriented injury is spinal cord lesion that mostly occurs in young male of low social status (Islam et al., 2011).

Shoulder pain and dysfunction can also have significant psychological consequences and two of the most important impacts are on social participation and quality of life (QOL). As the difficulties getting around, pain and dysfunction in the shoulders may reduce a person's ability and motivation to participate socially, using their normal means of transportation, and enduring pain while trying to participate with others.

Because of the distress of the pain, QOL itself can be impaired. The limits it puts on enjoyable activities, and the anxiety created about future functioning. The world health organization has recognized the importance of both social participation and QOL as essential outcomes of all rehabilitation efforts (Kemp et al., 2011).

Individuals with spinal cord injury (SCI) are highly susceptible to premature musculoskeletal complications. Compared with able bodied individuals an SCI potentially accelerates age-related declines in the function of body structures. In addition, individuals sustaining an SCI at older age may have other pre-existing comorbidities that affect their functional capability. Therefore, individuals with SCI are at increased risk of upper limb extremity pain, rapid bone loss in the lower extremities and fractures. SCI also results in spasticity and contractures in approximately two-thirds of individuals. There is the additional risk of progressive scoliosis for those injured at a young age. Information on these and other musculoskeletal complications are important because they help guide management and provide accurate estimates of the magnitude of the problem (Biering-Sorensen et al, 2012).

The impact of pain is sometimes described as worse than the loss of function itself, for example, on working ability Wheelchair propulsion as well as transfers are supposed to cause and increase upper extremity pain, such as shoulder pain in active wheelchair users. Consequently, shoulder pain has been found to have a high prevalence in the spinal cord-injured population. While the primary injury itself limits individual independence, any further functional limitation due to secondary complications, could cause a marked decrease or even total loss in remaining functional independence (Samuelsson et al., 2004).

The most common spinal cord injury region is cervical. Cervical injury present in 50-64% of the patients; the lumbar region represents 20-24% of cases. A greater biomechanical load is deposited on the patient's upper limbs after the spinal cord injury, since these follow-ups become indispensable for daily activities such as locomotion with walkers, wheelchairs or crutches. This overload can lead to muscle and joint pain, affecting, in increasing order, the shoulders, wrists, hands and elbows (Alves et al., 2012).

Few studies have carefully addressed the association of age and time of wheelchair use with shoulder pain or possible interactions between these factors. High levels of activities of daily living, for example, repetitive load from propulsion and transfer, are other factors thought to contribute to shoulder pain. Regarding different levels of activity and fitness, Few studies have investigated differences in shoulder pain among paraplegic wheelchair users. Fewer degenerative changes have been documented in active than in inactive persons, and less pain has been reported in athletes than in non-athletes. In contrast, other authors found no differences in prevalence of shoulder pain between athletic and non-athletic wheelchair users (Alm et al., 2008).

In Europe a data is recently published on the incidence of SCI in survivors the acute phase ranges from 10 to 25/million inhabitants per year. In the Nordic countries, two register-based studies have been published showing consistent rates between 22 and 25/100 000 inhabitants (Dahlberg et al., 2005). The retrospective study of Japan showed that the annual incidence of spinal column injuries ranges from 19-88/100,000. The incidence of spinal cord injury is 15-50 per million per year. The prevalence of SCI is 480-813 per million. Exact incidence of these injuries in this region is not known though in Pakistan there are few reports on demographics of spinal injuries (Qureshi et al., 2010).

In Australia a study showed that Spinal cord injury (SCI) or damage are the most devastating medical conditions. It causes life changing consequences in all facets of human functioning and existence. A recent review reported about the incidence of Traumatic SCI that worldwide varied between 10-4 and 83 per million per year. About 15–17 cases per million per year over the past decade the age-adjusted incidence rate of TSCI in adults aged 15 years has remained at and older surviving to reach hospital. In currently the incidence is 11.9 cases per million adults per year in Victoria in Australia (New & Sundararajan, 2008).

Jensen and colleagues surveyed persons with SCI who were experiencing pain and determined that the shoulder was the most frequently (61%) reported site of pain. In a smaller study of women with paraplegia by Pentland and Twomey, the shoulder joint was also the most frequently reported site of pain (Gutierrez et al, 2007).

The questionnaire contained items about, for example, amount of years as wheelchair user, wheelchair transfers, primary occupation, sport activities, driving, prevalence of shoulder pain, back pain and hand/elbow pain. The questionnaire also contained an evaluation-form concerning wheelchair ergonomics where all subjects were asked to evaluate a number of functionality aspects of their wheelchair on a 7-point scale from 1¼very bad to 7¼very good. In all, 56 subjects responded (63%). All subjects admitting having had shoulder pain during the last month were asked to participate in a physical examination and a complementing interview (Samuelsson et al., 2004).

The spinal cord injury (SCI) is one of the most severe forms of disabling syndromes, being a challenge for rehabilitation, because spinal cord is a communication way among various portions of the body, such as the brain, also having a regulator center, controlling important functions such as breathing, blood flow, bladder, intestines, thermal control, and sexual activity. Clinical picture's severity depends on the affected site and of the degree of damage to afferent and efferent spinal cord paths. The higher the level and the larger the extension of an injury, the less available muscular mass will be for physical activity and, therefore, the less the physical ability and functional independence will be (Gianini et al., 2006).

The increasing number of automobile accidents and the spread of violence in the urban areas of metropolitan areas has brought about a rise in the incidence of trauma in the general population. Spinal injuries are less frequent than appendicular skeleton injuries, occurring in approximately 6% of the patients with multiple trauma, half of whom present spinal cord injury (Alves et al., 2012).

Football and other penetrating wounds: stabbing, impalement, boat and parachuting, para-sailing, etc gymnastic activities other than trampoline baseball/softball, water skiing, basketball/volleyball, high jump, bomb, grenade, dynamite and gasoline. The non-traumatic cases caused by spinal tumor, TB spine, transverse myelitis, physical assault, physical weakness etc (Chen et al., 2013).

Shoulder mobility is classified by three patterns of motion: elevation, internal/external rotation and horizontal flexion and extension. In any function of placing the hand in a meaningful position for manual occupations, all main structures of the shoulder complex are involved. All subjects with paraplegia due to an SCI of more than 1 year

before this study, known to the University Hospitals of Uppsala as well as Linköping and living in the counties of Uppsala or Linköping, were contacted by mail. A package, including a cover letter, consent form, questionnaire and an addressed envelope, was sent to 89 subjects (Samuelsson et al., 2004).

Lower limb paralysis places a heavy reliance on the upper limbs for mobility and for performance of daily activities for persons with spinal cord injury (SCI). In this case, the upper limbs sustain repetitive and often weight bearing loads incurred by activities such as wheelchair propulsion, transfers and raises (Gutierrez et al, 2007).

Sometimes the drugs are mainly used to prevent the secondary complication. If the SCI patients who suffer secondary complication his or her the quality of life is degraded (Rabchevsky & Kitzman, 2011).

Initially re-training sessions with more repetitions & critical neural circuitry may be necessary to engender a rehabilitation effect. On the other hand some task-specific rehabilitative training can be employed clinically for the frequent contusive spinal cord injury contusive thoracic SCI requires more frequent re-training & initiating the re-training for spontaneous recovery (Onifer et al., 2011).

Findings such as radiographic bone and joint abnormalities, that is, acromioclavicular joint space narrowing and osteolysis of the distal clavicle, have also been found to be common. Further complications described in paraplegic wheelchair users, especially in wheelchair athletes, are peripheral neuropathies where the median nerve is the most commonly affected nerve and a high prevalence of carpal tunnel syndrome. Few studies have described which activities cause the most intense pain, how pain interferes in daily living, and what the individual consequences of shoulder pain are and only one study addressed the consequences and prevalence of shoulder pain in individuals with SCI in Sweden (Alm et al., 2008).

People face shoulder problems who use a manual wheelchair as their primary or only source of locomotion after several years of usage . The length of time before the onset of shoulder problems can vary from 5 to 20 years, depending on factors such as the age of the individual, the level of injury, and the type of use. Moreover, people frequently

adopt techniques for transfers, loading their wheelchairs, and miscellaneous upper extremity activities that are responsible for part of the shoulder problems experienced later. This complication may compromise people's daily activities by causing them various degrees of pain, and in its most severe form may result in turning a person functionally tetraplegic who was initially paraplegic. The structure of the human shoulder joint is not optimal for locomotion but its purpose is primarily to position the hand, to be able to lift weights, and to counterbalance the walking motion (Kemp et al., 2011).

Manual wheelchair users have increased demands placed on the structures of the shoulder with an addition to neuropathic phenomena, many factors contribute to mechanical shoulder stress with activities such as transferring the wheelchair in and out of vehicles, bathing, and even dressing contribute to stress on the shoulders (Brose et al., 2008).

During the initial phase of rehabilitation program following a spinal cord injury, it is mostly expected for individuals to be strongly focused on physical recovery and rehabilitation. There are two main models in rehabilitation teamwork – the multidisciplinary and the interdisciplinary approach. In both of these models, different professionals work usually toward a common goal. However, in the multidisciplinary model each member of the team conducts assessment and treatment individually and communicates with one person – the team leader; the approach results in the sum of each profession providing its own unique activity and contribution (Scovil et al., 2012).

To find out the level of injury the following ASIA Impairment Scale (AIS) designation is used in grading the degree of impairment:

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, And no motor function is preserved more than three levels below the motor level on either side of the body.

C = Motor incomplete. Motor function is preserved below the neurological level, and more than half of key muscle functions below the single neurological level of injury have a muscle grade less than 3 (Grades 0–2).



D = Motor incomplete. Motor function is preserved below the neurological level, and at least half (half or more) of key muscle functions below the NLI have a muscle grade >3.

