PASSIVE MOVEMENT PERFORMED BY THE THERAPIST OF SPINAL CORD INJURY PATIENT AT CRP

Nazman Khair Rony

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Department of Physiotherapy

CRP, Savar, Dhaka-1343

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled.

Passive Movement Performed By the Therapist of Spinal Cord Injury Patient at CRP.

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

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Muhammad Millat Hossain
Assistant Professor,
Dept of Rehabilitation Scinece
BHPI, CRP, Savar, Dhaka
Supervisor

.....

Mohammad Anwar Hossain
Associate Professor, Physiotherapy, BHPI
Head of the Department of Physiotherapy
CRP, Savar, Dhaka

.....

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

.....

Md. Shofiqul Islam
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 here 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 of information of the study. I would be bound to take written consent from the Physiotherapy Department, Bangladesh Health Profession Institute (BHPI).

Signature Nazman Khair Rony **Date** 04/10/17

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First of all I would like to express my gratitude to the almighty of Allah. When I started the study I didn't know whether I could complete it or not but I was believed "Fortune favors the brave". So, I was determined to try my best to make it successful and I am most grateful to almighty Allah. After that I must go to my family who inspired me always and provide necessary support.

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Acronyms

ASIA- American Spinal Injury Association

BHPI- Bangladesh Health Professions Institute

BMRC- Bangladesh Medical and Research Council

CRP- Centre for the Rehabilitation of the Paralysed

HIV- Human Immunodeficiency Virus

ICF- International Classification of Functioning, Disability and Health

IRB-Institute Review Board

ISNCSC- International Standards for Neurological Classifications of Spinal Cord Injury

MVCs- Motor Vehicle Collisions

OT- Occupational therapy

PT- Physiotherapy

ROM- Range of Motion

RTA- Road Traffic Accident

SCI- Spinal Cord Injury

SPSS- Statistical Package for the Social Science

TB- Tuberculosis

TSCI- Traumatic Spinal Cord Injury

US- United States

WHO- World Health Organization

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ABSTRACT

Purpose: The purpose of the study was to find out the passive range of motion as a treatment provided by physiotherapist and occupational therapist.

Objective: To quantify the amount of upper- and lower-extremity movement velocities as a treatment (that is, voluntary movements as part of a functional task or specific motion) occurring during inpatient spinal cord injury (SCI) provided by physical (PT) and occupational therapy (OT).

Methodology: The study was conducted through a cross sectional design to find out passive range of motion of major joints of upper and lower limb of tetra-plegic and paraplegic patients and the study the passive movements mainly study conduct to find out the objectives.

Results: In this research, 45 participants were participated in the study. There were both tetraplegic and paraplegic participants. There were also male and female participants. Every patient or participants have scored on the socio demographic questions. It was an observational study also. So I was present in that session while performing the therapy by the therapist. I had also collected my self-questionnaires answers in that time.

Conclusion: The result of the cross-sectional study has identified that the passive movement velocities which was performed by the therapist both the physiotherapist and the occupational therapist with some exercises of the spinal cord injury patients at CRP.

Key words: Spinal cord injury, Range of motion, Passive movements, Velocity

CHAPTER: I INTRODUCTION

1.1 Background:

Spinal cord injury (SCI) is an acute, devastating and life threaten event that results in significant and permanent life changes for the individuals spinal cord injury patients who are injured, as well as their surroundings founded by (Holtz & Levi, 2006).

Interaction between the conduction of sensory and motor signals across the sites of lesions by Spinal cord injury (SCI) founded by (Maynard, 2006). The spinal cord is the major functional system through which motor and sensory information travels between not only brain and but also the whole body. The spinal cord contains opposite transversely oriented spinal tracts (white matter) surrounding central areas (gray matter) where located the most spinal neuronal cell bodies. The gray matter is furnished into two segments comprising sensory and motor neurons. Axons which are situated in leave out from spinal sensory neurons enter and axons from motor neurons leave the spinal cord via segmental nerves or roots reported by (Maynard, 2006).

The reduction of somatic and autonomic control results in reduction of physical activity and blunted cardiovascular response to exercise. The consequences of this reduction in physical activity are the significant physical de-conditioning, changed the body composition, and development of detrimental metabolic profiles leading to poorer health outcomes in this population founded by (Gorgey et al., 2007). The following sentences focus on three key problems known as weakness, contracture poor muscle controls. No attempt is made to review the full scope of physiotherapy practice in spinal cord injury founded by (Jain, 2016). Jacobs and Nash founded (2004) that physical activity after a spinal cord injury (SCI) it is very important for optimizing recovery from SCI as well as the ability to increase secondary complications like physical de-conditioning resulting from bed rest, cardiovascular disease and autonomic disorders demonstrated. Bedbrook founded (2005) that the piecemeal care of spinal cord injury with paralysis characterized by the occasional patient being treated by the occasional doctor but what should not to do. This argument was most recently strengthened in a comparison of medical secondary

complications in patients treated obviously in specialized and non-specialized centers founded by (Donovan et al., 2005).

Must be the Specialized care is more effective than general care for those patients who are sustaining critical conditions such as major trauma it was founded by (Smetana et al., 2007). Weakness is the most obvious impairment that prevents people with spinal cord injury from performing motor task. Consequently strength training interventions are widely administrations by physiotherapist founded by (Van Langeveld, 2011).

David (2002) stressed that the importance of active and passive movements are helped in progress the condition and also help in preventing deforming contractures. Guttmann (2001) advocated passive movements of all joints at least three times daily to prevent contracture development and described how specific the joint contractures can delay with rehabilitation, that's why the passive stretching exercise is crying needed.

Yarkony (2005) has described the relationship of edema paralysis, poor positioning and minute hemorrhages and trauma to their development and advocated prevention by one full range of motion to the joints daily and not only proper positioning but also proper treatment such as direct joints passive range of motion exercises and also other dimensional movements. Physical therapy (PT) must be play a key and vital component of the rehabilitation process following spinal cord injury (SCI), and includes a variety of interventions that address multiple domains in the International Classification of Functioning, Disability and Health (ICF) adopted by World Health Organization (WHO) founded by (Ustan et al., 2003). These domains include body function and structure, activity limitation, and participation and also joint contractures. When applying these concepts for rehabilitating spinal cord injury patients, body function and structure refer to impairments in sensation or motor function, range of motion (ROM) limitations, musculoskeletal pain, joint stiffness etc. founded by (Van der Putten et al., 2001).

Occupational therapy (OT) is a key rehabilitation discipline that where the main goal of which is to assist to a person to recovering function and facilitate a return to a productive

and fulfilling life after spinal cord injury (SCI). Occupational therapists (OTs) evaluate a wide spectrum of life training or skills needed to function at home, at work, in school, in the community, and during leisure activities showed by (Am J Occup Ther, 2002). They select specific interventions to address identified patient needs however; there is a paucity of evidence supporting the use of these interventions, or which interventions will specifically lead to perform the best outcomes after SCI. Furthermore, little is known about the factors that contribute to select of these interventions and the amount of time spent on wide selected interventions during a typical SCI rehabilitation stay. In order to understand which interventions lead to perform the best outcomes after SCI, they must be defined and quantified, which includes specification of the type of intervention or service, technique or approach, the devices utilized, the amount of time spent, and the degree of patient participation in the activity. The interventions and services that Occupational therapists (OTs) provide during inpatient rehabilitation after SCI vary within and across centers and can be influenced by the experience of the therapist providing treatment, interactions between the therapist and person with SCI founded by (Barclay, 2002).

Contractures are seen as the most common complication of spinal cord injury. They are characterized by limited joint active and also passive range of motion, joint deformity and also joint stiffness. Contractures are seriously undesirable because they impaired the mobility and function, diminish effectiveness of locomotors training or system programs and lead to paralysis the body including with disability and pain founded by (Diong et al., 2012).

1.2 Rationale

Spinal cord injury (SCI) is a catastrophic event and one of the most common causes of severe disability following trauma founded by (Murthy, 2007).This review outlines the principles of physiotherapy rehabilitation for people with SCI and the evidence based effective treatment are commonly used physiotherapy intervention. It focuses on three problems which are very common to all such as muscles weakness, joints contractures and poor motor control of the body. Only the rehabilitation phase for the spinal cord injury is discussed here, because my topic is related to this, although physiotherapists also have a vital role to play immediately after spinal cord injury and in the community once patients are discharged from hospital to home founded by (Harvey, 2016). However, SCI also has widespread consequences for many body functions, including bladder, bowel, and respiratory, cardiovascular, sexual function also the sensory and motor function of both upper and lower limbs. It also has social, financial and psychological implications, and grows people's susceptibility to late-life renal complications as well as musculoskeletal injuries, pain, osteoporosis and other vital problems founded by (Harvey, 2016). Rehabilitation following SCI commences as soon as the patient is medically stable after injury. This can vary from a few days to many weeks, and many weeks to many months and many months to years depending on whether the patient suffered other injuries at the time of the accident or subsequently developed medical or respiratory complications. Rehabilitation performed by the team professionals and the patient current centered approach founded by (Harvey, 2016).

So the passive range of motion exercise is very important for spinal cord injury patients. Because who lost their sensory and motor function they did not know how to regain the power, but when the therapist perform passive range of motion it develops neuroplasticity, which develops more than the natural process of development of neuroplasticity. But this is not only the reason of passive range of motion but also passive range of motion exercise can prevent contracture, stiffness, adhesion formation, muscle soreness, muscle atrophy and also prevent pressure sore which is very common to the spinal cord injury patient. And the frequency is more important thing of the passive range of motion therapy. That's why I was choosing the dissertation.

1.3 Research question

What is passive range of motion or movements velocity as a treatment provided by the therapists?

1.4 Aim of the study

The aim of the study was to find out the passive range of motion as a treatment provided by physiotherapist and occupational therapist.

1.5 Objectives

1.5.1 General objective

The overall aim of this research was to find out the passive range of motion as an intervention performed by the physiotherapist and the occupational therapist.

1.5.2 Specific objectives

- To find out passive ROM of the large joints of the patients.
- To find out the frequency of range of motion as a treatment provided by the physiotherapist and occupational therapist.
- To explore the mean differences between the passive range of movements as a treatment provided by the physiotherapist and occupational therapist.

1.6 Conceptual framework

Independent variable **Dependent variable**

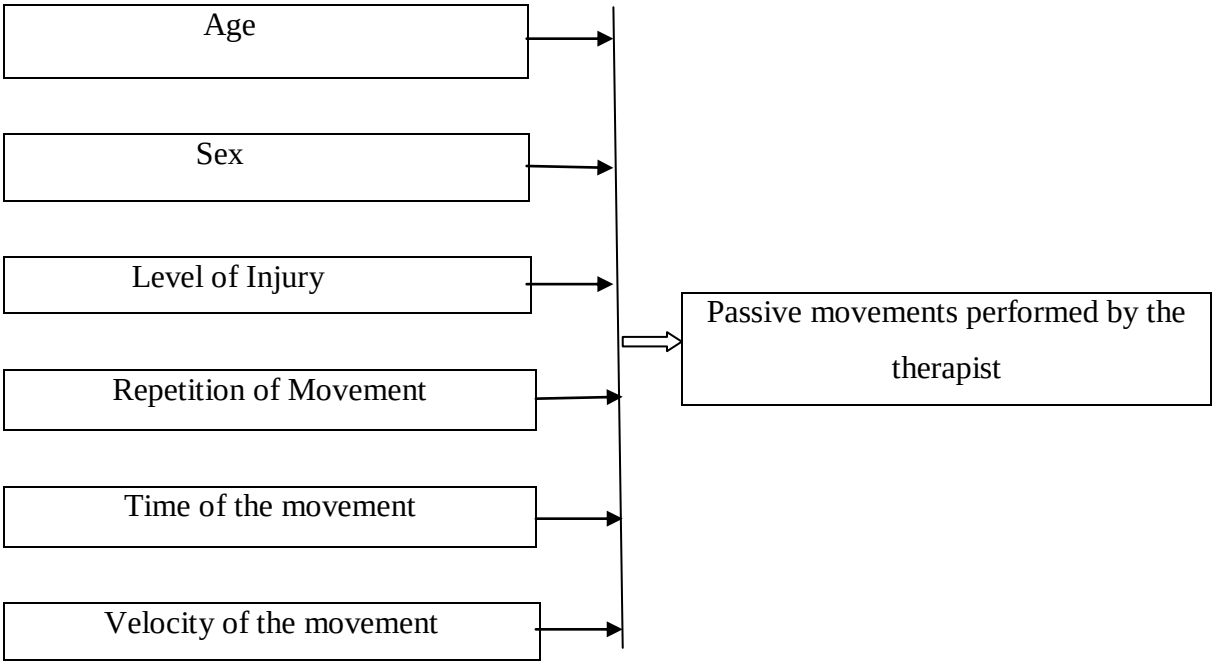

Table-1: List of variables

1.7 Operational definitions

Spinal cord injury

A spinal cord injury (SCI) is damage to the spinal cord that causes changes in its function, either temporary or permanent. These changes translate into loss of muscle function, sensation, or autonomic function in parts of the body served by the spinal cord below the level of the lesion.

