

**FACTORS INFLUENCING SPORTS PARTICIPATION FOR  
PHYSICAL ACTIVITIES OF PEOPLE WITH SPINAL CORD LESION**

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

Session: 2015-16

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Bangladesh

August, 2020

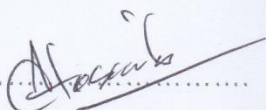
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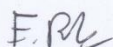
Submitted by **Md. Emran Hossain**, for the partial fulfilment of the requirement for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).



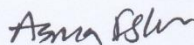
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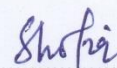
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## **Declaration**

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 Department of Physiotherapy, Bangladesh Health Professions Institute.

**Signature:**

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

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## Acknowledgement

First of all, I would pay my gratitude to Almighty **ALLAH** who gave me the passion to complete the study. At the same time my thanks with respect to my family members, specially my parents for whom I have been able to come in this stage.

I am extremely grateful and thankful to my honorable and praiseworthy Supervisor, Professor **Md. Obaidul Haque**, Vice-principal, Bangladesh Health Professions Institute (BHPI) for giving me his valuable time, keen supervision, excellent guidance and always gave me best directions to keep in track which help me to complete this project.

I would like to express my gratitude to respected **Mohammad Anwar Hossain**, Associate Professor and Head, Department of Physiotherapy, CRP, Savar, Dhaka, for his permission to collect the data to carry out the study. I am also very thankful to honorable **Md. Shofiqul Islam**, Associate Professor and Head, Department of Physiotherapy, BHPI. I am grateful to my respected teacher **Ehsanur Rahman**, Associate Professor, Department of Physiotherapy, BHPI, for sanctioning me to select this title and for his excellent guidance from the very beginning of this study. I am also thankful and want to express my gratitude to my respected teacher **Asma Islam** Assistant Professor, **Muhammad Millat Hossain**, Assistant Professor and my class mentor **Fabiha Alam**, Lecturer, Department of Physiotherapy, BHPI, CRP, Savar, Dhaka and all of my respected teachers. I would like to remember **Farjana Taoheed**, **A K Hasnat**, Clinical Physiotherapist, SCI unit, CRP, Savar and **Md. Nazmul Hasan Mollah**, Clinical Physiotherapist, Musculoskeletal unit, CRP, Savar, who were giving me valuable suggestion and helping me in different stage of the study that made the work easy, relive from difficulties and inspired me to work with enthusiasm. My special thanks to Rafi, Fabiha, Rawnak & my beloved friends, well-wishers and juniors mentioning Afridi, Nirob, Akter, Sanvi, Nazmul who were besides me without any expectations.

I also pay my thanks to the staffs of the BHPI library for their kind support to find out related books, journals and also access to internet. Finally I would like to thank to all participants of the study for their enormous cooperation.

<b>Acronym</b>
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<b>BHPI</b>	Bangladesh Health Professions Institute
<b>BMRC</b>	Bangladesh Medical Research Council
<b>CRP</b>	Center for the Rehabilitation of the Paralyzed
<b>IRB</b>	Institutional Review Board
<b>PA</b>	Physical Activities
<b>QoL</b>	Quality of Life
<b>SCI</b>	Spinal Cord Injury
<b>SPSS</b>	Statistical Package of Social Science
<b>WHO</b>	World Health Organization
<b>WHODAS</b>	World Health Organization Disability Assessment Schedule