E = Normal. If sensation and motor function as tested with the ISNCSCI are graded as normal in all segments, and the patient had prior deficits, then the AIS grade is E (Kirshblum et al., 2011).

Today there are 200,000 tetraplegic or paraplegic trauma victims living in the US, a population that is growing due to the increase in life expectancy associated with the improvement in the methods of treatment and rehabilitation of these patients. Corresponding to more than half of the cases the most common cause of spinal cord trauma is the automotive accident with other causes include falls from heights (25%), firearm projectile injuries (15%) and the practice of sports (10%) (Alves et al., 2012).

Independence in occupational performance is a major goal in rehabilitation of the client with paraplegia due to a spinal cord injury (SCI). Whereas the ability to move and transfer is most central in the independence process and necessary to compensate for, the manual wheelchair becomes an important assistive device. However, the wheelchair user with paraplegia due to SCI puts an intense load upon the muscles and joints of the upper trunk and extremities during wheelchair propulsion, and in almost every other daily activity such as transfer, driving and household activities. Due to this potential intense load in the upper extremities, musculoskeletal pain is a common complication in the spinal cord injured paraplegic wheelchair user (Samuelsson et al., 2004).

Shoulder pain is multi-factorial in individuals with paraplegia, but the aetiology and associated factors have not been investigated fully. Some studies report says that the prevalence of shoulder pain in subjects with paraplegia increases the longer the time since injury. Others failed to observe any differences regarding time since injury and age in subjects with and without shoulder pain (Alm et al., 2008).

A wide variety of other shoulder pathologies have been described by Boninger et al in individuals with paraplegia including acromioclavicular joint abnormalities, coracoacromial ligament thickening and edema, subacromial spurs, and distal clavicle osteolysis. Kivimäki and Ahoniemi used diagnostic US to demonstrate that the

shoulders of persons with SCI have an increased frequency of irregularity and effusion in the glenohumeral joint space compared with individuals without SCI. Given the frequent occurrence of shoulder pain and pathology in persons with SCI, it is important for both clinical and research purposes to have versatile and inexpensive diagnostic technologies available to evaluate shoulder pathology (Brose et al., 2008).

The main aim of this study is to describe the consequences of shoulder pain on activity and participation in spinal cord-injured paraplegic wheelchair users. We have also discussed the prevalence and types of shoulder pain (Samuelsson et al., 2004).

## **Rationale**

Spinal cord injury (SCI) is a catastrophic event which causes severe disability following trauma (Murthy & T., 2007). Now a days Spinal cord Injury is most commonly occurring in disable condition in all developing and developed countries in the world with a gradually increasing rate day by day due to lack of awareness. Injuries that are affecting the spinal cord and complicated by physical damage are an important health problem in Bangladesh as they carry a high rate of morbidity and mortality. As a developing country Bangladesh is trying to develop health care system still demography of spinal cord injury is important to know. It is generate exact information considering detail about which causes, occupation, age, gender, diagnosis, residential area, educational level and economic level were responsible for that injury to help raise awareness among the population and will help full to get information about spinal cord injury. And indicate that the spinal cord injury patient who needs a specialized and comprehensive rehabilitation services to continue their activities of daily living in the community. We are not conscious about spinal cord injury in our country. Spinal cord injury can destroy of one's life and ruin his whole family. Though the patient can survive with full struggle, life is so much challenging to him. In some area people think that spinal cord injury is the curse by Allah but it is just an accident which destroys the whole life. So it is very important to aware about the incidence to prevent the injury. In SCI major treatment is patient's rehabilitation program or long time management, where physiotherapy is essential. So the study enhances the knowledge about SCI and its nature such as type, extent etc. The preventative measure may help about SCI. The injury rate may be reduced if we concern about road traffic accident. If people from all corner of the Bangladesh are aware about the cause of SCI then it can help to lowering the rate of injury.

## **Research question**

What are the common characteristics of shoulder pain among paraplegic wheelchair user?

## **Aim**

The aim of the study was to find the common characteristics of shoulder pain among paraplegic wheelchair user.

## **Objectives**

### **General objective**

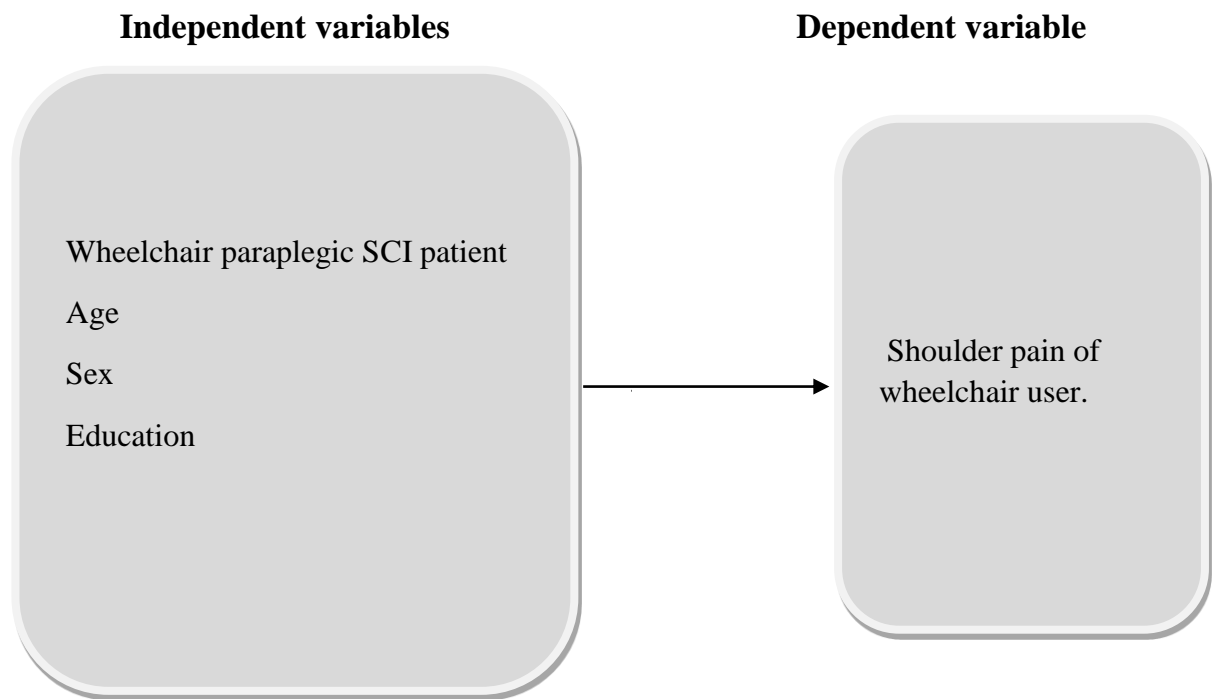
To identify the common characteristics of shoulder pain among paraplegic wheelchair user.

### **Specific objectives**

- To explore the socio.-demographic of the participants.
- To clarify the onset and behavior of shoulder pain .
- To identify the pain intensity/severity level according to NPR scale.
- To focus the shoulder pain while propel wheelchair use.
- To find out more effected age group.

## Conceptual Framework

### List of Variables



## **Operational Definition**

### **Traumatic Spinal Cord Injury**

A direct or indirect trauma to spinal cord following complete or incomplete cut off the spinal cord. Complete cut injuries defect in total loss of motor and sensory function, incomplete injuries result in the loss of some motor and sensory function.

### **Shoulder Pain**

Shoulder pain is any pain in or around the shoulder joint.

### **Paraplegia**

Complete paralysis of the lower half of the body including both legs, usually caused by damage to the spinal cord.

### **Rehabilitation**

The process of restoration and adaptation of previous skills by a person who had an injury so as to regain maximum self-sufficiency and function.

### **Complete injury**

Loss of sensory and motor function in the lowest sacral segment resulting in bowel-bladder control.

### **Incomplete injury**

Preservation of motor and sensory function below the neurological level of injury that included the lowest sacral segment.

### **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.

The leading cause of SCI among persons aged more than sixty are falls. So, it is not surprising that the rate of new SCI patients showing that falls has been increasing injuries among older persons have become more frequent (Devivo & M.J, 2012).

Spinal cord injury is devastating and costly event which occur in sudden and unexpected for human and social life. Life threaten complications are developed after these injury (Islam et al., 2011).

The incidence of spinal cord injury lies down between 10.4 and 83 per million people affected per year (Kennedy & Chessell, 2013).

Spinal cord injury or damage can cause a wide range of impairments, activity limitations and participation restrictions which has an adverse impact on the society (New et al., 2013).

One of the debilitating condition is SCI that causes paralysis of the limb and injury such as compression, contusion or laceration, disrupts autonomic function occurs at the site of injury or below, then permanent disability such as paralysis, loss of sensation, neuropathic pain etc. can occur depending on the level of the lesion (Mothe & Tator, 2013).

Spinal cord injury or damage can cause a wide range of impairments, activity limitations and participation restrictions which has an adverse impact on the society (New et al., 2013).

Nwankwo & Uche (2013) found that in SCI, The 31–45 years age group is the most frequently affected and male is more affected than female (4.3:1), 53% injury occurred in cervical spine, 22% thoracic spine and 25% lumber spine injury.

In Australia, male is more affected than female in non-traumatic SCI and the ratio is 197:169 and the prevalence of paraplegia is more about 269 per million than tetraplegia (98 per million) (New et al., 2013).

The worldwide incidence of SCI is 10.4 and 83 per million per year and the mean age is 33 years old, male and female ratio is 3.8:1 and one- third of the patients are tetraplegic all over the world (Wyndaele & Wyndaele, 2006). And 2.5 million people live with SCI around the world (Oyinbo & C.A., 2011).