Tetraplegia

This term refers to impairment or loss of motor and/or sensory function in the cervical segments of the spinal cord due to damage of neural elements within the spinal canal. Tetraplegia results in impairment of function in the arms as well as typically in the trunk, legs and pelvic organs, i.e., including the four extremities. It does not include brachial plexus lesions or injury to peripheral nerves outside the neural canal.

Paraplegia

This term refers to impairment or loss of motor and/or sensory function in the thoracic, lumbar or sacral (but not cervical) segments of the spinal cord, secondary to damage of neural elements within the spinal canal. With paraplegia, arm functioning is spared but the trunk, legs and pelvic organs may be involved depending on the level of injury. The term is used in referring to cauda equina and conus medullaris injuries, but not to lumbosacral plexus lesions or injury to peripheral nerves outside the neural canal.

Passive Range of motion

The moving of a joint through its range of motion without exertion by the subject, usually done by an examiner who moves the person's body part manually.

Time of movement

How many seconds take a therapist in performance in individually per every joint in every movement is known as time of the movements.

Repetition

How many times a joint moves while performing passive movements which performed by the therapist in every joint is known as the repetition of the movement.

Velocity

How many seconds a therapist take in performing one repetition in individual joint motions in only one direction such as (Elbow flexion) is known as velocity.

It is also can define easily as a speed of the movement.

Physiotherapy

Physical therapy (PT), mostly known as Physiotherapy, is a primary care specialty in western medicine that, by using mechanical force and movements [Bio-mechanics or Kinesiology], Manual therapy, exercise therapy, electrotherapy and various physical therapies who practice evidence based treatments, remediates impairments and promotes mobility, function, and quality of life through examination, diagnosis, prognosis, and physical intervention. It is performed by physical therapists (known as physiotherapists in many countries).

Occupational therapy

Occupational therapy (OT) is the use of assessment and intervention to develop, recover, or maintain the meaningful activities, or occupations, of individuals, groups, or communities. It is an allied health profession performed by occupational therapists**.**

CHAPTER: II LITERATURE REVIEW

Spinal Cord injury may be traumatic or non-traumatic but occurs must be sudden founded by (Fyffe et al., 2014) devastating and debilitating founded by (Sridharan et al., 2015) neurological condition addressed throughout the history founded by (Rathore, 2013).

The spinal cord is divided into the neurological segmental levels that correspond to the nerve roots that exit the spinal column among each of the individual vertebrae. There are 31 pairs of spinal nerve roots named by 8 cervical, 12 thoracic, 5 lumbar, 5 sacral and 1 coccygeal. The neural elements in the spinal canal that are spinal cord and cauda equina damage which can arise resolving or permanent neurological deficit founded by (New & Marshall, 2013). Owing to the difference in length between the spinal column and the spinal cord, the neurological levels do not crying need correspond to the vertebral segments founded by (World Health Organization and International Spinal Cord Society, 2013). The spinal cord begins as a continuation of the medulla oblongata; the caudal part of the brainstem founded by (Moore and Dalley, 2006). Spinal cord injury (SCI) is an insult to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function founded by (ISNCSC, 2000).

According the American Spinal Injury Association (ASIA) impairment scale, the classification of SCI severity is –A (complete): no motor or sensory function is preserved in the sacral segments S4-S5. B (incomplete): sensory but no motor function is preserved bellow the neurological level and includes the sacral segment S4 -S5. C (incomplete): Motor function is preserved below the neurological level, and more than a half of key muscles below the neurological level have a muscle grade of <3. D (incomplete): Motor function is preserved below the neurological level, and at least a half of key muscles below the neurological level have a muscle grade of ≥3. E (normal): Motor and sensory functions are normal. C4 injury- tetraplegia, C6 injury- tetraplegia, T6 injury- paraplegia, L1 injury- paraplegia founded by (Thuret et al., 2006).

The incidence of spinal cord injury is increasing with time with an annual rate of 15-40 cases per million so it is devastating rate stressed by (Singh et al., 2014). It is happened in the most low income countries that the patients or people who sustain a SCI are

discharged home with little access to support services. However, survival rates in low and middle income countries remain poor as low as 1 to 2 years after injury in some settings and this contributes to lower prevalence. In a Netherlands study, more than half of respondents with SCI were delayed leaving in-patient rehabilitation due to delays in obtaining wheelchairs. One Nigerian study, for instance, showed that for more than 40% of respondents with SCI, acute treatment costs represented over 50% of their annual income founded by (Kawu et al., 2011). It should or must be occur, so not to surprise, that they fall into another risk such as, they often then develop life threatening complications. The condition caries out not only to varying degrees of physical disabilities including paralysis, sensory deficit, dysfunction of bowel and bladder founded by (Sridharan et al., 2015) but also to various crippling complications such as pressure sore, autonomic dysreflexia, deep vein thrombosis, spasticity, sexual dysfunction and pneumonia founded by (Grivna et al., 2015). Many of them die within a few years of discharge founded by (Gosselin & Coppotelli, 2005).

Spinal cord injury usually result from an accident that damage the central nerve cord in the neck or back, when the cord is damaged, feeling & movement in the body below the level of injury are lost or reduced founded by (David, 2006). Traumatic SCI can result from several different reasons such as road traffic crashes, falls, violence, while undertaking different activities, e.g. at work, during sport or while at home. Prevention strategies tend to relate to the specific setting where there is increased risk of an injury occurring. This section discusses traumatic SCI prevention by caused founded by (Godlwana et al., 2008).

Preventable non-traumatic causes of spinal cord dysfunction include

1. Communicable diseases − tuberculosis (TB) and human immunodeficiency virus (HIV).
2. Non communicable conditions – cancer, degenerative diseases such as osteoarthritis what leading to spinal stenosis and cardiovascular disease.
3. Nutritional deficiencies – neural tube defects, vitamin B12 deficiency.

(Johnson et al., 2001).

Nwankwo & Uche (2013) founded 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 United States the annual incidence of traumatic SCI is 40 cases per million or 1200 new cases each year founded by (Rabadi et al., 2013). 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) founded by (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 founded by (Wyndaele & Wyndaele, 2006). And 2.5 million people live with SCI around the world founded by (Oyinbo, 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 founded by (Ning et al., 2012).

Worldwide, approximately 90 million people currently suffering from Spinal cord injury and the prevalence in developed countries varies from one to five persons per 100,000 said by (Holtz & Levi, 2006). In the Nordic countries the incidence of traumatic SCI is about 11-16 cases per million inhabitants in twelve months founded by (Biering & Sorensen, 2002), and prevalence rates of 223-755 per million inhabitants have been estimated in studies from Australia, Finland, Sweden, and USA reported by (Dahlberg et al., 2005).

The number of people in the USA who are alive in 2016 who have SCI has been estimated to be approximately 282,000 persons, with a range from 243,000 to 347,000 persons. Regional data are available from North America (40 per million), Western Europe (16 per million) and Australia (15 per million). Extrapolated regional data are available for Asia-Central (25 per million), Asia-South (21 per million), Caribbean (19 per million), Latin America, Andean (19 per million), Latin America, Central (24 per million), Latin America-Southern (25 per million), Sub Saharan Africa-Central (29 per million), Sub Saharan Africa-East (21 per million). In every year, about 40 million people worldwide suffer from SCI founded by (Lee et al., 2001).

Most of them are young men, typically aged from 20 to 35, although 1% of this population is children founded by (Yip & Malaspina, 2012). Boys are more likely to experience spinal trauma than girls founded by (Mahan et al., 2009). In children, motor vehicle accidents are the most common mechanism of injury. Sports-related injuries are responsible for the largest number of spinal injuries after children begin school and start participating in organized sports. Among all sports, football causes the greatest number of injuries founded by (Cantu et al., 2013).

Sixty to eighty percent of spinal injuries in children occur in the cervical region. The remaining 20%-40% are evenly split between the thoracic and lumbar region. Based on the 2012 world population estimates, this means that every year between 250 000 and 500 000 people suffer a spinal cord injury founded by (Gerland et al., 2014). For countries where data are available, The World Health Organization 2013 study said that TSCI prevalence figures range from 280 per million population in Finland to 681 per founded by (Noonan et al., 2012). The World Health Organization 2013 study said that 367 million in Australia to 1298 per million in Canada founded by (WHO, 2013). The World Health Organization 2013 study said that NTSCI prevalence for adults and children in Australia is 367 per million and in Canada 1227 per million founded by (Middleton et al., 2012).

There is a trend towards increasing prevalence of SCI in high-income countries due to increases in survival rates, which have reached approximately 70% of general population life expectancy for tetraplegics and 88% for people with complete paraplegia founded by (Middleton et al., 2012).

In Sweden, near about 120 individuals suffer from traumatic spinal cord injury in twelve months, resulting in prevalence of 500 persons founded by (Holtz & Levi, 2006). The age adjusted incidence rate for SCI is calculated to be 14.5 per million of population in Australia founded by (O'Connor, 2000).

In US, the National Spinal Cord Injury Statistical Center (NSCISC) reported that motor vehicle crashes account for (42%) of reported SCI cases. The next most common cause of SCI is falls (27.1%), followed by acts of violence (primarily gunshot wounds) (15.3%), and recreational sporting activities (7.4%). In Pakistan falling down (FD) account for

(57.85%) of TSCI, followed by RTA (25.2%), and gunshot (8.4%) founded by (Rathore, 2008). In Arabia Saudi the most common causes of TSCI are RTA (80%), fall (9.4%) and gunshot (6.4%) founded by (Jadid, 2004). Traumatic spinal cord injury is caused by direct or indirect trauma. In developing countries, there are three main causes that patient is admitted into hospital. Those are fall from height, transportation accident and being struck by an object. Study says that 561 traumatic spinal cord injury whose injuries occurred between 2001 and 2010. The annual incidence in Beijing is 60.6 per million which is more than other countries and regions. TSCI patient may suffer from different conditions such as spasticity, sensory changes, exaggerated reflex activities which is depending on the different level of lesion founded by (Carlson and Gorden, 2002).

In general the most common causes of TSCI around the world are RTA and FD and incidence of the most common causes followed local factors in each area around the world. This study shows that 75% patient were traumatic causes. There were three main causes of injury. Falling from height was the most traumatic cause of spinal cord injury in Bangladesh 43% result from a fall from height such as a tree. Second one is a carrying a heavy load on the head. 20% were associated with falling while caring heavy load. 20% were associated with falling while caring heavy load on the head. RTA are less common in Bangladesh than carrying heavy load in the head, 18% were result of a RTA. Other causes are 6% formed a very diverse group which assault, stab injury, sport injury and bull attack founded by (Sipski & Richards, 2006).