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## Abstract

*Introduction:* Spinal cord injury (SCI) is a chronic debilitating condition with long-term sufferings, and physical inactivity of SCI patients is considered as common comorbidity. Sports participation of SCI patients in rehabilitation phase help to increase physical activities. *Aim of the study:* It was aimed to evaluate the sport participation on physical activities among the SCI patients. *Objectives:* To identify the evolutionary in physical activities on sport participation of SCI patients. *Methods:* This study was done by using quantitative method, which was a cross sectional study on the people with spinal cord injury and who rehabilitated at CRP the largest rehabilitation center for SCI in Bangladesh. The study population was all spinal cord injury patients and 127 Sample were conveniently selected for the study. Data were collected by using Self-generated WHODAS 2.0 and a standard structured and semi-structured questionnaire. Researcher maintained the all-ethical issues. Data were numerically captured in SPSS 20 version. Furthermore, Microsoft excel was used for the analysis of data and for the presentation of the data as well. *Results:* Among the 127 participants the gender frequency between male and female was 89% (n=113) and 11% (n=14). Among them the age median (IQR) was 28 (20-36). Married were 66% (n= 52), unmarried were 48% (n=61). Causes of injury were Road Traffic Accident 44%, Fall from height 38%, Carrying Heavy Weight 11%, Scarf Injury 2%, Shallow dive 0.8% and others 4%. 32% were tetraplegia and 68% were paraplegia. 38% participants were complete A and 62% were incomplete. 96% were using any kind of assistive devices. Significant correlations between the independent variables and domains of Self-generated WHODAS 2.0 had been showed and type of injury had correlations with all domains where p-value was <0.05 and the life activities in school and work place had significant correlations with the occupational status of the participants. *Conclusion:* In this study, researcher found significant correlations between sports participation and physical activities. Participating sports have benefits in physical activities and improving quality of life for people with SCI.

*Key Words:* Spinal Cord Injury, sport participation, physical activities.

*Word count:* 11,100.

**1.1 Background**

Sports has been defined by UNESCO as “any physical activity which the character of play and which involves a struggle with oneself or with other, or a confrontation with natural elements in sports.” Sports are human activities which are capable of achieving a result requiring physical exertion and/or physical skill, which, by its nature and organization, is competitive and is generally accepted as being a sport (Australian sports commission, 2011).

Sport has an immense therapeutic value and plays a great part in physical, psychological and social rehabilitation (Stephens et al., 2012). There are different aspects of sports- Recreational, Therapeutic, Competitive. Sport can play a key role in the lives and communities of person with a disability, the same as their peers without a disability (McLoughlin et al., 2017).

Sports participation helps to develop strength, coordination, endurance and respiratory fitness with other physical activities (McPhee et al., 2016). Sport can help people with disabilities improve their physical abilities. Sports and recreation are important in the successful rehabilitation of people with impairments. Facing the reality of disability, many disable persons lose their physical activities with their confidence, which leads to depression and the belief that their lives have to come to an end. Several sports activities that might be utilized for the rehabilitation have become available to the persons with spinal cord injury. Sport is increasingly being utilized as a treatment to supplement traditional physiotherapy approaches (Martin et al., 2016).

Sports offer the opportunity to achieve success in a very short period of time; to use success to build self-confidence. While sports have value in everyone’s life, it is even 18 more important in the life of a person with disability. This is because of sport’s rehabilitative influence, and the fact that it is a mean to integrate the person into society. Sport is used as treatment complementing the conventional methods of physiotherapy. It helps to develop strength, coordination and endurance (Hossain et al., 2016).

Disabled with SCI alienated from family and friends for this they cannot share positive experience. At that time sports give self-discipline, a competitive spirit, and comradeship, its value in promoting health, physical strength (Jamil, 2012).

Participation in sports can help physically disabled people to regain self-esteem, promotes the development of positive mental attitudes and helps them to come to terms with their disability and achieve social reintegration (Williams et al., 2014). Physical activity for the sake of enjoyment, such as in play, exercise to enhance or maintain fitness, or activity necessary in the workplace are not included in the definition of rehabilitation (Eitivipart et al., 2019).

According to this definition of rehabilitation, activities of daily living including the physical demands which deliberate structured activity to maintain or improve fitness, normal ambulation, play, sport and domestic chores. Today the model of fitness development includes play, sport, physical demands of employment involving large and small muscles and daily chores for the disable people as spinal cord injury patients and able bodied people alike. By rehabilitation program flexibility, mobility and coordination can be improved (Rimmer et al., 2012).

Rehabilitation can enhance the functioning and health of their heart, lungs, muscles and bones in most cases through regular physical activity of people with disabilities. The effects of sport on the rehabilitation of people with paraplegia and tetraplegia are promoting development of their physical and cardio-respiratory status (Jamil, 2012). Since physical activity contributes to the maintenance of health, by exercising, people build stamina that makes the demands of daily living easier thus leaving extra energy at the end of the day for additional social activities. Where people who participate in rehabilitation, it contributes physical fitness. Rehabilitation is the restoration the handicapped person to a useful life. There are many sports that have immense therapeutic value for the person with disability. Rehabilitation professional recognize the importance of sports and recreation in the successful rehabilitation of individual with disability. Many sporting activities can be helps to develop strength, coordination, endurance and ultimately can improve their mental status (Goodridge et al., 2015).