In Asia the incidence rates of SCI is ranged from 12.06 to 61.6 per million and the average age is 26.8 to 56.6 years old, men are more vulnerable than women also in traumatic spinal cord injury main causes are motor vehicle collisions (MVCs) and falls (Ning et al., 2012).

In CRP, Bangladesh, 25-29 years aged peoples are most commonly affected among them males are more 83% than female and 92% came from rural area and 8% came from urban area also majority of the patients are paraplegia 56%, Cervical lesion present in 44% cases, thoracic lesion 27% and lumber lesion 29% (Islam et al., 2011).

In CRP, Bangladesh, 25-29 years aged peoples are most commonly affected among them males are more 83% than female and 92% came from rural area and 8% came from urban area also majority of the patients are paraplegia 56%, Cervical lesion present in 44% cases, thoracic lesion 27% and lumber lesion 29% (Islam et al., 2011).

Traumatic SCIs caused by act of violence, gunshot wound, motorcycle crash: 2-wheeled, diving, medical/surgical complications: impairment of spinal cord function resulting from adverse effects of medical, surgical or diagnostic procedures and treatment, bicycle, tricycles, Pedestrian, including falling/jumping into the path of a vehicle, auto racing, glider kite, slide, swimming, bungee jumping, scuba diving, lightning, kicked by an animal, machinery accidents, tractor, bulldozer, go-cart, steamroller, train, road grader, forklift, sledding, snow tubing, tobogganing, playing ice hockey, snowboarding. Personal contact, including being hit with a blunt object, falls as a result of being pushed (Chen et al., 2013).

Tentorial spinal cord compression injuries are easily produced using forceps; however the primary trauma varies as a function of compression rate and duration. The amount of major trauma also is expected to vary function. The spinal cord that is compressed



and the size of compression across the ventral-most part of the spinal cord (Popovich et al., 2012).

The epidemiology of spinal cord injury is less often reported in adults as compared with children Without radiographic abnormality. The main thing is epidemiological characteristics, such as injury origin, injury level or severity, neurological scale and MRI feature were acquired. Day by day the young adult population increases, it is mostly important to set up an individualized evaluation system that is based on a nationally scaled epidemiological database (Guo et al., 2012).

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 user. Hand or elbow pain was also relatively common since the beginning of wheelchair use. Thirty-five subjects (40%) reported current shoulder pain, usually bilateral or left sided (table II). Most subjects with current shoulder pain (32/35, 91%) had chronic pain (pain > 3 months), and 26 subjects (74%) reported long-lasting shoulder pain for more than one year. of all subjects, 43 (49%) had Subject characteristics associated with shoulder pain (Alm et al., 2008).

The common causes of spinal cord injury is long-term impact on physical and mental health with paralysis. Sometime Secondary complications may focus & the complications are focus the main cause of life changing effect (Bellon et al., 2013).

Greater efficiency in the use of resources and the management of care for the prolong period of spinal cord injury (SCI) on the health care system. In particular to develop a certification process for SCI Programs there is very important to access Care of Training project is part of a broader vision to create a methodological framework to evaluate clinical practices. (Noonan et al., 2012).

The mechanical forces created by increased intra-articular pressure and repetitive motions necessitated by manual wheelchair mobility are believed to contribute to the development of shoulder pain, impingement syndromes, and rotator cuff injuries. An imbalance may cause by weakness in specific muscles in the forces placed on the rotator cuff as well as lead to shortening of antagonists to weak muscles. Another proposed source of increased demand on the shoulders is overuse of structures that compensate for weakness in other muscle groups (Brose et al., 2008).

A spinal cord injury (SCI) is a devastating event that mostly depend on the level & severity. For the regaining of independence and a good life there is most important to create the affected area mark for rehabilitative interventions. Naow a days widely accepted that the functional training for an incomplete SCI is very effective for the central nervous system is able to recover (Hubli et al., 2013).

In order to be independent patients with SCI use limbs for performing daily activities whether for locomotion actions, or transference, self-care or others. However, a high prevalence of pain in that so essential joint is a serious problem for this population. Pain and shoulder range of motion disorders lead the patient to a significant functional limitation, directly affecting daily activities, professional activities, and sport-related activities, whether for recreation or professional purposes so shoulder pain may limit the access of SCI carriers to the community, thus reducing social integration. Additionally, this can influence the self-perception of health to a more negative status (Gianini et al., 2006).

The concept of a multidisciplinary team in Pakistan was generally equated with 'physiotherapy', is best treatment rather than the medical specialty of Physical Medicine and Rehabilitation. So, SCI unit and disaster planning did not include disability management despite neurosurgical departments in nearly all major teaching hospitals, there existed no. The Armed Forces Institute of Rehabilitation Medicine (AFIRM) only one dedicated rehabilitation medicine institute was functioning at the time of the disaster, providing rehabilitation services to persons with SCI, stroke, amputation, musculoskeletal disabilities, and pediatric disabilities (Rathore et al., 2007).

The prevalence of traumatic spinal cord injury in the USA is estimated at 525 to 1124 people per million inhabitants. In spite of the technological advances in the automotive industry, with growing investments in equipment such as seat belts, speed limiters and airbags, the incidence of spinal cord injury associated with trauma has not dropped in the last three decades, and is estimated at between 29-50 new cases per million people every year, excluding fatal victims in the accident (Alves et al., 2012).

Since the shoulder is optimally designed for reaching and locating the hand in the environment, these weight-bearing loads lead to mechanical trauma and place the shoulder joint at risk for overuse which causes pain. When shoulder pain occurs in a person with SCI, mobility and daily activities are even further limited by this “secondary” disability. As the upper limbs are required for all activities of daily living, persons with SCI are not able to rest their shoulders when pain develops. As a result, it is common for persons with SCI to experience shoulder pain at some point in their lives (Gutierrez et al, 2007).

People with paraplegia due to spinal cord injury (SCI) are particularly at risk for developing shoulder problems and pain because their average age of onset is about 40 years of age and as a group they are now experiencing near-normal life expectancies. In one of our studies conducted by the rehabilitation research and training center on aging with SCI (Kemp et al., 2011).

For acute or chronic SCI manifested in uncontrolled muscle spasms or autonomic dysreflexia there is no effective pharmacological treatment. Now a days the current drug treatments which main goal to be degrade of spasticity and autonomic dysfunction for the chronic SCI population. Mainly anti-spastic medications include baclofen, tizanidine, clonidine, benzodiazepine, dantrolene, and cannabis are used to better improve autonomic dysreflexia include anti-hypertensive nitrates, nifedipine, and adrenergic blockers (Onifer et al., 2011).

A 10yrs study aimed to investigate the life expectancy of people with SCI revealed that only 16.4% of the study population survived for 10 years in Bangladesh which was much lower than in developed countries like Finland (97.9%), Australia (86%), Canada (92%), UK (85%), and USA (80.7%). Beside this the study also found that the situation in Bangladesh is worse than other developing countries. The data indicates that Bangladesh has very poor medical facilities to promote the safe and worthwhile life after having a spinal cord injury. The study also pointed out some possible causes of poor life expectancy of persons with SCI, including inadequate acute management and lack of proper social reintegration (Razzak et al., 2011).

Spinal cord injured individuals use their upper limbs for mobility, yet the higher the level of spinal cord injury, the greater the degree of denervation and loss of power of the abdominal and trunk muscles. Therefore, the higher the injury level, the greater the need to use the upper limbs and the shoulder for body stability, further increasing the stress in this segment (Alves et al., 2012).

Despite the high prevalence of shoulder pain in this population, the relationship between shoulder pain intensity and quality of life, physical activity, and community involvement has not been established. Therefore, the purpose of this study was to investigate the relationship of shoulder pain intensity with quality of life, physical activity, and community activities in persons with paraplegia who propel a manual wheelchair. For that purpose we hypothesized that increased shoulder pain intensity would be associated with decreased quality of life, decreased physical activity, and decreased community activity. A secondary purpose was to determine the influence of gender on subjective reports of shoulder pain intensity, quality of life, physical activity, and community activity (Gutierrez et al, 2007).

Shoulder pain in the acute injured individual has been described to be due to high demands on weak or unconditioned muscles, whereas shoulder pain in the chronic phases is believed to be partly a result of overuse cause for stability and mobility individuals who use a wheelchair for mobility and have poorly innervated trunk muscles must rely on their upper extremities. In the chronic stage after SCI, soft tissue structures are exposed to overuse in activities of daily living, for example, in wheelchair propulsion and transfer in which the shoulder becomes a weight-bearing joint. Subacromial impingement with bursitis; tendinopathy; and tears of the rotator cuff (especially the supraspinatus), the biceps tendon, or both are the most common diagnoses of individuals with paraplegia suffering from chronic nociceptive shoulder pain (Alm et al., 2008).

For the spinal cord injury patients the most devastating type is traumatic spinal cord injury and that causes paralysis, sensory loss, and bladder/bowel dysfunction. The epidemiological understanding is important for preventative measures and planning clinical services. In Asia the purpose of epidemiological characteristics of TSCI in

orders to increase prevention and creates awareness. Thus we create social and worldwide awareness about spinal cord injury (Ning et al., 2012).

The sites of motion within the shoulder girdle are; the sternoclavicular joint, the acromioclavicular joint, glenohumeral joint and the scapulothoracic interface. There are also several other structures around the shoulder complex that are involved in movements of the upper extremity and which can be the site of shoulder pain. The most mobile joint is the junction of the humerus and scapula (Samuelsson et al., 2004).

The increased demand on the upper limbs during manual wheelchair use results in a high prevalence of shoulder pathology in people with spinal cord injury (SCI). Because individuals with SCI are dependent on their upper extremities for mobility and daily activities, shoulder dysfunction can present a devastating loss of independence and decreased quality of life (Requejo et al., 2008).