The most common causes of SCI in the world are traffic accidents, gunshot injuries, knife injuries, and fall and sports injuries. Diving was reported to be the most common sport injury. Injury is usually caused by flexion, compression, hyperextension or flexion-rotation mechanisms. This is called “primary damage’’ that occurs as a result of these mechanisms. The responses of the body in order to overcome the primary damage, such as hemorrhage, inflammation and the release of various chemicals, are described as secondary damage found by (Sipski & Richards, 2006). The most common form of spinal cord injury in the neck is the posterior ligament rupture and dislocation that causes severe neurological pathologies, especially as it is related to damage and ischemia of the gray part in the cord. Ischemia occurs due to direct injury of the circulatory system or

neurogenic shock caused by vasospasm. Results of the SCI vary according to the size and localization of the injury stated by (Barbin & Ninot, 2008). Traffic accidents and falls from a height were the most common causes of SCI. Diving were also a common cause, especially in younger patients. Two patients were stabbed, and one had a shotgun injury. Gymnastics and wrestling were the causes of sport injuries in 9.7% patients. It is of interest that 20.3% of males and 9.3% of females were found to be under the influence of alcohol at the time of their injury. The majority of the persons with SCI (70-80%) are men, but women have increased their proportion during the last years founded by (Biering Sorensen et al., 2002) and according to the (NSCID, 2005), since 2000, 79.6 % of the cases are male, with a slight trend toward a decreasing percentage of males, with 81.1% of new injuries among males prior to 1980. The educational levels of individuals with SCI tend to be lower than those of the general population, and most people with SCI have never been married at time of injury (51.8%), with the reduced likelihood of getting married after injury (NSCID, 2005). SCI chiefly affects young people between the ages of 16 and 30. They account for 55% of all SCI, with 80-82% of cases occurring in males. It was reported that, the mean age at injury has risen during the last years, to be 38-39 years reported by (Alaranta et al., 2000). In detected that the mean age at injury is 33 years, Holtz and Levi (2006) reported that the median age is approximately 30years, and male to female ratio is 4:1. Which is clearly higher than that for persons with traumatic SCI, and the male/female ratio was 1.2:1 founded by (Catz et al., 2004).

The worldwide annual incidence of TSCI has been reported to be 15 to 40 cases per million individuals. Daily US accidents result annually in over 20,000 cases of TSCI associated with complete and permanent paraplegias and quadriplegias described by (Zeyada, 2009). In Qatar, it is estimated that the annual incidence of TSCI is 1.25 cases per 100,000 populations per year founded by (Quinones, 2002). A person can experience by spinal cord injury which is most common among the catastrophic injuries. Young adult people are more suffering lifelong disability than other ages. Fifty four percent of spinal cord injuries occur in ages between 16 and 30 years, 75% of injuries occur in those < 45 years old founded by (Winslow and Rozovsky 2003). Generally spinal cord injury is male's disease. Younger men are more affected in complete injuries than older adults and

women. In a study, there are many causes of SCI since 2010 vehicular (36.5%), falls (28.5%), violence (14.3%), sports (9.2%) and other causes (11.4%). The affected rate is 80.7%. The average age of this injury is 46 years since 2010 founded by (Carlson and Gorden, 2002).

When the spinal cord is damaged the nerves above the level of the injury continue to work, however, below the level of the injury communication is disrupted which can result in loss of movement, sensation (feeling), bowel and bladder control. The injury may also impact on the person's breathing, sexual function and ability to control body temperature studied by (Zeyda, 2009).

According to their level of injury, people with SCI often have significant functional limitations and lack of independence founded by (Notara et al., 2012).

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 founded by (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 founded by (New et al., 2013). The most common and important complication is the development of joint contractures and stiffness during this period. At least one joint contracture (43% shoulder, 33% elbow, 41% forearm and wrist, 32% hip, 11% knee, 40% foot and ankle) has been reported in about 66% of patients within 1 year founded by (Gerland et al., 2014).

If the patient is paraplegic or tetraplegic, intensive passive ROM exercises must maintain the lower extremities to be compatible with the level of the injury. ROM exercises prevent contractures and maintain functional capacity. These exercises should be done in a flaccid period at least once a day and at least 2-3 times a day in the presence of spasticity. Damage level, awareness and cooperation with the state determine the places that must be protected by passive EHA. Shoulder ROM exercises are important to prevent pain in all levels of damage. Passive ROM exercises should be done for both upper extremities in C1-C4 level tetraplegia. In injuries of C5 and C6 levels, ROM

exercises should be done to prevent the development of contractures, especially contractures of elbow flexion and supination founded by (Diong, 2012). Contracture is a common problem as a secondary complication of spinal cord injury. At least two cohort studies have followed representation samples of people of spinal cord injury over one year period in an attempt to quantify the extension of the problem. One study indicated that 66% of people who sustain a SCI will have at least one notable contracture within a year of the injury founded by (Diong et al., 2012).

Negative changes occur in the patient's perception of health due to complications resulting from SCI. Pressure ulcers, spasticity, contractures, bladder and bowel problems especially cause delay of integration with society and psychosocial distress for patients. SCI patients are hospitalized for a long period of time and experience a variety of limitations in daily living activities due to these complications. Low self-esteem can also occur as a result of the decrease in sexual dysfunction, negatively affecting the patient's body image founded by (Yuen & Hanson, 2002).

Patients with SCIs typically experience muscle spasticity as spinal shock recedes and reflexes return. Spasticity may take a flexor or extensor pattern or a combination. Spasticity can reduce venous pooling and stabilize the thoracic and abdominal muscles used in respiration. It's also associated with chronic pain syndrome, sleep disturbance, fatigue, joint contracture, bone density loss, heterotopic ossification (presence of bone in soft tissue where it normally doesn't occur), and skin breakdown. Non pharmacologic strategies to manage spasticity include range of motion exercises, positioning techniques, weight-bearing exercises, electrical stimulation, and orthoses or splinting to prevent loss of muscle length and contractures founded by (Bauman & Russo-McCourt, 2008).

During the growth period, diabetes and metabolic diseases are potentially serious diseases in patients who have suffered spinal cord injury in childhood. Spasticity, insulin resistance, dyslipidemia, reduced glucose transfer and obesity are common childhood complications. Passive, active-assisted, active and resistive exercises, cycling and water exercises have to be compatible with the level of SCI and the complications. These exercises will reduce muscle atrophy, decubitus ulcers, inactivity, obesity and bone

fractures founded by (Chen et al., 2005). The aim of rehabilitation in this period is to prevent complications that may occur long term. Passive exercises should be done intensively to resolve contractures, muscle atrophy and pain during the acute period of hospitalization in patients with complete injury. Positioning of the joints is important in order to protect the articular structure and maintain the optimal muscle tonus. Sand bags and pillows can be useful in positioning. If the pillows and sandbags are not able to provide positioning, it can be achieved with plaster splints or more rigid orthotics. Ankle foot orthosis, knee-ankle foot orthosis or static ankle foot orthosis, etc. are mainly used for this purpose founded by (Chi, 2009).

The World Health Organization 2009 stressed that the tertiary prevention focuses on rehabilitation post SCI and environmental interventions to reduce complications and promote successful inclusion of the injured person in family and community life said by SCI rehabilitation is a multi-disciplinary process and treatment responsibilities may be shared among the treating disciplines. For example, OTs shares some common treatment areas with physical therapists (PTs). The SCI Rehabilitation OT and PT taxonomies were developed so that shared activities were defined and described in a manner to be complementary while allowing each discipline to focus on and describe work done in relation to discipline-specific goals. Activities where OT and PT may overlap include equipment evaluation, bed mobility, wheelchair skills training, transfers, and therapeutic exercises of strengthening, endurance, ROM/stretching, and balance. Examining treatment time involving only OTs in these areas may not provide a complete picture of total care provided. For example, OTs spent a mean of 16 minutes per week providing transfer training, but when you combine this OT time with the time physical therapists spent providing similar transfer training, the total time patients spent practicing transfers was 72 minutes per week. Power wheelchair mobility training can be within the realm of PT only, OT only, or a combination of the two disciplines. Time was divided fairly evenly; OTs spent 9 minutes per week and PT spent 10 minutes per week on power wheelchair mobility training founded by (Schroeder et al., 2011). Variations in physical activity from day to day present a challenge for reliable assessment founded by (Baranowski et al., 2000) and there are multiple options for assessing physical activity, each with strengths and weaknesses. Some are infrastructure and resource intensive, such

as direct observation founded by (Warms et al., 2006) precluding their viability as convenient options for measurement over an entire inpatient day, though direct observation has been used to observe small portions of the day during physical therapy and occupational therapy during inpatient rehabilitation founded by (Zbogar et al., 2011).

Physical therapists strive to shorten recovery time and enhance the healing process following athletic injuries. They recognize the importance of instituting joint motion as soon as possible, within the safe limits of tissue healing. Several studies have reported potential advantages of initiating early motion, including allowing early controlled forces to act on collagen tissues, maintaining articular cartilage nutrition, decreasing the effects of disuse, and retarding capsular contractures and joint stiffness founded by (McCarthy et al., 1981).

Occupational therapy and finding the patient's role in society are most important factors in restoring the psychological state. Social and psychological problems in the absence of daily activities have been reported. Suicide attempts have been reported due to a lack of daily activity, depression, alcohol dependence and emotional distress. Occupational therapy allows SCI patients to be more social, to use their own functions for creative jobs and to deal with psychological problems like depression founded by (Loy et al., 2003). Occupational therapy is an important part of the rehabilitation process. In developed countries, occupational therapy is carried out by the occupational therapist in the rehabilitation team. Occupational therapists assess the patient's limitations and plan the occupational activities. Occupational therapy is planned and implemented depending on the social and cultural characteristics of individuals, level of education, personality traits, interests, values, attitudes and behaviors before and after the injury. Pictures, music, crafts, ceramic work and a variety of activities (for example, sports) and entertainment are implemented and planned to focus on the purpose in the occupational treatment founded by (Youngstrom, 2002).

CHAPTER: III METHODOLOGY

3.1 Study design

The study were conducted through a cross sectional design to find out passive range of motion of major joints of upper and lower limb of tetra-plegic and paraplegic patients and the study the passive movements as a treatment which was performed by therapist with in order to maintain and increase joint range of motion. Survey research was one of the most common forms of research that involves the researchers asking a large group of people questions about a particular topic or issue and these were related to the interest of the participants.

3.2 Study area

The researcher is a fourth year B.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) in session 2012-2013 and the research is a part of the course curriculum. For this reason the researcher has to be collecting data with in short time to maintain the contrasts. Data will collect from the spinal cord injury unit, department of physiotherapy of Centre for the Rehabilitation of the Paralyzed (CRP), saver, Dhaka-1343, which is the largest and best specialist rehabilitation Centre for the SCI patients in Bangladesh.

3.3 Study population

The study populations were spinal cord injury incomplete and complete patients with tetra-plegia and paraplegic both who were admitted at CRP.

3.4 Sample size

The number of items to be selected from the population was the sample size. Sample a group of subjects were selected from population, who were used in a piece of research (Hicks, 1999).

The equation of sample size for my dissertation calculation is given below:

$$n = \frac{NZ^2p(1-p)}{d^2(N-1)+z^2(1-p)}$$

=47

Here...

n = sample.

Z = 1.96 {95% confidential interval}

P= 0.78 (P= prevalence and P= 51%). The patients had normal range of motion in 78 per cent of joint motions founded by (Yarkony, 1985)

N= population =75

d= 0.05 {margin of error at 5%}

According to formula of sample size calculation for a cross sectional study, it would have required total 45 subjects and the researcher could manage the 45 subjects as to fulfill the requirement.

3.5 Sampling procedure

Searching an appropriate number and kind of people who are a part of this study is called "Sampling" (Hicks, 1999). Samples would be selected conveniently from SCI unit of CRP. Sampling was an important concept in research. Basically it was a procedure to how to choose the people who will study or who would participate in research. Samples that were studied most easily, cheaply or quickly, selected for the study by using convenience sampling procedure. Samples were selected from Centre for the Rehabilitation of the paralyzed (CRP) at Saver, Dhaka by using inform consent. There were 75 patients, from that population it was selected 45 samples, according to the inclusion and exclusion criteria.