Sports offer the opportunity to achieve success to build self-confidence and focus on possibilities instead of dwelling on what can no longer be done (Disable world, 2009). Some wheelchair sports include basketball, archery, billiards, bowling, boxing, Fencing, fishing, hand cycling, quad rugby, table tennis, team handball, wheelchair basketball, wheelchair Tennis (Wheelchair sports federation, 2010).

Spinal cord injuries can happen at any level of the spine, and the severity of the injury will determine which physiological functions are affected or lost. It is conceivable that SCI could be complete or incomplete. Complete injuries cause a complete loss of sensation and function below the level of the injury. Partial loss is the outcome of incomplete injuries. The term complete does not imply that the cord has been cut. In paraplegia and tetraplegia, each of the following categories can occur (Nas et al., 2015).

Sport develops self-reliance especially important for disabled people since they are typically confined to their homes, sheltered and watched by their relatives. Peer connection, cooperative relationships and teamwork are all enhanced by participation in sports. Sports can help people prepare to deal with the difficulty of having a handicap in their life and to learn to adapt to change. Sports are about more than simply having fun or competing, they also contribute to a healthy mind and body. The physical, emotional, and social advantages and values that can be obtained from participation in sport and physical activity are widely accepted (Surgeon et al., 2012). Sport can also play a significant role in reducing the focus on the impairment or disability of the person and place the focus on their abilities. The therapeutic values of the sports program are the patient's regained strength, coordination and confidence they began to find regular work and a place in the outside world. Sport is part of the treatment, like taking their medicine, or doing physiotherapy. Participation in physical activity (PA) regularly is imperative for good health for individuals (Bloemen et al., 2015). Active people are usually benefited from higher levels of health-related fitness and are at lower risk of developing many disabling conditions than inactive people (Eime et al., 2013).

It is widely acknowledged that the health benefits of participation in Physical Activities (PA) are not limited to physical health but also the activities of daily living and psychological health of individuals (Janssen et al., 2013).

Further, substantial public investment in sport development has been justified in terms of a range of health benefits (VicHealth., 2013). Extensive research has been conducted on the determinants of participation in Physical Activities (PA) and on interventions that attempt to increase PA participation (Kriemler et al., 2012), with relatively little research focusing more specifically on sport. Also, with regard to the health benefits of Physical

Activities (PA), the research has generally not extended to the mental and social health benefits of sport participation in particular (Calfas et al., 2012).

Physical activity in sports has the potential to promote health and to enhance quality of life. However, despite the known benefits of physical activity, large proportions of the population are physically inactive to the point that it impacts negatively on health. This is true to an even greater extent for people with spinal-cord injury (SCI).The wheelchair sports can improve physical status as strength, coordination power, cardiovascular status, pulmonary function and that all can improve their physical status and improve activities of daily living. Wheel chair sports like wheelchair basketball, wheelchair table tennis, and wheelchair volley ball and many others sports are part of their exercise program in the rehabilitation phase.

## **1.2 Rationale of the study**

SCI is considered as one of the most serious condition of the musculoskeletal system. It is estimated that 10-83 persons per one million suffer from SCI annually, whereas most countries reported an incidence of 15-30 per million populations. Cervical spine injury causing tetraplegia is considered as one half of these injuries and the other half is constituted of thoracic, lumbar and sacrum parts of the spine causing paraplegia . Studies have shown that exercise and physical activity provide health and wellness benefits for paraplegics and tetraplegics including: improved psychological functioning, physical activities and prevention of many secondary conditions. Quality of life (QoL) for individuals with disabilities has been recognized as an important issue in the health care field. Thus, improving QoL has become a major goal as well as an important outcome in providing services for this population. Individuals with acquired SCI being actively involved in physical exercise and sports differ from physically inactive individuals. In Bangladesh there are two institutes, National institute of Traumatology Orthopedic and Rehabilitation (NITOR) and Centre for the Rehabilitation of the Paralysed (CRP) for the management of spinal cord injury. Different sports activity include wheelchair sports are introduce in rehabilitation phase in CRP. In SCI patient's rehabilitation program or for long time management, disability sports participation can be a part of their daily living by increasing physical activities. This study is formulated to fill the gap of knowledge in the area of sports participation of the persons with SCI. The aim of the study is to identify the evaluation of sport participation among the patients with SCI. And from this study awareness is increased and may provide proper recommendation for every single risk which is helpful for participants. Beside this it is help to established proper guidelines for the people with SCI for sport participation. This study is also help to discover the lacking area of a disable participant, especially about their participation in sports to develop their physical activities. So the study enhances the knowledge about the benefits of participation in sports and their view towards sports participation. Individual with spinal cord injury have variable problems in their daily physical activities. Sports can be used in treatment purpose and study would be helpful for disabled people as treatment. From their rehabilitation and recreation if it can be proven that sporting activity can improve physical activities and quality of life.