Shoulder pain remains common among persons with SCI who use manual wheelchairs with the increasing amount of literature in the field, with reported occurrence ranging from 51% to 78%. Bayley et al found a 30% incidence of chronic, persistent shoulder pain during transfers in a cohort of 94 patients with paraplegia. Impingement syndrome with subacromial bursitis was the most common diagnosis in this group where shoulder pathology in persons with SCI is common. Bayley found that 65% of subjects with paraplegia who had signs and symptoms of impingement had tears of the rotator cuff. Escobedo et al found that 57% of persons with paraplegia had rotator cuff tears and found a significantly higher rate of rotator cuff tear in persons with paraplegia than in uninjured people (Brose et al., 2008).

Shoulder pain (69.9%) reported pain at any site of the shoulder joint of the 93 participants. When stratified by the use of assistive mobility devices, shoulder pain was reported by 46.7% for motorized wheelchair users (Jain et al., 2010).

The etiology of shoulder pain in individuals with SCI may be partially a result of overload (overuse). The patient with SCI excessively overloads the upper limbs, especially the shoulders, using them more frequently and in a higher number of activities than people without SCI and those segments are used for performing transfers, wheelchair propulsion, locomotion with crutches and sport related

activities. However, this functional demand on shoulder's joint may lead to a painful picture, interfering on these patient's daily activities. With the improvements on technology and healthcare life expectancy for SCI patients has been increased and since then, issues regarding quality of life and age-related diseases are very important for this population, with the purpose of this paper was to better understand shoulder pain in SCI patients by reviewing available literature. Chronic pain incidence was investigated in 384 SCI carriers. From these, 75.6% referred pain in the upper limbs, limiting function and their independence. Among musculoskeletal complications in SCI patients, shoulder pain was the most relevant one, present in 48% of the 216 studied patients (Gianini et al., 2006).

Based on epidemiological studies, it seems evident that manual wheelchair propulsion and wheelchair-related daily life activities cause a heavy load on the upper extremities, especially for persons with cervical spinal cord injury (SCI). Other suggested risk factors for the development of shoulder pain are the duration of injury, age (ie older people have a higher risk than younger people), higher body mass index (BMI) and wheelchair propulsion style (Van Drongelen et al., 2006).

A significant correlation of  $-0.35$  between shoulder pain as measured in this study and QOL. This finding led us to hypothesize that changes in pain may relate to changes in QOL as well. Certainly, pain is one of those distressing experiences that can diminish enjoyment, productivity, and interpersonal relations enough to impact one's QOL and in such relationships between pain and QOL measures have been observed by others. Latimer et al. found a significant relationship between bodily pain and a measure of depression, which was reduced when the pain was treated. However, to our knowledge no previous studies exist about specifically treating shoulder pain in people with SCI and assessing their QOL before and after, similarly, it is well known that among people with an SCI there is a strong correlation of about 0.45 between social interaction and QOL. This finding suggest the necessity of testing whether any improvement in QOL that results from decreases in shoulder pain occurs directly through the mechanism of increased social participation following the reduction of shoulder pain (Kemp et al., 2011).

The high prevalence of shoulder pain in wheelchair users may be related to the repetitive use of the upper limbs during self-care and wheelchair-related activities (Nawoczinski et al., 2006).

In a study on shoulder kinematics in patients with SCI it was observed that the strength of the flexor muscles was superior for tetraplegic patients during manual wheelchair propulsion, when compared to paraplegic patients with high injury. For the authors, the superior strength of the flexor muscles in tetraplegic patients associated to thoracic-humeral weakness increases the susceptibility for sub acromial structures compression. The result of this study has shown that a moderate load on shoulder joint imposes on wheelchair propulsion and, for being a cyclical activity, the continuous demand of that between the trunk and upper limb when there is a reduction of the functional capacity in other parts of the body (Gianini et al., 2006).

The ample kinematic function of the shoulder is due to a combination of factors: the high mobility of the scapulohumeral joint combined with the acromioclavicular, sternoclavicular anatomical complex and with the functional diversity of the muscles inserted into this topography. When the shoulder becomes a load-bearing joint, situations such as compression and sub acromial impingement are more frequent and accentuated, increasing the risk of bursitis, tendinopathy and tears of the rotator cuff structures. It is assumed that chronic overload of the shoulder can cause degenerative osteoarticular alterations in a younger age bracket, with authors having described alterations such as narrowing of the acromioclavicular space with marginal osteophytosis and, in some cases, clavicular osteolysis (Alves et al., 2012).

The association between spinal cord injury (SCI) and complaints in the upper extremities has been studied, with 69–76% of SCI subjects reporting pain in the upper extremities, most often around the shoulders.<sup>1–3</sup> Shoulder complaints gradually increase with time after injury (Kivimäki et al., 2008).

Research on quantification of shoulder loading and muscular demands during wheelchair propulsion, self-transfers, weight-relief raises, and overhead activities is presented. This review examines evidence-based recommendations aimed at preserving shoulder function by addressing environmental factors related to ergonomics,

equipment selection, and performance technique and personal factors related to enhancement of the load-bearing capacity of shoulder structure through strengthening and resistance training (Requejo et al., 2008).

Chronic shoulder pain is a frequently reported phenomenon in individuals who use wheelchairs as their primary means of mobility. No indices are currently available which detect difficulties in performing daily activities due to shoulder discomfort in a largely independent population of wheelchair users (Mulroy et al., 2011).

Shoulder pain is the most common painful process among spinal cord injury (SCI) patients with pain in the upper extremity (UE; 71%), followed by pain in the wrist (53%), hands (43%) and elbows (35%).<sup>1</sup> The high incidence of shoulder pain in this population is due to the greater strain placed on the joint because they use their UE in daily activities (DA). On the other hand, persons with severe high SCI have no muscle support or sensation around their shoulders and, therefore, may be prone to injuries (Medina et al., 2011).

Women experienced more intense levels of shoulder pain than men did. This finding is supported by previous research in nondisabled individuals revealing that women report higher levels of musculoskeletal pain. Furthermore, Andersson and colleagues identified that non-disabled women also experienced a greater prevalence of shoulder pain than men did. In the SCI literature, Cardenas et al determined that gender differences did not exist in the severity of generalized bodily pain. Higher levels of shoulder pain have been demonstrated in women with paraplegia compared to matched able-bodied women. Our study identified significant gender differences, with women reporting twofold higher levels of shoulder pain than men did. This is the first time men and women have been compared as a cohort using the same measure. Although women reported higher shoulder pain intensities, men and women had similar levels of physical activity (Gutierrez et al, 2007).

Wheelchair-bound patients is challenging for rotator cuff surgery and clinical data on this condition are also limited. Rotator cuff repair surgery provides satisfactory functional outcomes for paraplegic wheelchair-bound patients. Suspicious postoperative management can help in obtaining positive functional outcomes (Jung et al., 2015).



Persons with tetraplegia use alternative muscle groups for the lost contribution of the normative primary movers for a given task; an example of this phenomenon would be a person with C6 tetraplegia performing inferior reach. This leads to compensatory use of rotator cuff muscles to perform the task previously accomplished by prime movers. Established risk factors for shoulder pain in persons with SCI include increased body mass index, duration of injury, and age (Brose et al., 2008).

Abnormal mechanical loading is the primary cause of chronic shoulder pain that caused by repetitive weight-bearing shoulder motions. These motions impose an deceptive chronic strain on the shoulder joints and support structures, leading to "shoulder impingement syndrome". Unmodifiable risk factors are increasing age, greater time post-SCI, and higher neurological level of SCI (Figoni & S.F, 2009).

In the past few years, GPHRC staff has provided sexual 16 education about changes in sexual function after SCI. At the home visit, spinal cord injured patients and spouses recalled having education about sexuality, and 80% found it to be helpful (Scovil et al., 2012).

Rotator cuff disease is the most common disease which correlates with age and duration of spinal cord injury, which underlines the theory of "wear and tear" in wheelchair-dependent patients (Akbar et al., 2011).

**Study design**

A cross sectional study was chosen to conduct the study.

**Study area**

Department of Physiotherapy Spinal Cord Injury unit, Centre for the Rehabilitation of the Paralysed (Savar), Dhaka.

**Study sampling and population**

A population refers to the entire group of people or items that meet the criteria set by the researcher. The populations of this study will be the Paraplegic wheelchair user. The sample was chosen by using convenience sampling.

**Sample size**

Researcher took a number of samples as the researcher can analyze the data deeply that was came from the participants easily. So researcher will choose about 30 Paraplegic patients of spinal cord injury those are using wheelchair.

The equation of sample size calculation is given below:

$$n = \left\{ \frac{z \left( 1 - \frac{\alpha}{2} \right)}{d} \right\}^2 \times pq$$

Here,

$$Z \left( 1 - \frac{\alpha}{2} \right) = 1.96 \text{ \{linked to 95\% confidential interval (used to 1.96)\}}$$

$$P = 0.51 \text{ (p = prevalence and q = 51\%)}$$

$$q = 1 - p$$

$$d = 0.05 \text{ \{margin of error at 5\% (value of 0.05)\}}$$

According to formula of sample size calculation for a cross sectional study, it would require total 286 subjects, but the researcher could recruit only 70 subjects due to resource constraint.

**Inclusion criteria**

- Patient with complete paraplegia.
- Willingness.
- Age range: From 10-60 years.
- Both male and female included.
- People who use manual wheelchair.

**Exclusion criteria**

- The uncoordinated people.
- The person with mental problem.
- Tetraplegic patients.
- People who does not use wheelchair.
- Physically inactive patient.
- Subjects who has severe general illness.
- Age less than 10 years and more than 60 years.