3.6 Inclusion criteria

1. Spinal cord injury patients should be admitted into CRP.
2. Paraplegic and tetra-pelagic both.
3. Men and women both are present in my population. (As there was no chance of discrimination of gender)
4. Willingly participated patients.
5. Which patients must took physiotherapy and occupational therapy they were the participants.
6. Ongoing rehabilitation patients were taken.
7. Participants with all age group took part in the study.
8. Which patient took physiotherapy by a same physiotherapist for quite long time and also took occupational therapy by a same occupational therapist for a long time.

3.7 Exclusion criteria

1. Isolated patient who were admitted in word number four.
2. Patient with permanent contracture.
3. Patients who were medically unstable.
4. Participants who had speaking and hearing problem.
5. Subject who had mental disorders.
6. Subjects who are unwillingness to participate.
7. Acute stage patient.

3.8 Data collection tools

The researcher organized the materials to successfully complete the interview session. Data would collected by using a structural mixed type questionnaire paper set by conducting to interview to collect information. The questionnaire sought information on identification socio-demographic information and passive range of motion related questions such as some observational data. Like do you get physiotherapy and occupational therapy booths? Does the same therapist give you individual physiotherapy

and occupational therapy? The organized material was a written questionnaire, pen, paper, Goniometer, laptop would be used for the collection of data in this study.

3.8. a. Questionnaire

The questionnaire is developing under the advice and permission of the supervisor following certain guidelines. Data was collected by using a questionnaire on paper and the questions types were open and closed ended questions. These questions were used to collect nominal and ordinal data for research findings and were setup sequentially.

3.8. b. Goniometer

In this study researcher used goniometer for measuring the range of motion passively. The goiniometer was a simple and accurate way of objective assessment of a range of motion of individual.

3.9 Data collection procedure

There will a questionnaire for acquiring the participant's socio-demographic information including age, sex, education, religion, occupation, family income, disease condition related information. Not only that's but also checks the range of motion by using GONIOMETER. To know about the passive range of motion exercises time, repetition and velocity of individual large joint. And try to know the skeletal level, neurological level of an individual.

3.10 Data collectors

One data collector (student) would to take from 3rd year B.SC physiotherapy academy for measuring the range of motion of an individual. Give some training about measurement of range of motion by using GONIOMETER to the student. There are two way to realistic to the result.

1. **Intra-rater reliability:** The collector measures the range of motion for one joint three times at once. Then calculate the mean. Was there looking any fault then it should not be reliable. Is there showing no far differences between mean and individual values then it should be recorded.

3.11 Data Analysis

Data was analyzed in Microsoft Excel 2010 using a SPSS 20 version software program. All the data entered into the computer with specific coding and then analyzed using Statistical Package for the social sciences (SPSS) 20 version. The results were presented with the use of percentage (%). The collected data presented with tables, column and pie chart etc. Data was also analyzed by calculating the mean range of motion, repetition per movements and also the duration of time of an individual physiotherapist and occupational therapist intervention for large six joints of the body such as shoulder flexion, shoulder extension, hip flexion and hip extension etc. Then from the results of the repetitions and duration of time researcher find out the velocity of the joints movement.

3.11. a. Velocity measurements

From this calculation,

$$V = {Repitition}/{Time}$$

Here,

V= velocity

R= repetition

T= duration of time

For example

V=?

R= 10 times

T= 55 second

$$V = {Repitition}/{Time}$$

$$V = {10}/{55}$$

V= .182 time per second.

Means the therapist took (v=.182) velocity to perform a joint movement per repetitions.

3.11. b. Mean range of motion

There were given some mean results of passive range of motion which was performed by the therapist.

FORMULA,

$$X=\frac{x1+x2+\cdots+xn}{n}$$

For an example,

$$X=\frac{180^{\circ}+180^{\circ}+\cdots+178^{\circ}}{45}$$

$$=178.4^{\circ}$$

Here, x1=1st patient SH Flx ROM=180 ˚

x2= 2nd patient SH Flx ROM=180 ˚

xn= last patient SH Flx ROM= 178 ˚

n= sample size

Mean for right shoulder ROM

Joint movement	Right side	Left side
Flexion	178.44°	178.44°
Extension	59.78°	59.67°
Adduction	45°	44.89°
Abduction	179°	178.78°
Medial rotation	44.78°	44.78°
Lateral rotation	39.89°	39.67°

3.11. c. Mean velocity measurement

Here calculated the mean of the movement velocities which was performed by the therapist.

FORMULA,

$$X=\frac{x1+x2+\cdots+xn}{n}$$

For an example

$$X=\frac{.213+.333+\cdots+.456}{45}$$

$$=.285$$

Here, x1=1st patient Hip Flx velocity= .213

x2= 2nd patient Hip Flx velocity = .333

xn= last Hip Flx velocity = .456

n= sample size

Mean for right hip joint velocity

Right hip	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.285 sec	.273 sec
Adduction	.297 sec	.325 sec
Abduction	.294 sec	.312 sec
Medial rotation	.347 sec	.358 sec
Lateral rotation	.347 sec	.357 sec

3.11. d. Mean differences between two velocities

Mean differences between the physiotherapist movement's velocity and the occupational therapist movement velocities one by one joint functions such as shoulder flexion, extension.

FORMULA,

For an example

In right shoulder flexion physiotherapist took = .166 v

In right shoulder flexion occupational therapist took = .229 v

---

So occupational therapist took more = 0.063 v

FOR RIGHT SHOULDER

Right Shoulder	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.166 sec	.229 sec
Extension	.178 sec	.240 sec
Adduction	.224 sec	.261 sec
Abduction	.215 sec	.260 sec
Medial rotation	.303 sec	.387 sec
Lateral rotation	.296 sec	.383 sec

3.12 Ethical consideration

The research proposal was submitted to Institute Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) for oral presentation and defense was done in front of the IRB. Then IRB was approved the proposal. A research proposal was submitted to the physiotherapy department of BHPI for approval and the proposal was approved by the faculty members. For data collection purposes, it was also taken official permission for the study from the head of the Physiotherapy Department of CRP. Then the head of the Physiotherapy Department of CRP permitted to collect data. Data collection was started and completed within the allocate time frame. All information was kept in secure. World Health Organization (WHO) and Bangladesh Medical and Research Council (BMRC) rules were followed to conduct the study.

3.13 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 participants including signature or finger trip (who were not able to give signature). So the participant assured that they could understand about the consent form and their participation were voluntary basis. The researcher was obtained consent to participate from every subject. A signed informed consent form was received from each participant. The participants are informing that they have the right to meet with outdoor doctor if they think that the treatment is not enough to control the condition or if the condition become worsens. The participants are also inform that they are completely free to decline answering any question during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study would not affect their treatment in the hospital authorities and they would still get the same facilities.

3.14 Rigor

During the data collection and data analysis the author was always tried not to influence the process by his own perspectives, values and biases. No leading questions were asked and judgments were avoided. When conduct the study the researcher was taken help from the supervisor when needed. The other researchers could use the results in their related area.

CHAPTER: IV RESULTS

0.1 Socio demographic Information

Age group

Among the 45 participants, there were 13.33% (n=6) participants were in the age group between the range of 11-20 years. there were also 11.11% (n=5) participants were in the age group between the range of 21-30 years, there were also 42.22% (n=19) participants were in the age group between the range of 31-40 years, there were also 26.67% (12) participants were in the age group between the range of 41-50 years and lastly there were 6.67% (n=3) who were more than 50 years old and had injured in spinal cord.

Age of the participants

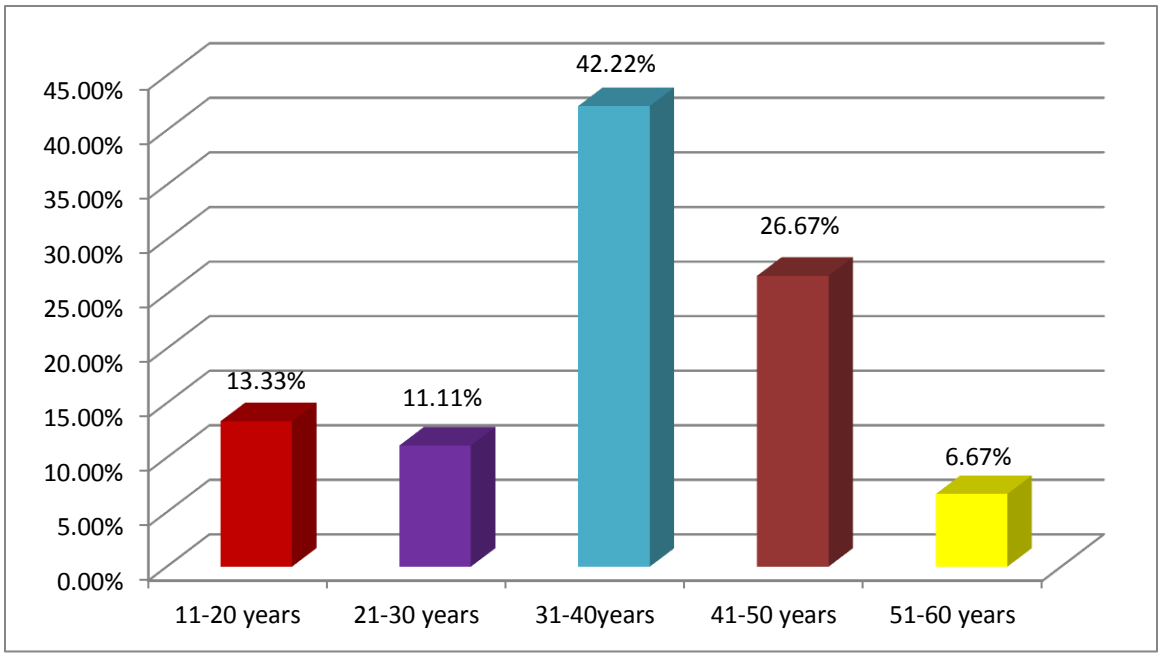

Figure: 01- Age of the participants.

Sex group

Gender Distribution of the Participants

In this study 45 Patients with SCI were included as sample, among them 31.90% (n=13) were Female and 68.10% (n=32) were Male.

Sex of the participants

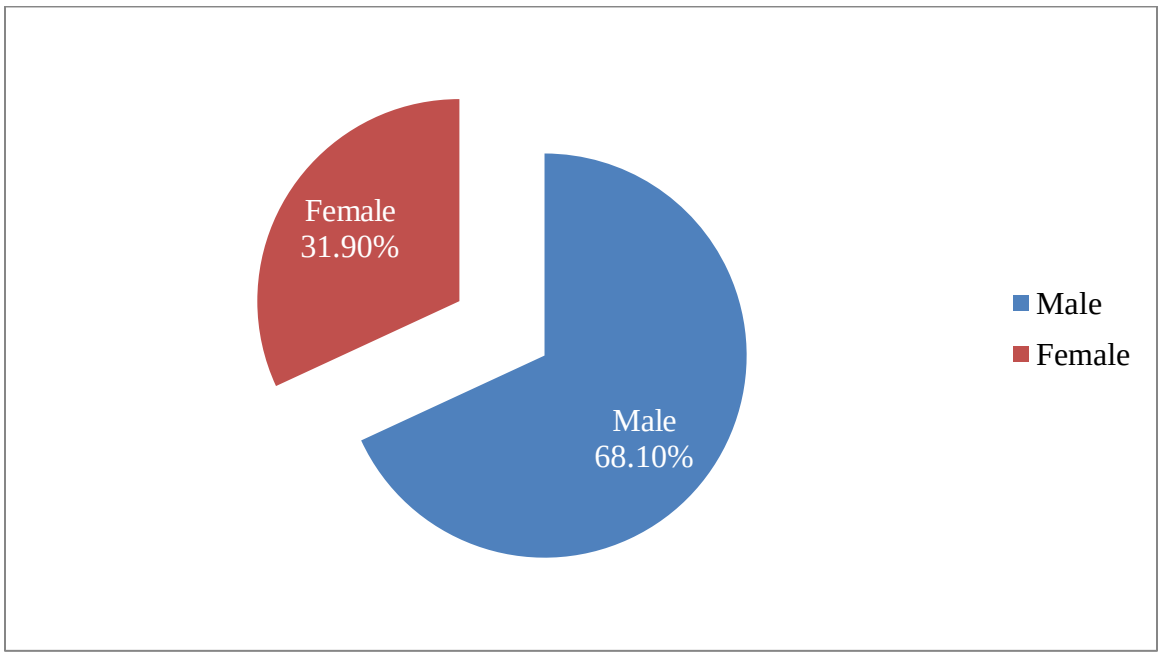

Figure: 02- Sex of the participants.