### **1.3 Research Question**

What are the factors that influence the SCI patients in sport participation for physical activities?



## **1.4 Objectives**

### **1.4.1. General objective**

To find out the factors that influence in sports participation for physical activities for spinal cord lesion patients.

### **1.4.2. Specific objectives**

- i. To identify the sociodemographic information of participants;
- ii. To find out participants eagerness in sports;
- iii. To identify the factors influenced them to participate in sports;
- iv. To find out the barriers for participating in sports;
- v. To find out the benefits of sport participation in their life activities;
- vi. To determine the impacts of sport participation on physical activities;
- vii. To find out the severity level of disability of participants in ADL;
- viii. To identify the limitations of participants in ADL;
- ix. To find out the correlations between sociodemographic factors of participants with getting around, self-care and life activities domains of WHODAS 2.0.

## **1.5 Operational definition**

### **Spinal cord injury-**

Spinal cord injury (SCI) is damage to the spinal cord that results in a loss of function such as mobility or feeling.

### **Physical activity-**

Physical activity refers to all movement including during leisure time, for transport to get to and from places, or as part of a person's work

### **Sports Participation-**

Sports participation may define as 'purposeful active participation in sports related physical activities performed during leisure-time'.

### **Wheelchair-**

A special chair used by people who cannot walk because of illness, an accident etc.

### **Paralysis-**

Injury or disease to the nervous system can affect the ability to move a particular part of the body. This reduce motor ability is called paralysis.

### **Paraplegia-**

Paraplegia is impairment in motor or sensory function of the lower extremities.

### **Tetraplegia-**

Paralysis of both upper and lower limbs, it is also called quadriplegia.

### **Skeletal level-**

The level at which the greatest vertebral damage is found after radiological examination.

### **Neurological level-**

The neurological level of injury is determined by identifying the most caudal segment of the cord with both intact sensation and normal antigravity muscle function strength.

### **Complete injury-**

A complete injury means there is no function, no sensation and no voluntary movement below the level of the injury. Both sides of the body are equally affected.

### **Incomplete injury-**

An incomplete injury means there is some function below the primary level of injury. A person with an incomplete injury may be able to move one limb more than another.

**ASIA:** American Spinal Injury Association.

**AIS:** Asia Impairment Scale.

**AIS A:** Complete. No sensory or motor function is preserved in sacral segments S4-S5.

**AIS B:** Incomplete. Sensory function below neurologic level and in S4-S5, no motor function below neurologic level.

**AIS C:** Incomplete. Motor function is preserved below neurologic level and more than half of the key muscle groups below neurologic level have a muscle grade less than 3.

**AIS D:** Incomplete. Motor function is preserved below neurologic level and at least half of the key muscle groups below neurologic level have a muscle grade 3.

**AIS E:** Normal. Sensory and motor function is normal.

Spinal cord injury is a serious and significant occurrence that occurs suddenly and without warning, disrupting personal and social life. Following these injuries, life-threatening complications arise (Islam et al., 2011). Damage to the neuronal components in the spinal canal, such as the spinal cord and cauda equine, can result in temporary or permanent neurological impairment (Marshall et al., 2013).

The incidence rate of spinal cord injury ranges between 10.4 and 83 per million persons (Kennedy et al., 2013). The life-changing event that impacts not only individuals with SCI, but also their spouses, parents, siblings, and children, as well as being a significant cause of death and morbidity. Individual impairment is common after a spinal cord injury, and this is reflected in drastic lifestyle adjustments (Kawanishi et al, 2013). The life expectancy of SCI patients in developing countries like Bangladesh was considerably lower than in developed countries (Razzak et al., 2011).