## **Sampling technique**

Simple random sampling was used for this study

## **Data collection method and tools**

Data was collected by using the Bengali version questionnaire through face to face interview with the participants. During the interview the researcher was ensure the environment is quiet & that the participant feels comfortable talking with researcher. The researcher was address client about confidentiality by consent. Data was collected by using the Bengali version questionnaire through face to face interview with the participants. During the interview the researcher was ensured the environment is quiet &that the participant feels comfortable talking with researcher. The researcher will address client about confidentiality by consent.

Data was analyzed with the software named Statistical Package for Social Science (SPSS) version 19.0.

## **Data collection procedure**

There was a questionnaire for acquiring the participant's demographic information including age, sex, disease condition related information such as musculoskeletal related information, neurological related, and others information.

## **Data Analysis**

Descriptive quantitative data was analyzed by using SPSS 16 software. The coded responses on the questionnaire were then entered on the computer general coding forms. They were analyzed using Statistical Package for the Social Science (SPSS) windows version 16.0. The results were presented with the use of simple percentage (%). The collected data was illustrated with tables and pie charts also.

### **Ethical issues**

Research proposal was submitted for approval to the institution of Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) and after defense the research proposal approval was taken from the IRB. A written/ verbal consent was taken from the participant before collecting data. The World Health Organization (WHO) and Bangladesh Medical Research Council (BMRC) guideline was followed to conduct the study. Again before beginning the data collection, researcher was obtained the permission from the concerned authorities ensuring the safety of the participants. In order to eliminate ethical claims, the participants were set free to receive treatment for other purposes as usual. Each participant was informed about the study before beginning and given written consent.

### **Rigor**

This study was conducted in systemic way. All the steps of research were followed by a sequent during data collection and analysis there was avoided influencing the whole process by own perspectives values and biases. When conducting the study it took help from the supervisors and physiotherapists. There was never influenced the participants by personal perception during data collection. A trustful relationship with participants was always maintained and the documents were kept confidential. During data analysis biasness was avoided.

Prevalence of shoulder pain

By following this formula,

$$\text{Prevalence} = \frac{\text{number of paraplegic wheelchair user with shoulder pain}(23)}{\text{total paraplegic wheelchair user (30)}} \times 100$$

Among the 30 participants 76.7% (n=23) were affected from shoulder pain and 23.3% (n=7) were not suffered from shoulder pain. Figure:1 show the number of affected participants in pie.

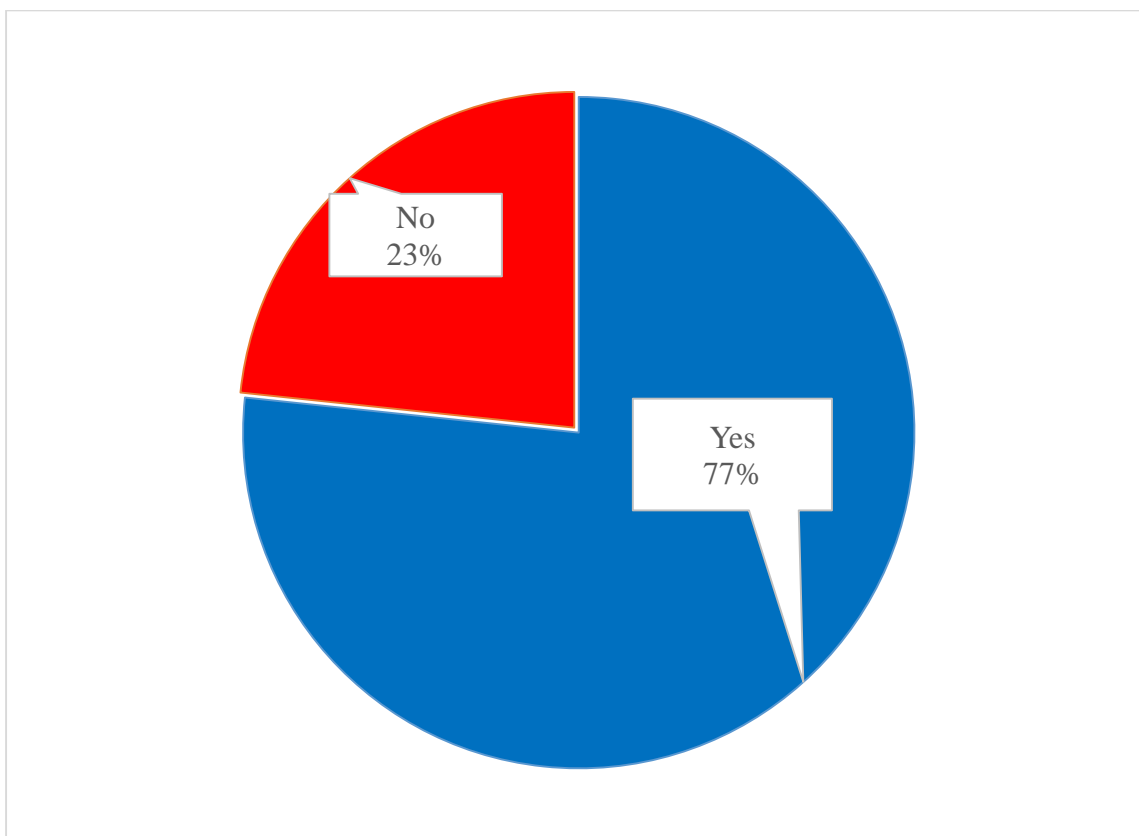


Figure-1: Prevalence of Shoulder pain

## Age group

Among the age group 10-20 years 23.3% (n=7), age group 21-30years 33.3% (n=10), age group 31-40 years 33.3% (n=10), age group 41-50 years 10% (n=3), age range 51-60 years 0% (n=0).Figure shows, distribution of age group of the participants.

**Table-1: Age group**

<b>Age</b>	<b>Participants</b>	<b>Percentage</b>
10-20 Years	7	23.3%
21-30 Years	10	33.3%
31-40 Years	10	33.3%
41-50 Years	3	10.0%
51-60 Years	0	00.0%
Total	30	100%

## **Residential Area**

In this study, among 30 participants, there were 80% (n=24) are lived in rural areas and only 20% (n=6) are lived in urban areas. Figure 3 shows the number of peoples living condition.

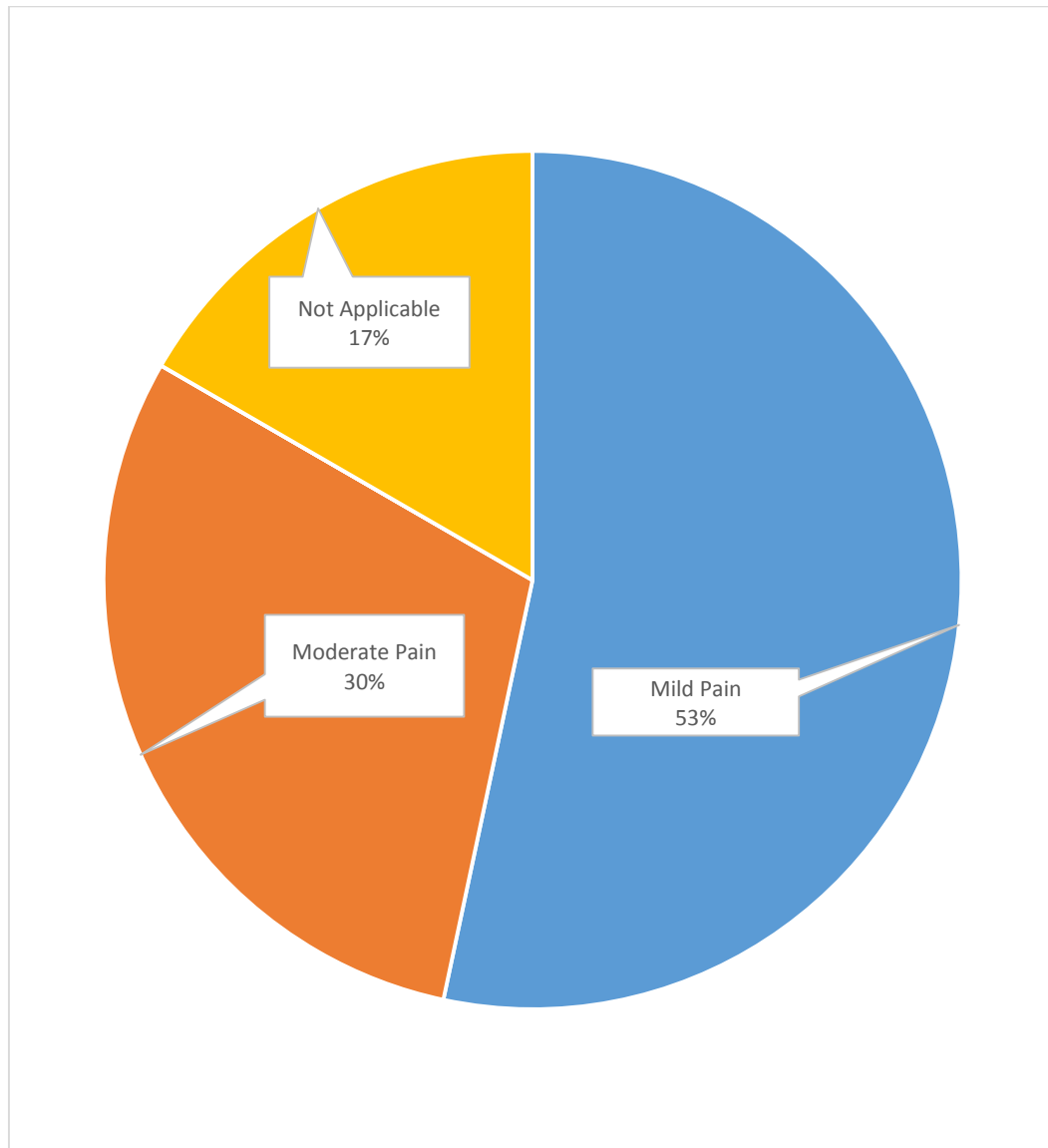
**Table-2: Residential status of total participants**

<b>Living Area</b>	<b>Participants</b>	<b>Percentage</b>
Rural	24	80%
Urban	6	20%
Total	30	100%



## Severity of Pain

Study reveals that among the 30 cases 16(53.3%) participants had mild symptoms and 9(30%) participants had moderate symptoms and 0(0%) have severe symptoms of pain and 5(16.7%) have no symptoms of pain. Figure 4 shows the severity of pain in pie.