Marital status

Analysis shows that, here married peoples were more than other. Married were 57.4% (n= 27), unmarried were 25.5% (n=12), widow were 8.5% (n=4), the number of divorced were 4.3% (n=2).

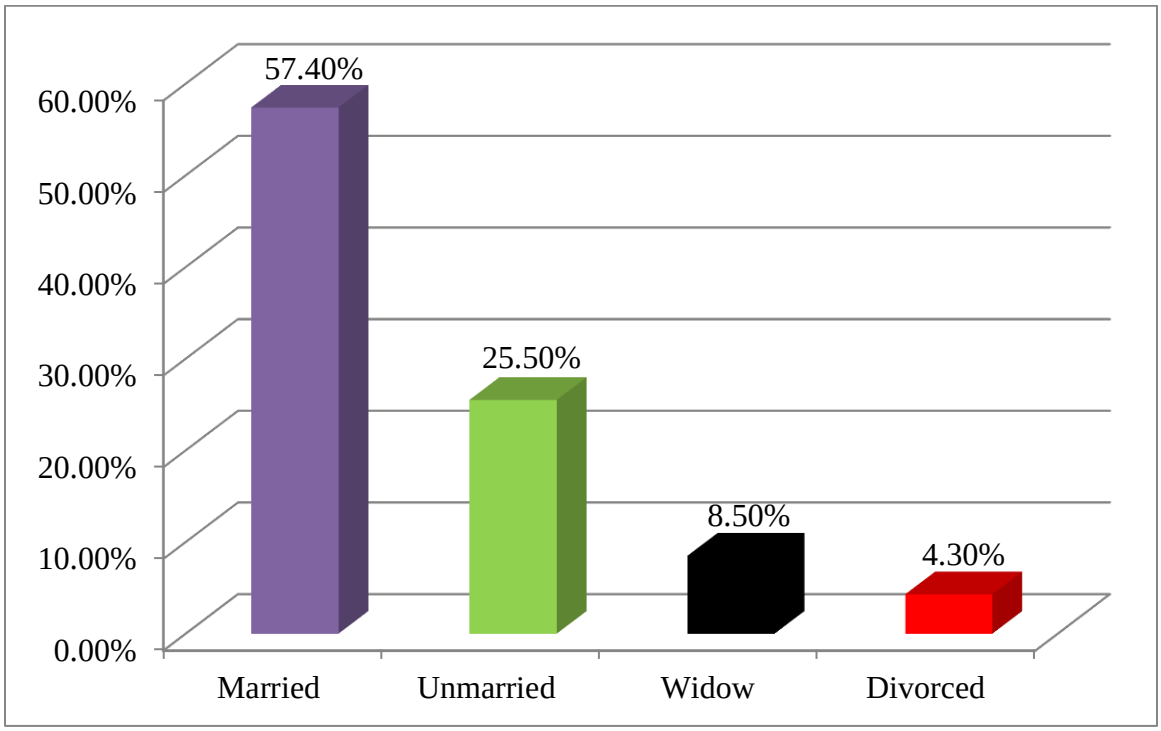

Figure: 03- Marital status of the participants.

Religion of the participants

Here the number of Muslims was more than other religion. Muslims were 93.33% (n=42), Hindus were 6.66% (n=3).

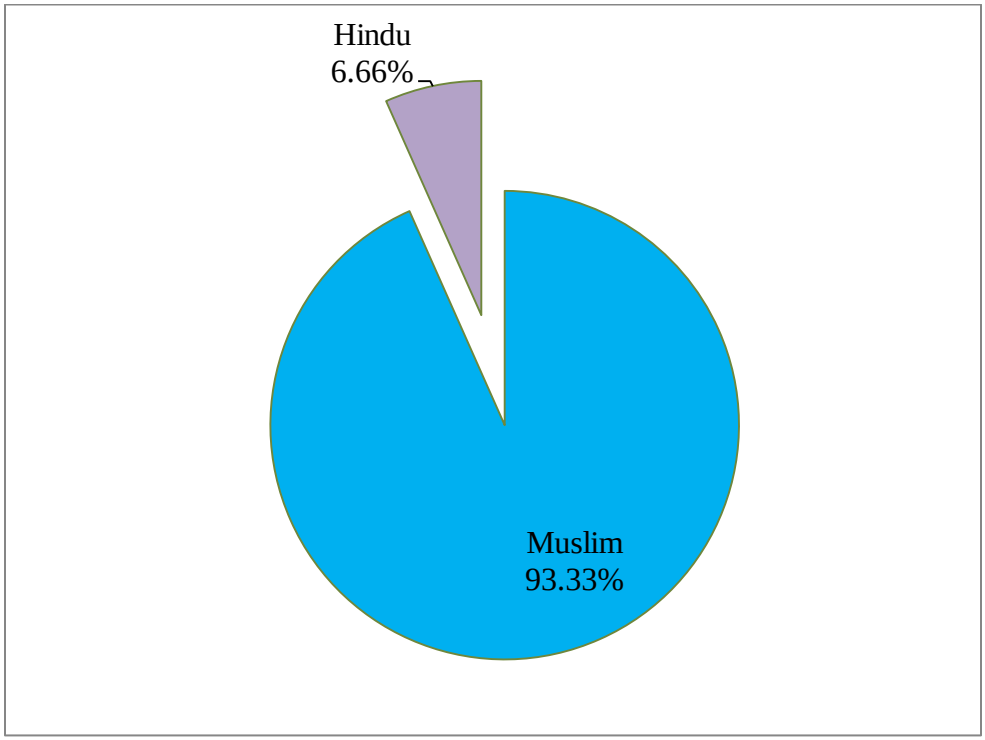

Figure: 04- Religion of the participants

Income of the family of the participants

More of the participants were really poor that's why their family income was so tiny. Fifteen participants family income was less than 5000 taka. The percentage was 40% (n=18). Nineteen participants family income was between 5000-20000 taka. The percentage was 42.2% (n=19). Rest of the participants was earned more than 20000 taka. Rest of the percentage was 17.78% (n=8).

Family income of the participants

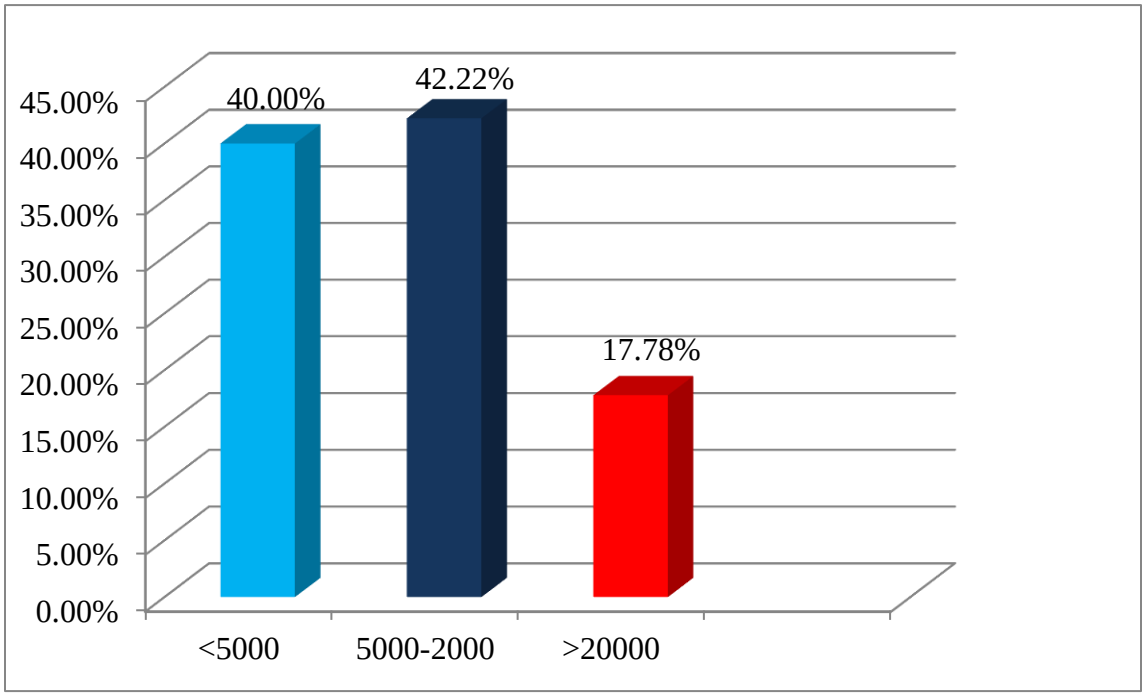

Figure: 05- Family income of the participants

Educational status

Analysis shows that here illiterate participants were more. The illiterate participants were 55.3% (n=26). Primary complete participants were 21.3% (n=10). S.S.C complete participants were 6.4% (n=3). H.S.C complete participants were 6.4% (n=3). Graduation complete participants were 6.4% (n=3).

Educational status of the participants

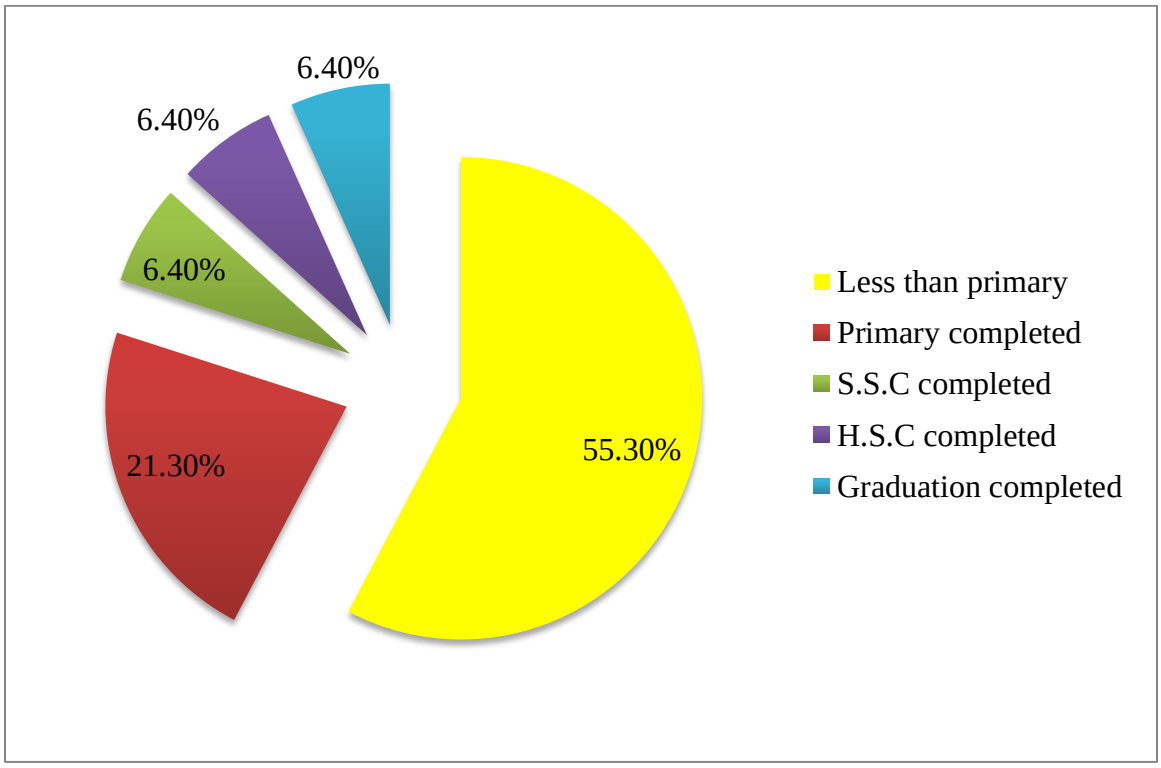

Figure: 06- Educational status

Residential Area

Analysis shows that here more of the participants were lived in rural area. The number of the participants who lived in rural area was 66% (n=31). The urban area was in second position in count of 21.3% (n=10). The rest of the participants were lived in semi urban area 8.5% (n=4).