SCI, which causes limb paralysis and damage such as compression, contusion, or laceration, alters autonomic function at the site of injury or below, can result in lifelong impairment such as paralysis, loss of feeling, neuropathic pain, and so on, depending on the severity of the lesion (Mothe et al, 2013). According to new study, primary nerve injury is caused by an initial spinal cord injury that results in subsequent damage owing to inflammation, ischemia, and toxicity. After a SCI, a loss of motor control develops, causing disruption in everyday tasks (Kong, et al., 2013). Injury or damage to the spinal cord can result in a variety of disabilities, activity limits, and participation restrictions, all of which have a negative impact on society (New et al., 2013).

Studies show that the most common age group affected by SCI is 31–45 years old, and males are more impacted than females (4.3:1), with 53 % of injuries occurring in the cervical spine, 22 % in the thoracic spine, and 25 % in the lumbar spine. The annual incidence of traumatic SCI in the United States is 40 incidences per million, or 1200 new cases each year (Rabadi et al., 2013). In Australia, males are more affected than females in non-traumatic SCI, with a ratio of 197:169, and paraplegia is more common than tetraplegia, with a prevalence of 269 per million (New et al., 2013).

The global incidence of SCI is 10.4 and 83 per million per year, with a mean age of 33 years, a male to female ratio of 3.8:1, with one-third of patients globally being tetraplegic (Wyndaele et al., 2018). Study has found that men are more vulnerable than women in traumatic spinal cord injury, and the primary causes are motor vehicle collisions and falls. In Asia, the incidence rates of SCI range from 12.06 to 61.6 per million, with an average age of 26.8 to 56.6 years (Ning et al., 2012). Males are more 83% afflicted than females in CRP, Bangladesh, with 92 % coming from rural areas and 8% from urban areas. The majority of patients had paraplegia (56%), cervical lesion (44%), thoracic lesion (27%), and lumber lesion (29%) (Islam et al., 2011). Just under half of people with SCI who participated in this study engaged in some sporting activity each week, the majority of whom (78%) preferred individual over team sports. Over half of the participants were unable to continue with their favorite.

Sport due to their injury or lack of opportunity, and 74.6% indicated that accessing information about sports participation post-SCI was difficult. In line with previous studies (Brewer et al., 2017), this study showed that athletic identity in people with SCI is higher for males than for females. For both males and females, those who engaged in more hours of sports participation per week had higher levels of athletic identity than those who engaged in fewer hours or none. However, athlete status, based on sporting achievement, was associated with athletic identity for men, not women; males with higher athlete status showing significantly higher athletic identity than males of lower athlete status. The mean scores on individual AIMS items were consistently lower than equivalent scores on the same items of the 10-item AIMS, for adolescent swimmers with disabilities and able-bodied adults (Martin et al., 2016).

This was true for gender as well as people who engaged in more than 1 hour of sports participation per week and those with high athlete status. These findings suggest that people with SCI do not see themselves within the athlete role as much as able-bodied individuals do, either due to their injury, the existing social-stigma of disability, or lack of profile or status as an athlete with a disability. People with SCI, as a consequence of injury, have to adjust to a major loss or losses in relation to their physical mobility and independence (Ma et al., 2014). This adjustment might result in the development of a broader self-concept, not solely based in athletic identity, even if these people become high-status athletes.

In addition, it might be expected that adolescents would score higher on athletic identity than adults do, irrespective of disability. Adolescents often engage in black and white thinking, which could be argued to lead to over-commitment to one identity, and adolescents' roles in other areas such as work and family may not have been established due to their life stage. Also, this study found that the majority of people with SCI prefer individual sports, and this could have had an impact on their level of social identity in particular (Bailey et al., 2017).

The most common reasons for not participating in sports post-injury appear to be injury-related, including lack of accessible sports facilities, dislike of traditional sports for people with disabilities, and high-dependency in activities of daily living. This finding agrees with results of previous studies (Tasiemski et al., 2017) and further highlights the need to improve the profile and access of sports facilities of people with disabilities. Given that nearly 40% of people in this sample indicated a lack of accessible sporting facilities, it seems that society is failing to acknowledge and encourage sports participation in this population. Most participants were not living in cities (78%), indicating that improved facilities and access are needed at a local level. In addition, "traditional" sports for people with disabilities.