**Figure-2: Severity of pain among the participants**

### Aggravating factors of Pain

Among the 30 cases, 21 (70%) participants pain is aggravated with movements and 9(30%) participants pain aggravates with rest. Figure 5 shows the aggravating factors of pain in pie.

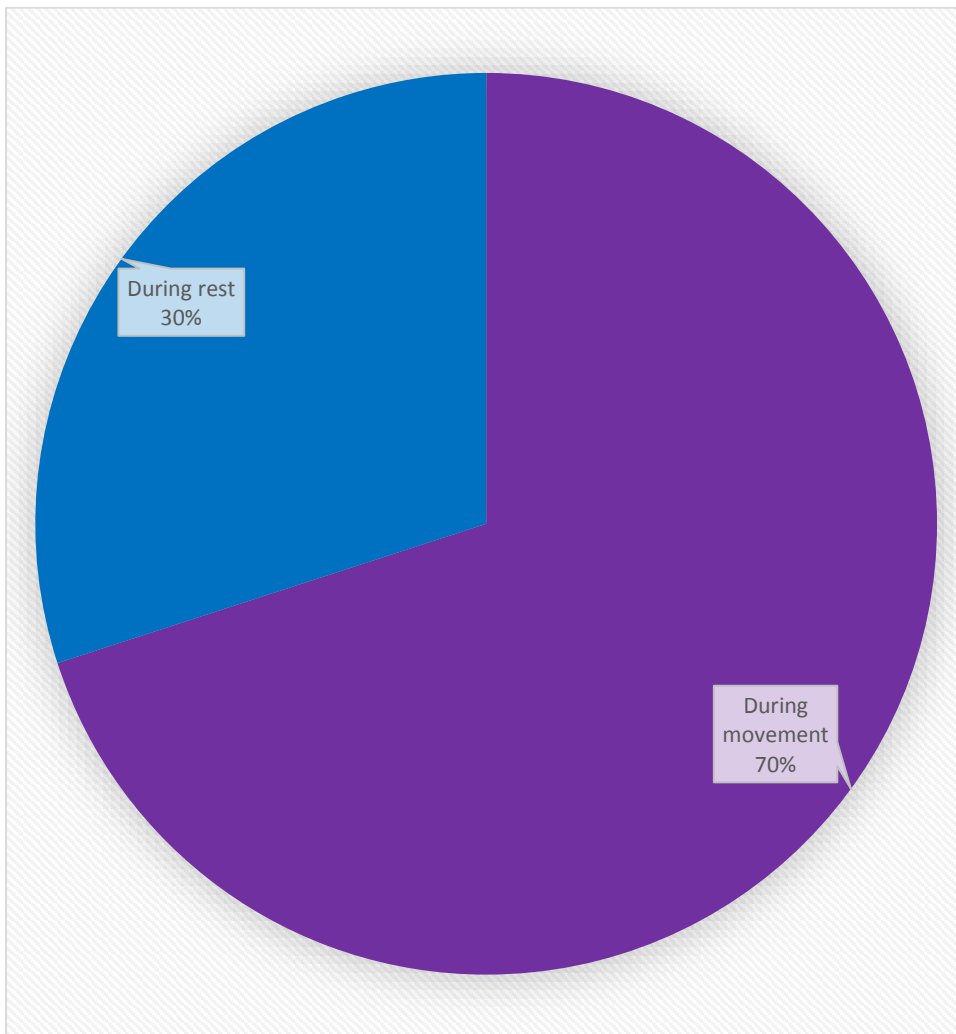
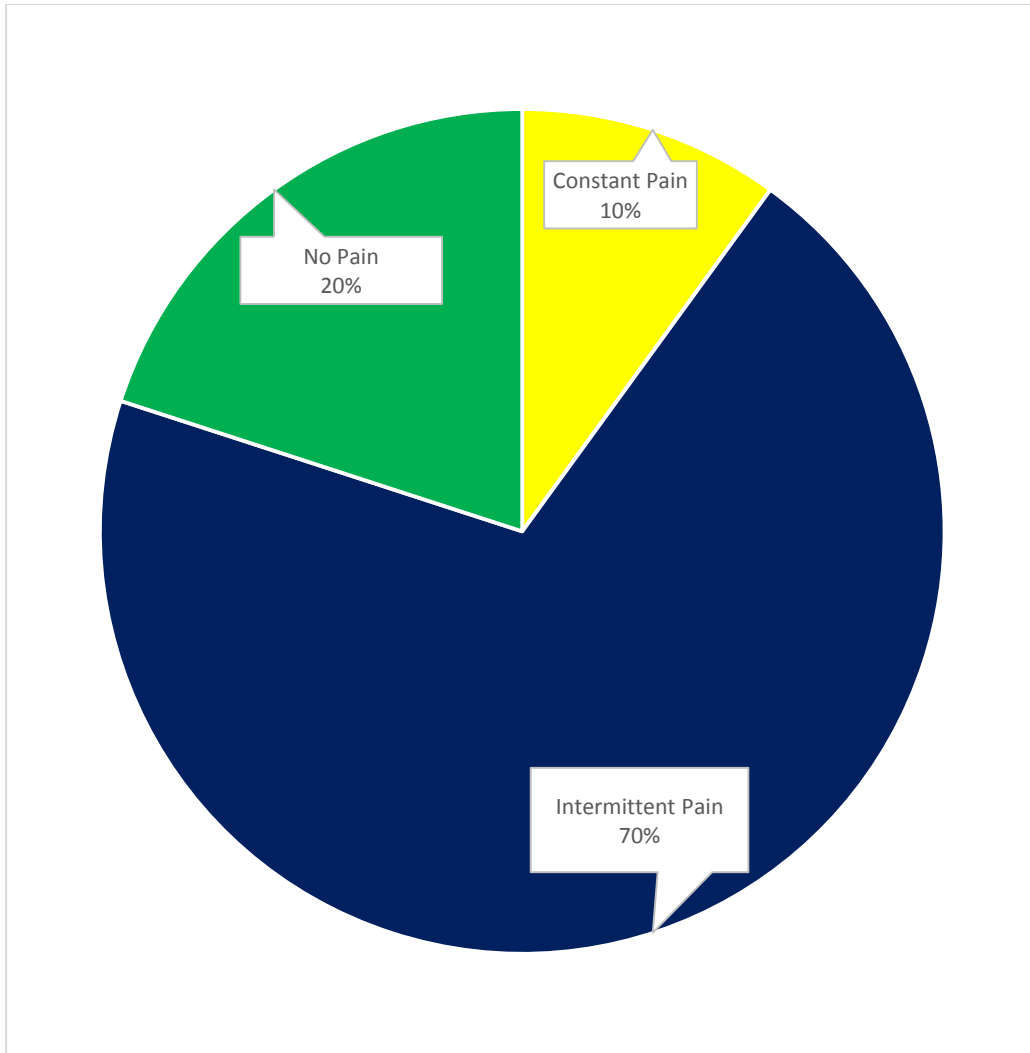