Living area of the participants

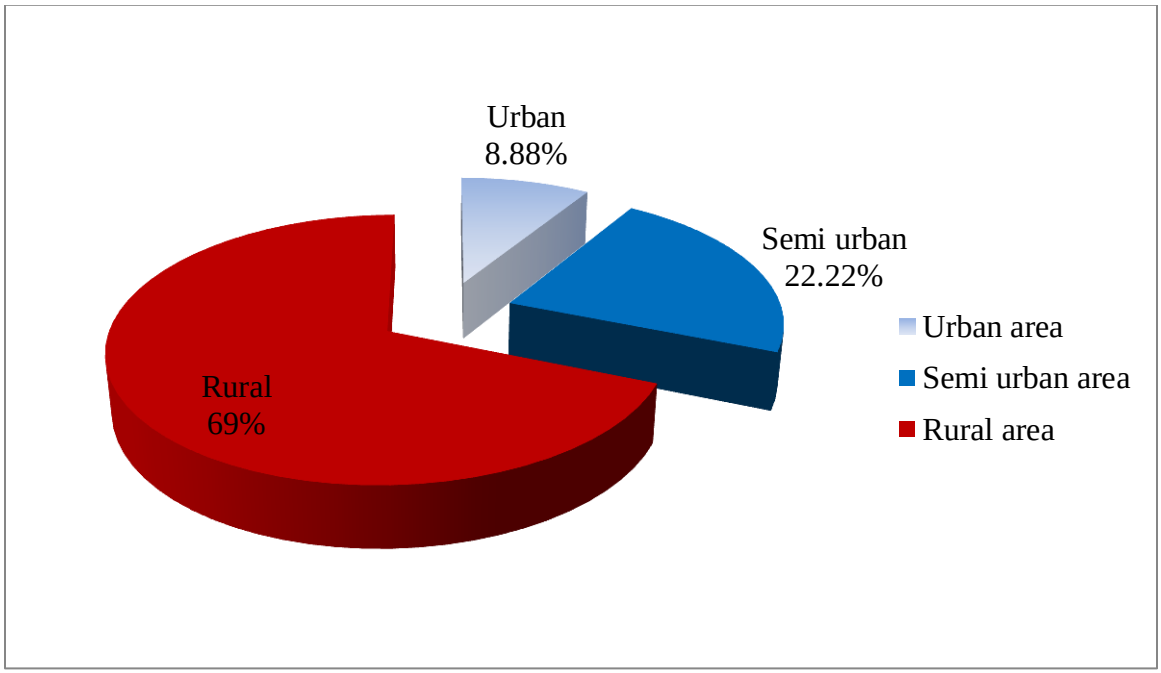

Figure: 07- Place of the living area

Occupational background

Analysis shows that here the number of housewives are more than other profession. Here 19.1% (n=9) are service holder, 8.5% (n=4) are day labor. The percentage of business man is 17% (n=8). The most percentage is going on home worker 23.4% (n=11). Rest of the participants 27.7% (n=13) were did other type of works.

Occupation of the participants

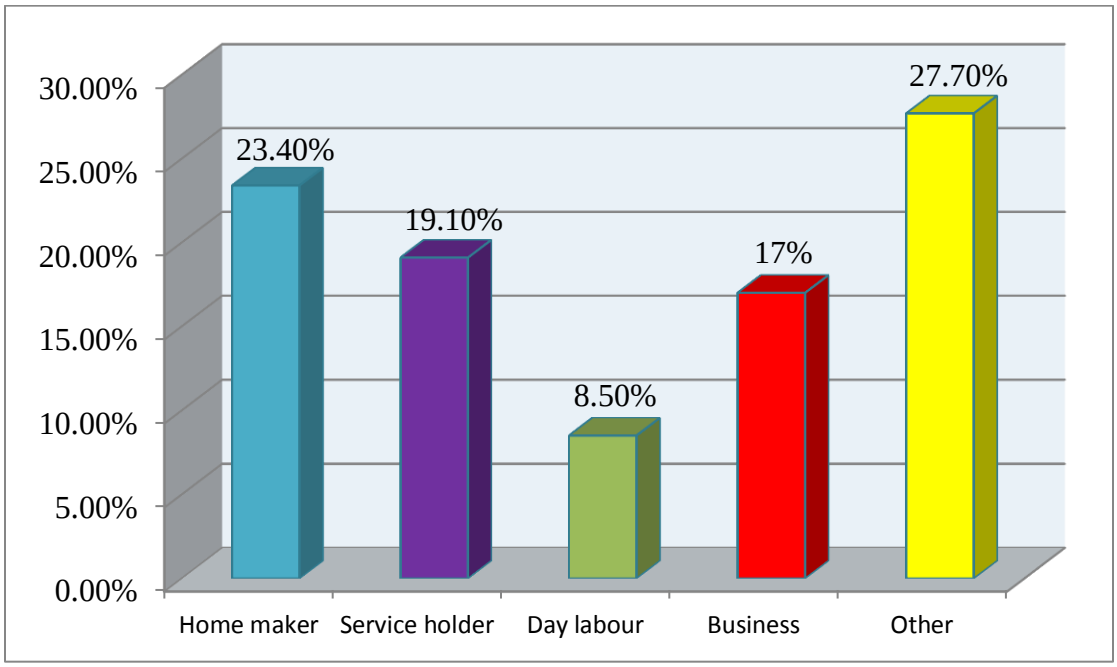

Figure: 08- Occupation of the participants.

Mean of the range of motion of shoulder joint

Mean differences between right and left shoulder joint of all the patients including paraplegic and tetra plegic. Here analysis shows that in shoulder flexion, medial rotation range of motion was same in both sides. In left side adduction and extension both was (0.11 ˚) less than right side. And abduction and lateral rotation (0.21˚) is also more in the right side than left side.

Table: 01: Shoulder joint

Joint movement	Right side	Left side
Flexion	178.44°	178.44°
Extension	59.78°	59.67°
Adduction	45°	44.89°
Abduction	179°	178.78°
Medial rotation	44.78°	44.78°
Lateral rotation	39.89°	39.67°

Mean of the range of motion of elbow joint

Mean differences between right and left elbow joint of all the patients including paraplegic and tetra plegic. Here analysis shows to us that the elbow flexion in both sides was same. But the right elbow extension was (0.11˚) more than left side.

Table: 02: Elbow joint

Joint movement	Right side	Left side
Flexion	137.78°	137.78°
Extension	-1.67°	-1.78°

Mean of the range of motion of wrist joint

Mean differences between right and left wrist joint of all the patients including paraplegic and tetra plegic. Analysis shows that in wrist joint the mean differences of radial deviation are same in both sides. The mean differences Wrist flexion was (0.34˚), medial deviation was (0.12˚) more in the right than left. And exist wrist extension was (0.67˚) more in left side than right.

Table: 03: Wrist joint

Joint movement	Right side	Left side
Flexion	79.78°	79.44°
Extension	69.11°	68.78°
Radial deviation	19.78°	19.78°
Medial deviation	29.56°	29.44°

Mean of the range of motion of hip joint

Mean differences between right and left hip joint of all the patients including paraplegic and tetra plegic. Analysis shows that here the entire joint ranges of motion of hip were same in both sides except medial rotation of hip. The medial rotation was (0.11˚) of hip more in the right side than left.

Table: 04: Hip joint

Joint movement	Right side	Left side
Flexion	118.22°	118.22°
Extension	29.44°	29.44°
Adduction	29.78°	29.78°
Abduction	39.78°	39.78°
Medial rotation	39.89°	39.78°
Lateral rotation	44.89°	44.89°

Mean of the range of motion of knee joint

Mean differences between right and left knee joint of all the patients including paraplegic and tetra plegic. Here the knee extension ranges are same in both sides. But right side knee flexion was (0.22˚) more than the left.

Table: 05: Knee joint

Joint movement	Right side	Left side
Flexion	128°	127.78°
Extension	-2.44°	-2.44°

Mean of the range of motion of ankle joint

Mean differences between right and left ankle joint of all the patients including paraplegic and tetra plegic. Here all the joint range of motion of ankle joint was same in both sides that were given below in the table.

Table: 06: Ankle joint

Joint movement	Right side	Left side
Dorsi flexion	44.78°	44.78°
Planter flexion	24.78°	24.78°
Inversion	24.89°	24.89°
Eversion	29.67°	29.67°

MEASUREMENT OF MOVEMENTS MEAN VELOCITIES OF THE JOINTS FOR RIGHT HAND

Here analysis showed that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in shoulder flexion (0.063 sec), extension (0.062 sec), adduction (0.037 sec), abduction (0.045 sec), medial rotation (0.084 sec), lateral rotation (0.087 sec).

Table: 07: Shoulder joint

Right Shoulder	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.166 sec	.229 sec
Extension	.178 sec	.240 sec
Adduction	.224 sec	.261 sec
Abduction	.215 sec	.260 sec
Medial rotation	.303 sec	.387 sec
Lateral rotation	.296 sec	.383 sec

FOR LEFT HAND

Here analysis showed that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in shoulder flexion (0.052 sec), extension (0.046 sec), adduction (0.039 sec), abduction (0.036 sec), medial rotation (0.051 sec), lateral rotation (0.061 sec).

Table: 08: Shoulder joint

Left Shoulder	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.178 sec	.230 sec
Extension	.187 sec	.233 sec
Adduction	.220 sec	.259 sec
Abduction	.216 sec	.252 sec
Medial rotation	.323 sec	.374 sec
Lateral rotation	.312 sec	.373 sec

FOR RIGHT HAND

Here we could be seeing that in elbow flexion physiotherapist took more time but in elbow extension occupational therapist took more time. The physiotherapist took (0.029 sec) more than occupational therapist in elbow flexion. The occupational therapist took (0.024 sec) more than physiotherapist in elbow extension.

Table: 09: Elbow joint

Right Elbow	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.300 sec	.271 sec
Extension	.252 sec	.276 sec

FOR LEFT HAND

Here we can see that in both elbow flexion and extension occupational therapist took more time than physiotherapist. The occupational therapist took (0.015 sec) more than physiotherapist in elbow flexion and (0.004 sec) more in elbow extension.

Table: 10: Elbow joint

Left Elbow	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.255 sec	.270 sec
Extension	.267 sec	.271 sec

FOR RIGHT HAND

Here analysis showed that the physiotherapist took more time than the occupational therapist in all the passive movement performance. The physiotherapist took more time in wrist flexion (0.006 sec), wrist extension (0.005 sec), radial deviation (0.014 sec), and ulnar deviation (0.010sec).

Table: 11: Wrist joint

Right wrist	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.541 sec	.535 sec
Extension	.548 sec	.543 sec
Radial deviation	.568 sec	.554 sec
Ulnar deviation	.556 sec	.546 sec

FOR LEFT HAND

Here analysis shows that the occupational therapist took less time than physiotherapist in wrist flexion (0.005 sec). And rest of the movements the occupational therapist took more time than physiotherapist. The occupational therapist took more time in wrist extension (0.005 sec), radial deviation (0.043 sec), ulnar deviation (0.047 sec).

Table: 12: Wrist joint

Left wrist	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.532 sec	.527 sec
Extension	.523 sec	.528 sec
Radial deviation	.582 sec	.625 sec
Ulnar deviation	.565 sec	.612 sec

FOR RIGHT LEG

Here analysis showed that the occupational therapist took more time than physiotherapist in all the passive movement performance except hip flexion. The occupational therapist took more time in adduction (0.028 sec), abduction (0.018 sec), medial rotation (0.011 sec), lateral rotation (0.010 sec). Just in hip flexion the physiotherapist took (0.012 sec) extra than occupational therapist.