Figure-3: Aggravating factors of pain

### Behavior of Pain

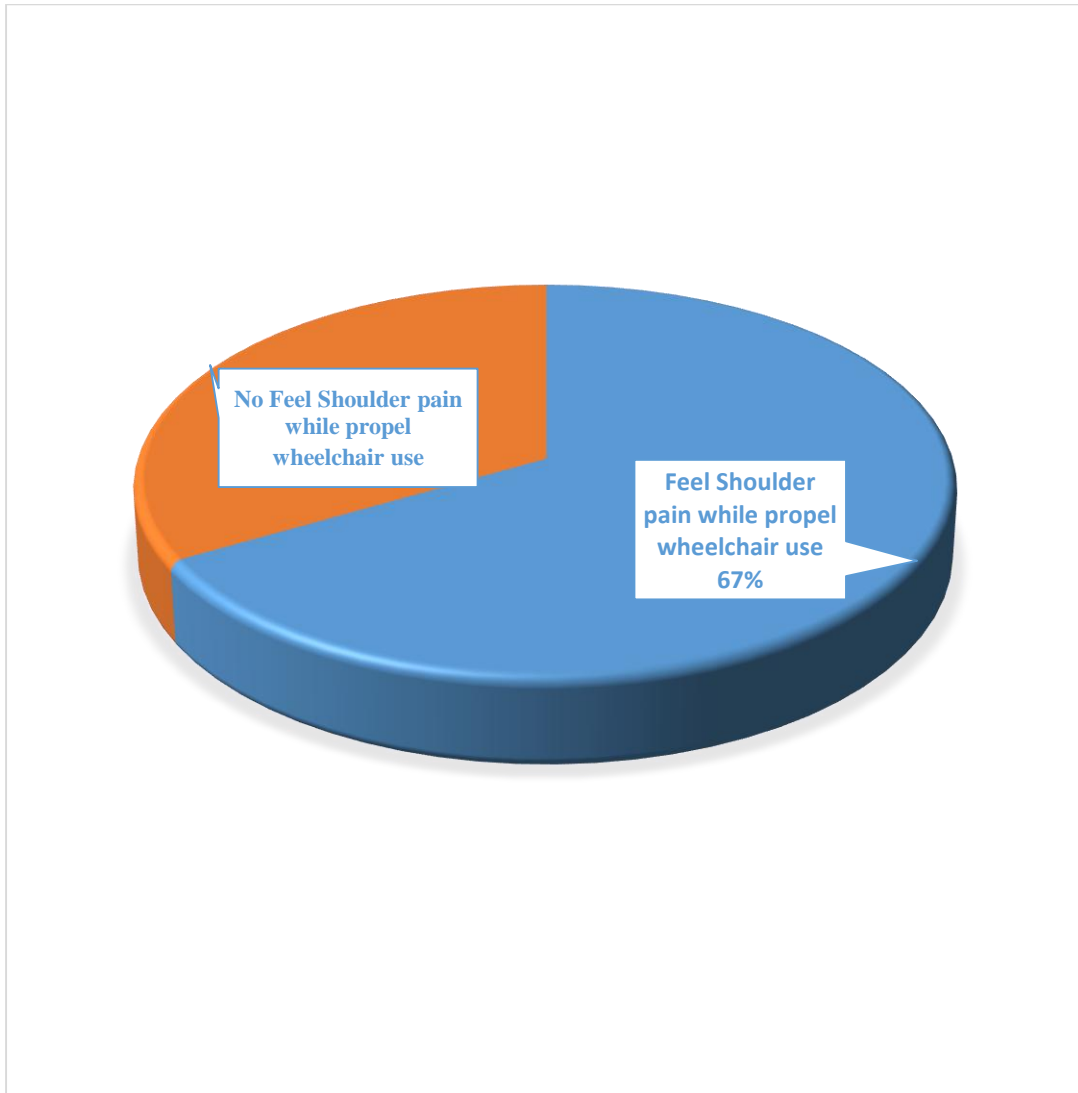
Study reveals that among the 30 cases 3(10%) participants had constant pain and 21(70%) participants had intermittent pain and 6(20%) have no pain. Figure 4 shows the behavior of pain in pie.



**Figure-4: Behavior of pain**

### **Shoulder pain while propel wheelchair use**

Among the 30 cases, 20 (66.7%) participants feel shoulder pain while propel wheelchair and 10(33.3%) participants had no feel shoulder pain while propel wheelchair use. Figure 5 shows feel shoulder pain while propel wheelchair use in pie.



**Figure-5: Shoulder pain while propel wheelchair use**

This study examined the characteristics of shoulder pain among paraplegia wheelchair user patients. Seventy patients of paraplegia were studied. By this study it has been found that near the 2/3 of the participant 76.7% (23) suffered from shoulder pain out of 30 and 23.3(7) have no pain. This high prevalence rate was similar of many studies all over the world. For example: (Samuelsson et al., 2004) have found that the shoulder pain affects (37.5%) of paraplegia respondents. This result is comparable to Marius in 2010 at UK that (58.34%) paraplegia patients have been reported of shoulder pain. Also, (Jain et al., 2010) found that (69.9%) of the subjects reported shoulder pain. An epidemiological study in India has been found that approximate 20,000 new cases of SCI are added every year and most of them are suffered by shoulder pain (60-70%). Among the age group 10-20 years 23.3% (n=7), age group 21-30 years 33.3% (n=10), age group 31-40 years 33.3% (n=10), age group 41-50 years 10% (n=3), age range 51-60 years 0% (n=0). Analysis showed that more affected age group was 21-40 years. (Jain et al., 2010) found that near about two third (69.9%) male paraplegia participants showed greater prevalence of shoulder pain.

In this study, among 30 participants, there were 80% (n=24) are lived in rural areas and only 20% (n=6) are lived in urban areas. A Brazilian study showed that out of the 60 affected patients, 48 (83.3%) had live in rural area (Blanes et al., 2009). Study reveals that among the 30 cases 16(53.3%) participants had mild symptoms and 9(30%) participants had moderate symptoms and 0 (0%) have severe symptoms of pain and 5(16.7%) have no symptoms of pain. So study shows that mild pain was more than moderate pain and severe pain. (Gianini et al., 2006) found that 75.6% patients were affected by moderate pain.

Study reveals that among the 30 cases 3(10%) participants had constant pain and 21(70%) participants had intermittent pain and 6(20%) have no pain.

Among the 30 cases, 20 (66.7%) participants feel shoulder pain while propel wheelchair and 10(33.3%) participants had no feel shoulder pain while propel wheelchair use.

## **Limitation**

There were some limitations or barriers to consider the result of the study as listed below:

- The first limitation of this study was sample size. It was taken just thirty (30) samples.
- There were a few researches completed in Bangladesh related to this research, so there was little evidence to support the result of this project with other study.
- The result of the study might not be generalized because of small number of sample.
- As the study was conducted at Centre for the Rehabilitation of the paralyzed (CRP) which may not represent the whole country.

**Conclusion**

The result of the study identified the characteristics of shoulder pain among paraplegic wheelchair user. In this study, total participants were 30. From this study it can be concluded that maximum (76.7%) of the patients had suffered by shoulder pain and most of the patient's pain was mild pain. Researcher revealed that 100% were male among cases and movements are containing aggravating factors rather than resting position. There was an association between age group and shoulder pain, in this study, most of the patients with shoulder pain age group were middle age (21-40years) patients and patients who lived in rural areas are more affected. Shoulder pain is preventable for paraplegia patients. Awareness and enough knowledge about shoulder pain can prevent this higher prevalence rate of shoulder pain among paraplegia patients. So this is very important for the paraplegia patients focusing on preventing the shoulder pain and improving quality of life for people with paraplegia patients. If enough knowledge about the shoulder pain is given among paraplegia patients, it would take fewer rescues to prevent further complications. Researcher had explored the prevalence of shoulder pain among paraplegia patients. From this study, we will be aware about the characteristics of shoulder pain among paraplegic wheelchair user patients, This is very important for the paraplegic patients focusing on preventing the shoulder pain and improving quality of life for people with paraplegic wheelchair user patients.



## **Recommendations**

A recommendation evolves out of the context in which the study was conducted the purpose of the study was to estimate paraplegia wheelchair user patients with shoulder pain. Though the researcher has some limitations but researcher identified some further step that might be taken for the better accomplishment of further research. For the esurient of the generalization of the research it is recommended to investigate large sample. In this study researcher only took the paraplegia wheelchair user patients who were attended at CRP to show the characteristics of shoulder pain among paraplegic wheelchair user patients. But due to resources constriction the investigator was not able to gather huge amount of participants and for this reason the result can't be generalized in all over Bangladesh. So for further study it is strongly recommended to increase sample size and area of sample selection to generalize the result in all of the paraplegic wheelchair user patients in Bangladesh. Beside this, there is an unequal ratio of male and female participants so it is recommended for further study to take the participants equally for comparison of gender among paraplegic wheelchair user patients.

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## Appendix

### Institutional Review Board Approval



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

Ref: CRP-BHPI/IRB/04/17/77

Date: 05/04/2017

To  
Rubel Ahmad Samir  
BSc in Physiotherapy,  
Department of Physiotherapy  
Session: 2009-2010, DU Reg. No.: 848  
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

**Subject: Approval of the thesis proposal – “Characteristics of shoulder pain among paraplegic wheelchair user” by ethics committee.**

Dear Rubel Ahmad Samir,

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on February 22, 2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The following documents have been reviewed and approved:

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

Since the study involves answering “Characteristics of shoulder pain among wheelchair user questionnaire that takes 25 to 30 minutes and have no likelihood of any harm to the participants and have possibility of benefit patients in their pain management and rehabilitation, the members of the Ethics committee has approved the study to be conducted in the presented form at the meeting held at 08:30 AM on February 25, 2016 at BHPI.

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

CRP-Chapain, Savar, Dhaka-1343. Tel: 02-7745464-5, 7741404, Fax: 02-7745069,  
Email: contact@crp-bangladesh.org, www.crp-bangladesh.org

## Permission Letter

### Permission Letter

25<sup>th</sup> July, 2016

The Head of the Programs,  
Associate Professor Physiotherapy,  
Bangladesh Health Professions Institute,  
Centre for the Rehabilitation of the Paralyzed (CRP)  
Savar, Dhaka-1343

Subject: Application for permission to collect data to conduct a research study.

Sir,

With due respect and humble submission to state that I am Rubel Ahmad Samir of 4<sup>th</sup> year B.Sc in Physiotherapy student at Bangladesh Health Professions Institute (BHPI). In 4<sup>th</sup> year course curriculum, we have to do a research project for the partial fulfillment of the requirements for the degree of B.Sc in Physiotherapy. I have chosen a research title that is "Characteristics of shoulder pain among paraplegic wheel chair user". The participants would be the paraplegic wheel chair user patients & we expected to provide me necessary information, so that I can conduct this study successfully. I would like to assure that anything of my study will not be harmful for the participants. My supervisor is Md. Sohrab Hossain, Associate Professor Physiotherapy, BHPI, CRP For this reason, I need to obtain permission to collect data from inpatient, spinal cord injury unit of CRP.

Therefore, I pray and hope that you would be kind enough to grant my application and give me the permission to collect data from inpatient, spinal cord injury unit of CRP.

Yours faithfully

*Rubel Ahmad Samir*  
Rubel Ahmad Samir  
4<sup>th</sup> year B.Sc in Physiotherapy  
Session: 2009-2010  
BHPI, CRP, Savar, Dhaka-1343

*may be allowed,*  
*hossain*

**Md. Sohrab Hossain**  
Associate Professor Physiotherapy (BSc)  
Head of the Program  
CRP Savar, Dhaka



## Verbal Consent Form

**(Please read out to the participant)**

Assalamualaikum / Namaskar, My name is Rubel Ahmad Samir, I'm conducting this study for a BSc in Physiotherapy project study dissertation titled "Characteristics of shoulder pain among paraplegic wheelchair user". Under Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related information regarding Shoulder pain. You will perform some tasks which are mention in this form. This will take approximately 35 to 40 minutes.

I would like to inform you that is a purely academic study and will not to be used for any other purpose. The researcher is not directly related with this spinal cord injury unit, so your participation in the research will have no impact in this area. All information provided by you will be continue the services 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 questions about the study or your right as a participation, you may contact with me or my supervisor Md. Shofiqul Islam , Assistant Professor, Department of Physiotherapy, BHPI, CRP, Savar, Dhaka-1343

Do you have any questions before I start?

.....

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

YES .....

NO.....

Signature of the participant .....

Date: .....

Signature of the researcher .....

Date: .....

## মৌখিক অনুমতি পত্রঃ

আসসালামুআলাইকুম/নমস্কার, আমার নাম রুবেল আহমদ সামিরা আমি এই গবেষণাটি “বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট” (বি. এইচ. পি.আই) এ করছি যা আমার অধ্যয়নের অন্তর্ভুক্ত। যার শিরোনাম হল “হুইল চেয়ার ব্যবহারকারী প্যারাপ্লেজিক রোগীদের কাধের ব্যাথার বৈশিষ্ট্য”। এজন্যে আমি কিছু ব্যক্তিগত এবং কাধের ব্যাথা সমস্যা জনিত আনুষঙ্গিক প্রশ্ন জানতে চাচ্ছি, যা আনুমানিক ৩৫ থেকে ৪০ মিনিটের মত লাগবে। আমি আপনাকে অবগত করছি যে, এটা আমার অধ্যয়নের অংশ এবং অন্যকোন উদ্দেশ্যে এটি ব্যবহার হবে না। গবেষক সরাসরি মেরুরঞ্জু আঘাত জনিত রোগীদের বিভাগের সাথে জড়িত নয়। তাই এই গবেষণায় অংশগ্রহন আপনার বর্তমান এবং ভবিষ্যৎ চিকিৎসার ক্ষেত্রে কোনরূপ প্রভাব ফেলবে না। আপনি যেসব তথ্য প্রদান করবেন তার গোপনীয়তা বজায় থাকবে এবং আপনার ঘটনা প্রবাহে এটা নিশ্চিত করা হবে যে, এই তথ্যের উৎস অপ্রকাশিত থাকবে।

এই অধ্যয়নে আপনার অংশগ্রহন স্বেচ্ছা প্রনোদিত এবং আপনি যেকোন সময় এই অধ্যয়ন থেকে কোন নেতিবাচক ফলাফল ছাড়াই নিজেকে প্রত্যাহার করতে পারবেন। এছাড়াও সাক্ষাৎকারের সময় কোন প্রশ্ন অপছন্দ করার বা উত্তর দিতে না চাওয়ার সম্পূর্ণ অধিকার আপনার রয়েছে। এই অধ্যয়নে অংশগ্রহনকারী হিসেবে আপনার কোন প্রশ্ন থাকে তাহলে আপনি আমাকে অথবা মোঃ সফিকুল ইসলাম, সহকারী অধ্যাপক, ডিপার্টমেন্ট অফ ফিজিওথেরাপী, বি.এইচ.পি.আই, সি.আর.পি, এর সাথে যোগাযোগ করতে পারেন।

গবেষণাটি আরম্ভ করার পূর্বে আপনার কোন প্রশ্ন আছে?

আমি কি আপনার অনুমতি পেয়ে এই সাক্ষাৎকারটি আরম্ভ করতে পারি?

হ্যাঁ .....

না .....

সাক্ষাৎকার প্রদানকারীর স্বাক্ষরঃ.....

## Questionnaire

Identification Number: .....

Date of interview .....

Questions	Responses	Answer	
01.Name			
02.Age	.....Yrs.		
03.Address			
04.Residential Area	Rural	1	<input style="width: 50px; height: 20px;" type="text"/>
	Urban	2	
05.Educational Level	Illiterate	1	<input style="width: 50px; height: 20px;" type="text"/>
	Primary Education	2	
	Secondary Education	3	
	Higher Secndary Education	4	
	Bachelor or Above	5	
06.Occupational Status	Employment	1	<input style="width: 50px; height: 20px;" type="text"/>
	Unemployment	2	
	Businessman	3	
	Other (Specify)	4	
07.Dominant Hand	Right	1	<input style="width: 50px; height: 20px;" type="text"/>
	Left	2	
08.Have you any shoulder pain?	Yes	1	<input style="width: 50px; height: 20px;" type="text"/>
	No	2	
09.In which side of shoulder do you feel pain?	Right	1	<input style="width: 50px; height: 20px;" type="text"/>
	Left	2	

	Both	3	
10. Severity of pain on NPR scale	1-4 (Mild)	1	<input type="text"/>
	5-7 (Moderate)	2	
	8-10 (Severe)	3	
	Not Applicable	4	
11. Behavior of pain	Constant	1	<input type="text"/>
	Intermittent	2	
	Not applicable	3	
12. Onset of pain	Sudden onset	1	<input type="text"/>
	Gradual onset	2	
	Repeated onset	3	
13. Does your pain related with movement?	Yes	1	<input type="text"/>
	No	2	
14. If yes, which movement responsible for this pain?	Reaching	1	<input type="text"/>
	Lifting	2	
	Pushing	3	
	Other (Specify)	4	
15. When do you feel the pain?	Day	1	<input type="text"/>
	Night	2	
	During movement	3	
	During rest	4	
	All time	5	
16. Muscle Wasting	Yes	1	<input type="text"/>
	No	2	
17. Do you have any other problem or injury?	Yes	1	<input type="text"/>
	No	2	
18. If yes, what type of problem or injury	.....	1	<input type="text"/>
	.....	2	
19. Do you feel pain while propel wheelchair?	Yes	1	<input type="text"/>
	No	2	

20. What type of wheelchair do you use?	Fixed	1	<input type="checkbox"/>
	Folding	2	
	Low	3	

Thank you for your co-operation.....

প্রশ্নপত্র:

আইডি নম্বর.....

সাক্ষাত গ্রহণের তারিখঃ .....

প্রশ্নসমূহ			উত্তর
১।নাম			
২।বয়স	..... বছর		
৩।ঠিকানা			
৪।আবাসিক এলাকা	গ্রাম	১	<input type="text"/>
	শহর	২	
৫।শিক্ষাগত যোগ্যতা	অশিক্ষিত	১	<input type="text"/>
	প্রাথমিক শিক্ষা	২	
	মাধ্যমিক শিক্ষা	৩	
	উচ্চ মাধ্যমিক শিক্ষা	৪	
	স্নাতক বা স্নাতকোত্তর	৫	
৬।কাজের ধরন	চাকুরীজীবী	১	<input type="text"/>
	বেকার	২	
	ব্যাবসায়ী	৩	
	অন্যান্য (উল্লেখ)	৪	

৭।অধিক ব্যবহারকারী হাত	ডান	১		<input type="text"/>
	বাম	২		
৮।আপনার কোন কাধের ব্যাথা আছে?	হ্যাঁ	১		<input type="text"/>
	না	২		
৯।কোন কাধের মধ্যে আপনি ব্যাথা অনুভব করেন?	ডান	১		<input type="text"/>
	বাম	২		
	উভয়	৩		
১০।এন পি আর স্কেলে ব্যাথার তীব্রতা কত?	১-৪ (কম )	১		<input type="text"/>
	৫-৭ (মধ্যম)	২		
	৮-১০(তীব্র)	৩		
	প্রযোজ্য নয়	৪		
১১।ব্যাথার ধরন	নিয়মিত	১		<input type="text"/>
	মাঝে মাঝে	২		
	প্রযোজ্য নয়	৩		
১২।ব্যাথার সুত্রপাত	হঠাৎ সুত্রপাত	১		<input type="text"/>
	ধীরেধীরে সুত্রপাত	২		
	পুনরাবৃত্ত সুত্রপাত	৩		
১৩।আপনার ব্যাথা কি চলাফেরার সাথে সম্পর্কিত?	হ্যাঁ	১		<input type="text"/>
	না	২		
১৪।যদি হ্যাঁ হয়, তাহলে কোন ধরনের নড়াচড়ায়?	পৌছানো	১		<input type="text"/>
	উত্তোলক	২		

	ধাক্কা দেওয়া।	৩		
	অন্যান্য(উল্লেখ করুন )	৪		
১৫।কখন আপনি ব্যাথা অনুভব করেন?	দিন	১	<input type="text"/>	
	রাত	২		
	নড়াচড়ার সময়	৩		
	বিশ্রামের সময়	৪		
	সবসময়	৫		
১৬।মাংস পেশীক্ষয়	হ্যাঁ	১	<input type="text"/>	
	না	২		
১৭।আপনার অন্য কোন আঘাত বা সমস্যা আছে কি?	হ্যাঁ	১	<input type="text"/>	
	না	২		
১৮।যদি থাকে, কোন ধরনের আঘাত বা সমস্যা?	.....	১	<input type="text"/>	
	.....	২		
১৯।হুইল চেয়ার চালানর সময় আপনি ব্যাথা অনুভব করেন কি?	হ্যাঁ	১	<input type="text"/>	
	না	২		
২০।আপনি কোন ধরনের হুইলচেয়ার ব্যবহার করেন?	স্থায়ী	১	<input type="text"/>	
	ভাঁজকরা	২		
	অনুন্নত	৩		