Table: 13: Hip joint

Right hip	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.285 sec	.273 sec
Adduction	.297 sec	.325 sec
Abduction	.294 sec	.312 sec
Medial rotation	.347 sec	.358 sec
Lateral rotation	.347 sec	.357 sec

FOR LEFT LEG

Here analysis shows that the occupational therapist took more time than physiotherapist in all the passive movement performance except hip flexion, abduction. The occupational therapist took more time in adduction (0.021 sec), medial rotation (0.013 sec), lateral rotation (0.023 sec) physiotherapist took more time in flexion (0.008 sec), abduction (0.007 sec) than occupational therapist.

Table: 14: Hip joint

Left hip	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.277 sec	.269 sec
Adduction	.296 sec	.317 sec
Abduction	.295 sec	.288 sec
Medial rotation	.336 sec	.349 sec
Lateral rotation	.338 sec	.361 sec

FOR RIGHT LEG

Here analysis shows that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in flexion (0.027 sec), extension (0.029 sec).

Table: 15: Knee joint

Right Knee	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.286 sec	.313 sec
Extension	.285 sec	.314 sec

FOR LEFT LEG

Here analysis shows that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in flexion (0.034 sec), extension (0.030 sec).

Table: 16: Knee joint

Left Knee	Physiotherapy (velocity)	Occupational therapy (velocity)
Flexion	.279 sec	.313 sec
Extension	.282 sec	.312 sec

FOR RIGHT LEG

Here analysis shows that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in dorsi flexion (0.017 sec), planter flexion (0.042 sec), inversion (0.057 sec), eversion (0.032 sec).

Table: 17: Ankle joint

Right ankle	Physiotherapy (velocity)	Occupational therapy (velocity)
Dorsi flexion	.425 sec	.442 sec
Planter flexion	.440 sec	.482 sec
Inversion	.520 sec	.577 sec
Eversion	.527 sec	.559 sec

FOR LEFT LEG

Here analysis shows that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in dorsi flexion (0.005 sec), planter flexion (0.003 sec), inversion (0.021 sec), eversion (0.021 sec).

Table: 18: Ankle joint

Left ankel	Physiotherapy (velocity)	Occupational therapy (velocity)
Dorsi flexion	.455 sec	.460 sec
Planter flexion	.477 sec	.480 sec
Inversion	.530 sec	.551 sec
Eversion	.528 sec	.549 sec

CHAPTER: V DISCUSSION

The main purpose of this study is to further clarify factors related to contracture development. No data exists on the incidence of contractures in spinal cord injured patients. Of particular interest as well is a comparison of their development in patients treated acutely in spinal cord centers versus general (non-centre) hospitals. Other factors related to contracture development that have not been adequately studied are the relationship if any of their development to the level of the lesion, completeness of lesion and fractures of the extremities. This study was undertaken to answer these questions. It was hoped that in undertaking this study an increased awareness of contractures will develop thereby decreasing an important physical factor delaying rehabilitation of spinal cord injured patients. Patients admitted with spinal injuries at CRP from January 2017 to June 2016 were selected as the study population and gender, age, place of habitat, occupation, religion, educational background, and family income and also the marital status were taking into consideration as demographic variables. Here also demonstrated some medical information such as joint ROM of both upper and lower limbs.

The age range of this study was 11-20 years there were 13.33% (n=6), age group 21-30 years 11.11% (n=5), age group 31-40 years 42.22% (n=19), age group 41-50 years 26.67% (12) and age of more than 50 years, there were 6.67% (n=3) people had injured in spinal cord. (Unalan et al., 2001).

In this study there are more number of patients are male. There are the numbers of total Patients are 45. Male predominance previously reported in both local and global studies were also found in this research where 31.90% (n=13) were Female and 68.10% (n=32) were Male. Distribution of age in this study showed more people are in the age group of 31-40 years 42.22% (n=19) is more vulnerable than other. Propensity of rural people is the more number of the participants who lived in rural area is 66% (n=31). (Altug et al., 2013).

In this study married peoples are more than other. Married are 57.4% (n= 27), unmarried are 25.5% (n=12), widow are 8.5% (n=4), the number of divorced are 4.3% (n=2). (Buchmueller et al., 2010).

The study shows that the number of Muslims is more than other religion. Muslims are 89.4% (n=42), Hindus are 6.4% (n=6.4).(Mitra et al., 2014).

In this study more of the participants are really poor that's why their family income is so tiny. Fifteen participants family income is less than 5000 taka. The percentage is 15 (31.9%). Six participants family income is more than 5000 taka. The percentage is 6 (12.8%). Rest of the half participant's (twelve) family income are less than 20000 taka, the percentage is 12 (25.50%) and rest of the participant's (twelve) family income are more than 20000 taka. the percentage is 12 (25.50%). (Hossain et al., 2000).

Analysis shows that here more of the participants are lived in rural area. The number of the participants who lived in rural area is 66% (n=31). The urban area is in second position in count of 21.3% (n=10). The rest of the participants are lived in semi urban area 8.5% (n=4). (Cripps et al., 2011).

Analysis shows that here illiterate participants are more. The illiterate participants are 55.3% (n=26). Primary complete participants are 21.3% (n=10). S.S.C complete participants are 6.4% (n=3). H.S.C complete participants are 6.4% (n=3). Graduation complete participants are 6.4% (n=3). (Shing et al., 2003).

In this study mean differences between right and left shoulder joint of all the patients including paraplegic and tetra-plegic. Here analysis shows that the mean of result in shoulder flexion, medial rotation range of motion is same in both sides. And the adduction (0.11˚) and extension (0.11˚) is more in the right than left. And abduction and lateral rotation (0.21˚) is also more in the right side than left.

In this study analysis shows to us that the mean of result of the elbow flexion in both sides is same. But right elbow extension (11˚) is more than left.

In this study analysis shows that the mean of result in wrist joint the mean differences of radial deviation are same in both sides. The mean differences Wrist flexion (34˚), medial deviation (12˚) is more in the right than left. And exist wrist extension (67˚) is more in left side than right.

Analysis shows that the mean of result of the entire joint ranges of motion of hip are same in both sides except medial rotation of hip. Just medial rotation (11˚) of hip is more in the right side than left.

Here shows the mean of result the of knee extension ranges are same in both sides. But right side knee flexion (22˚) is more than the left.

Here all the joint range of motion of ankle joint, the mean of result is same in both sides.

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance for right shoulder joint. The occupational therapist took more time in right hand shoulder flexion (0.063 sec), extension (0.062 sec), adduction (0.037 sec), abduction (0.045 sec), medial rotation (0.084 sec), lateral rotation (0.087 sec).

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in left hand shoulder flexion (0.052 sec), extension (0.046 sec), adduction (0.039 sec), abduction (0.036 sec), medial rotation (0.051 sec), lateral rotation (0.061 sec).

Here analysis shows the mean of result of taking time that in right elbow flexion physiotherapist took more time but in right hand elbow extension occupational therapist took more time. The physiotherapist took (0.029 sec) more than occupational therapist in elbow flexion. The occupational therapist took (0.024 sec) more than physiotherapist in elbow extension.

Here analysis shows the mean of result of taking time that in both left elbow flexion and extension occupational therapist took more time than physiotherapist. The occupational

therapist took (0.015 sec) more than physiotherapist in elbow flexion and (0.004 sec) more in elbow extension.

Here analysis shows the mean of result of taking time that the physiotherapist took more time than the occupational therapist in all the passive movement performance. The physiotherapist took more time in right wrist flexion (0.006 sec), wrist extension (0.005 sec), radial deviation (0.014 sec), and ulnar deviation (0.010sec).

Here analysis shows the mean of result of taking time that the occupational therapist took less time than physiotherapist in left wrist flexion (0.005 sec). And rest of the movements the occupational therapist took more time than physiotherapist. The occupational therapist took more time in wrist extension (0.005 sec), radial deviation (0.043 sec), ulnar deviation (0.047 sec).

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance except hip flexion. The occupational therapist took more time in right hip adduction (0.028 sec), abduction (0.018 sec), medial rotation (0.011 sec), lateral rotation (0.010 sec). Just in hip flexion the physiotherapist took (0.012 sec) extra than occupational therapist.

Here analysis shows that the occupational therapist took more time than physiotherapist in all the passive movement performance except hip flexion, abduction. The occupational therapist took more time in left hip adduction (0.021 sec), medial rotation (0.013 sec), lateral rotation (0.023 sec) physiotherapist took more time in flexion (0.008 sec), abduction (0.007 sec) than occupational therapist.

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in right knee flexion (0.027 sec), extension (0.029 sec).

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in left knee flexion (0.034 sec), extension (0.030 sec).

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance. The

occupational therapist took more time in right dorsi flexion (0.017 sec), planter flexion (0.042 sec), inversion (0.057 sec), eversion (0.032 sec).

Here analysis shows the mean of result of taking time that the occupational therapist took more time than physiotherapist in all the passive movement performance. The occupational therapist took more time in left dorsi flexion (0.005 sec), planter flexion (0.003 sec), inversion (0.021 sec), eversion (0.021 sec). (Zbogar et al., 2017).

The main limitation of the study was the sample size. Small sample size was the main barrier of the study. The numbers of 45 spinal cord injury patients were not enough for the study. This study was done in a short period of time. Researcher should take more time to conduct this study. A convenience sampling was used that was not reflecting the wider population under study.

The research project was done by an undergraduate student and it was first research project for him. So the researcher had limited experience with techniques and strategies in terms of the practical aspects of research. As it was the first survey of the researcher so might be there were some mistakes that overlooked by the supervisor and the honorable teacher.

CHAPTER: VI CONCLUSION AND RECOMENDATION

6.1 CONCLUSION

The two main types of spinal cord injuries are complete and incomplete. A complete injury causes a total loss of sensation and movement below the level of the injury. An incomplete injury results in partial loss of sensation and movement below the level of the injury because only part of the spinal cord or nerves has been damaged.

The result has identified that the passive movement repetitions known as frequency and also velocities which was performed by the therapist (both the physiotherapist and the occupational therapist) which known as passive movement intervention with some exercises of the spinal cord injury patients at CRP which was conducted by cross sectional study.

Researcher had find out the velocities which was performed by the physiotherapist and occupational therapist at spinal cord injury Unit.

6.2 RECOMENDATION

This research was worked to quantify the amount of upper- and lower-extremity movement velocities (that is, voluntary movements as part of a functional task or specific motion) occurring during inpatient spinal cord injury (SCI), physical (PT) and occupational therapy (OT), and examine changes over the inpatient rehabilitation and also in chronic stage.

So further research will be to find out to quantify the amount of upper- and lower-extremity movement repetitions in Bangladesh (that is, voluntary movements as part of a functional task or specific motion) occurring during inpatient spinal cord injury (SCI), physical (PT) and occupational therapy (OT), and examine changes over the inpatient rehabilitation and also in chronic stage.

Next research will be to find out to quantify the amount of upper- and lower-extremity movement repetitions in Bangladesh (that is, voluntary movements as part of a functional task or specific motion) occurring during inpatient spinal cord injury (SCI), physical (PT) and occupational therapy (OT), and examine changes over the inpatient rehabilitation and also in acute stage.

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Apendix

সম্মতিপত্র (বাংলা)

(অংশগ্রহনকারীকে পড়ে শোনাতে হবে)

আসালামু আলাইকুম /আদাব, আমার নাম নাজমান খায়ের রনি , আমি এই গবেষণাটি বাংলাদেশ হেল্‌থ প্রফেশনাল ইন্সিটিউটে (বি এইচ পি আই), ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে করছি যা আমার ফিজিওথেরাপী স্নাতক কোর্সের আংশিক অধিভূক্ত যার শিরোনাম হল **"থেরাপিস্ট দের দ্বারা মেরুরুজ্জ আঘাত জনিত ইউনিটে রোগীদের নিষ্ক্রিয় পিরিসরের গতিবিধি পরিমাপ "।**

ফরমে উল্লেখিত কিছু প্রশ্নের উত্তর দেয়ার জন্য আন্তরিকভাবে অনুরোধ জানাচ্ছি যা আনুমানিক ২০ – ৩০ মিনিট সময় নিবে।

আমি আপনাকে অবগত করছি যে, এটা কেবলমাত্র আমার অধ্যয়নের সাথে সম্পর্কযুক্ত এবং অন্য কোন উদ্দেশ্যে ব্যবহার হবে না। আমি আপনাকে আরো নিশ্চয়তা প্রদান করছি যে সকল তথ্য প্রদান করবেন তার গোপনীয়তা বজায় থাকবে এবং এই তথ্যের উৎস অপ্রকাশিত থাকবে। এমনকি গবেষণাটির শেষে এই সকল তথ্য নষ্ট করে ফেলা হবে ।এই অধ্যয়নে আপনার অংশগ্রহন স্বেচ্ছাপ্রণোদীত এবং আপনি যে কোন সময় এই অধ্যয়ন থেকে কোন নেতিবাচক এবং ফলাফল কোন বিব্রতবোধ ছাড়াই নিজেকে প্রত্যাহার করতে পারবেন। এছাড়াও কোন নিদিষ্ট প্রশ্ন অপছন্দ হলে উত্তর না দেয়ার এবং সাক্ষাৎকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকার আপনার আছে।

যদি আপনার এই গবেষণা সম্পর্কে কিছু প্রশ্ন করার থাকে অথবা একজন অংশগ্রহনকারী হিসেবে এটা আপনার অধিকার , তাহলে আপনি গবেষক মোহাম্মদ , সহকারী গৌরব হাসান, সাথে যোগাযোগ করতে পারেন। ফিজিওথেরাপী বিভাগ , বি এইচ পি আই , সাভার , ঢাকা – ১৩৪৩ এই ঠিকানায়।

এই সাক্ষাৎকার শুরু করার আগে আপনার কি কোন প্রশ্ন আছে ?

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে যাচ্ছি ?

হ্যা ☐ না ☐

সাক্ষাৎকার প্রদানকারীর স্বাক্ষর..... তারিখ .....

সাক্ষাৎকার গ্রহনকারীর স্বাক্ষর..... তারিখ .....

সাক্ষীর স্বাক্ষর..... তারিখ .....

CONSENT FORM

(Please read out to the participant)

Hello,

I am Nazman khair Rony, student of B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI) an academic institute of CRP. I shall have to conduct a research and it is a part of my study. The participants are requested to participate in the study after reading the following.

My research title is "Passive movement performed by therapist of spinal cord injury patients at CRP". If I can complete the study successfully, I can gain more knowledge about physical activity which is helpful for my profession. To fulfill my research project, I need to collect data. That's why I would like to know the answers of some questions, which takes about 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. I assure that all data will be kept confidentially. This will not harm you.

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.

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 and date _____

Signature of the Interviewer and date _____

Witness signature and date _____

Questionnaire:

Part a (socio demographic question)

Serial	Questionnaire	Coding category
1	What is your current age?	1=18-25 year 2=26-32 year 3=33-39 year 4=40-46 year
2	What is your Sex?	1= Male 2= Female
3	What is your marital status?	1= Married 2= Unmarried 3= Widow 4= Divorced 5= Widower
4	What is your educational qualification?	1= No formal schooling 2= less than primary 3= Primary completed 4= S.S.C completed 5= H.S.C completed 6= ≥ Graduation
5	What is your religion?	1= Muslim 2= Hindu 3= Christian 4= Buddhist 5= Others
6	What is your total family income per month?	1=<5000 Taka 2=5000-20000 Taka

		3=>20000 Taka
7	Where you spent most of the time in your life?	1=urban area 2=Semi urban area 3=Rural are.
8	What was your occupation?	1= Housewife 2= Service holder 3= Day laborer 4= Business 5= Others

Part B (medical information)

Serial	Questionnaire	Level
1.	What is the neurological level?	
2.	What is the skeletal level?	

Part C-(ROM by using goniometer)

1. Shoulder

Serial	Movement	PROM	
		rt	Lt
1	Flexion		
2	Extension		
3	Adduction		
4	Abduction		
5	Medial rotation		
6	Lateral rotation		

2. ELBOW

Serial	Movement	PROM

		RIGHT	LEFT
1	Flexion		
2	Extension		

3. WRIST

Serial	Movement	PROM	
		RIGHT	LEFT
1	Flexion		
2	Extension		
3	Radial deviation		
4	Medial deviation		
5	Supination		
6	Pronation		

4. HIP

Serial	Movement	PROM	
		RIGHT	LEFT
1	Flexion		
2	Extension		
3	Adduction		
4	Abduction		
5	Medial rotation		
6	Lateral rotation		

5. KNEE

Serial	Movement	PROM	
		RIGHT	LEFT
1	Flexion		
2	Extension		

6. ANKEL

Serial	Movement	PROM	
		RIGHT	LEFT

1	Dorsi Flexion		
2	Planter flexion		
3	Side glide(rt)		
4	Side glide(lt)		
5	Inversion		
6	Eversion		

Shoulder…

Serial	Movement	Repetition		Time		Velocity	
		rt	lt	rt	lt	rt	lt
1	Flexion						
2	Extension						
3	Adduction						
4	Abduction						
5	Medial rotation						
6	Lateral rotation						

Elbow…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						

Wrist…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						

3	Radial deviation						
4	Medial deviation						

Hip…

Serial	Movement	Repetition		Time		velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						
3	Adduction						
4	Abduction						
5	Medial rotation						
6	Lateral rotation						

Knee…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						

Ankle…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Dorsi Flexion						
2	Planter flexion						
3	Inversion						
4	Eversion						

Part D-Check the frequency, time and velocity of passive range of motion… performed by occupational therapist.

Shoulder…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						
3	Adduction						
4	Abduction						
5	Medial rotation						
6	Lateral rotation						

Elbow…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						

Wrist…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						
3	Radial deviation						
4	Medial deviation						

Hip…

Serial	Movement	Repetition		Time		velocity	
		RT	LT	RT	LT	RT	LT

1	Flexion						
2	Extension						
3	Adduction						
4	Abduction						
5	Medial rotation						
6	Lateral rotation						

Knee…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Flexion						
2	Extension						

Ankle…

Serial	Movement	Repetition		Time		Velocity	
		RT	LT	RT	LT	RT	LT
1	Dorsi Flexion						
2	Planter flexion						
3	Inversion						
4	Eversion						

পর্ব-ক (আর্থসামাজিক সম্পর্কিত প্রশ্ন)

ক্রমিক নং	প্রশ্ন	কোড
১	আপনার বয়স কত বছর হিসেবে?	১১-২০ বছর=১ ২১-৩০ বছর =২ ৩১-৪০ বছর=৩ ৪১-৫০ বছর=৪ ৫১-৬০ বছর=৫
২	লিঙ্গ	মহিলা =১ পুরুস=২
৩	আপনার বৈবাহিক অবস্থা ?	বিবাহিত=১ অবিবাহিত=২
৪	আপনার শিক্ষাগত যোগ্যতা?	প্রাইমারী থেকে কম =১ প্রাইমারী সম্পূর্ণ =২ এস এস সি সম্পুরন=৩ এইস এস সি সম্পুরন=৪ স্নাতক=৫
৫	আপনার ধর্ম কি ?	মুসলমান=১ হিন্দু=২
৬	আপানার পেশা কি?	গৃহিণী=১ চাকুরিজিবি=২ অন্নান=৩
৭	আপনার পরিবারের মাসিক আয় কত?	৫০০০>=১ ৫০০০-২০০০০=২ ২০০০০<=৩
৮	জীবনের বেশিরভাগ সময় আপনি কথায় বাস করেছেন?	শহর অঞ্চল=১ গ্রাম অঞ্চল=২

পর্ব-খ (মেডিকেল সম্পর্কিত প্রশ্ন)

ক্রমিক	**প্রশ্নাবলি**	লেভেল
১	আপনার নিউরোলজিকাল লেভেল কত?	
২	আপনার স্কেলেটাল লেভেল কত?	

কাধ

ক্রমিক	গতিবিধি	নিষ্ক্রিয় পরিসরের গতি	
		ডান	বাম
১			
২			
৩			
৪			
৫			
৬			

কনু

ক্রমিক	গতিবিধি	নিষ্ক্রিয় পরিসরের গতি	
		ডান	বাম
১			
২			

কবজি

ক্রমিক	গতিবিধি	নিষ্ক্রিয় পরিসরের গতি	
		ডান	বাম
১			
২			
৩			
৪			
৫			
৬			

কোমর

ক্রমিক	গতিবিধি	নিষ্ক্রিয় পরিসরের গতি	
		ডান	বাম
১			
২			
৩			
৪			
৫			
৬			

হাটু

ক্রমিক	গতিবিধি	নিষ্ক্রিয় পরিসরের গতি	
		ডান	বাম
১			
২			

টাকনু

ক্রমিক	গতিবিধি	নিষ্ক্রিয় পরিসরের গতি	
		ডান	বাম
১			
২			
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৪			

কাধ [ডান]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
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৬				

কাধ [বাম]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
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৬				

কনু ডান

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				

কনু [বাম]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				

কবজি ডান

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
৩				
৪				
৫				
৬				

কবজি[বাম]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
৩				
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৫				
৬				

কোমর ডান

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
৩				
৪				
৫				
৬				

কোমর [বাম]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
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৬				

হাটু ডান

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				

হাটু [বাম]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				

টাকনু ডান

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
৩				
৪				

টাকনু [বাম]

ক্রমিক	গতিবিধি	পুনরাবৃত্তি	সময়	বেগ
			ডান	বাম
১				
২				
৩				
৪				

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

Ref. CRP-BHPI/IRB/07/17/136

Date: 03/10/2017

To
Nazman khair Rony
B.Sc. in physiotherapy
Session: 2012-2013, Student ID-112120021
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: "Passive movement performed by therapists of spinal cord injury patient at CRP".

Dear Nazman khair Rony,

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on 08/08/2016 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 a self-administered questionnaire that takes 20 to 30 minutes, observation of patients' treatment and have no likelihood of any harm to the participants, the members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09:00 AM on August 17, 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

Permission letter

April 18, 2017

Head of the Department,

Department of Physiotherapy,

Centre for the Rehabilitation of the Paralyzed (CRP),

Chapain , Savar, Dhaka-1343.

Through: Head, Department of Physiotherapy, BHPI.

Subject: Seeking permission of data collection to conduct my research project.

Dear Sir,

With due respect and humble submission to state that I am NAZMAN KHAIR RONY, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical committee has approved my research project entitled "Passive movement performed by therapists of Spinal cord injury patient at CRP" under the supervision of MD MILLAT HOSSAIN, Assistant Professor and course coordinator of M.Sc. Rehabilitation science, BHPI, CRP. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. I want to collect data for my research project from the patients of SCI. So, I need permission for data collection from the SCI Unit of Centre for the rehabilitation of the paralyzed. I would like to assure that anything of my study will not be harmful for the participants.

In these circumstances I pray & hope that you would be kind enough to grant my application & give me the permission for data collection and oblige thereby.

Recommended & Forwarded
Dr. Velautham
18/04/17

Sincerely,

Nazman Khair Rony

Nazman Khair Rony

4th Professional B.Sc. in Physiotherapy

Roll-20, Session: 2012-2013

Bangladesh Health Professions Institute (BHPI), (An academic Institute of CRP)

CRP, Chapain, Savar, Dhaka-1343.

Approved
please contact with
Mr. Mozaffar Hossain
Lecturer, SCI Unit, as a
counterpart of data collection Accordingly

Recommended & Forwarded
18/04/17
Md. Ohahidul Haque
Associate Professor & Head of the Department
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343

Mohammad Anwar Hossain
Assistant Professor &
Head of Physiotherapy Dept.
CRP, Chapain, Savar, Dhaka-1343
18/04/17

Allow to him for
Data collection
Mozaffar Hossain
Senior PT & Incharge SCI Unit
Physiotherapy Department
CRP, Savar, Dhaka-1343