In several studies it has been shown that ages ranged between 18 and 55 year (mean age 33.3 year); 44% were married or living with a partner; 96% had and used a car; 23% were in full-time employment; 7% had part-time employment; and 5% were in full-time education. Twenty-nine percent of the subjects had cervical lesions, 56% thoracic lesions, 12% lumbar lesions, and 3% sacral lesions. Forty-two percent of them participated regularly in wheelchair basketball, 26% in wheelchair rugby, 20% in wheelchair tennis, and 12% in wheelchair athletics. The mean frequency of sport participation for all athletes was 4.2 times per week throughout the year although this ranged from two times a week in wheelchair basketball and rugby to two times a day for wheelchair athletics. The subjects were a SCI subset of subjects from a larger research project on Disability Sport Participation and represent a near-total sample of all athletes with SCI in the four sports studied (WU et al., 2017).

In the United States studies showed that persons with physical disabilities participate less regularly in recreational physical activity and sports compared with those without physical disabilities.<sup>1</sup> During the years 1998 to 2008, ~51% to 54% of those with physical disabilities (aged 18y and older) did not participate in leisure-time physical activity compared with 32% to 38% of those without physical disabilities (US Department of Health and Human Services., 2020). Consequently, more sedentary lifestyles are typical in this population and can predispose this group to higher risks of obesity, metabolic disorders, decreased overall health, increased social isolation, reduced contributions to the workforce, and reduced quality of life.

Health benefits from a physically active lifestyle are well known in the general population (Bassuk et al., 2014). Similarly the associated benefits from participating in regular exercise can be observed in populations such as those with SCI or stroke to lower cardiovascular disease and diabetes mellitus risk factors. These benefits include lower risks of secondary health consequences linked with a sedentary lifestyle such as body mass index (BMI), systolic blood pressure, presence of type 2 diabetes mellitus, and cardiovascular disease risk (Buchholz et al., 2012).

Adaptive Sports can serve as an adjunct and a bridge in rehabilitation once conventional rehabilitation services are formally completed. Disabled individuals face numerous physical and mental challenges in their paths to recovery and adjustment. Not only can adaptive sports provide an avenue to continue to optimize physical fitness but also can also positively impact quality of life (Diaz et al., 2019).

Adaptive sports participation has demonstrated a positive effect on quality of life and life satisfaction in the SCI population, as well as in other disabled populations. Yazicioglu and colleagues compared quality of life and life satisfaction scores between persons with paraplegia or amputation who participate in sports and those who did not and found that scores in the physical, psychological, and social domains were significantly higher in the sports participation group. These results were independent of the type of sport in which they participated (Yazicioglu et al., 2012).

In the SCI population, physical activity and sports participation have been associated with enhanced quality of life and community reintegration. McVeigh and his team investigated individuals who participated in sports to those who did not, as well as the impact of sports activity on quality of life and community integration, in two groups of adults living with chronic SCI. Participation in sports after SCI was shown to be 4.75 and 7.00 times more probable than not engaging in sports to improve quality of life (as judged by the Reintegration to Normal Living Index) (McVeigh et al., 2016).

Despite indications of positive effects from both exercise and sports, the impact upon QoL has yet to be demonstrated adequately. Since QoL is now regarded as a key outcome measure of successful rehabilitation, the WHO model of disablement provides a suitable framework to document the objective and subjective benefits of exercise and sport and their likely influence on quality of life (Tomasone et al., 2013).

People with SCI are now able to undertake very challenging forms of physical activity, including scuba diving, wheelchair mountaineering (Jaarsma et al., 2014). In winter, more and more people with SCI exchange their wheelchair for specially adapted skiing equipment (Maxwell et al., 2021).

In a study showed, Just under half of people with SCI who participated in this study engaged in some sporting activity each week, the majority of whom (78%) preferred individual over team sports. Over half of the participants were unable to continue with their favorite sport due to their injury or lack of opportunity, and 74.6% indicated that accessing information about sports participation post-SCI was difficult (Tasiemski et al., 2015).

More recently, cross sectional comparisons have also shown that wheelchair athletes score significantly higher on the vigour sub scale and lower on the depression sub scale than do their nonathletic peers with SCI (Tomasone et al., 2013).

Participation in sports can lead to higher levels of self-efficacy. There have been some studies that demonstrated that those athletes with disabilities who reported positive sports related self-efficacy scores perform better in competitive sports (Lowther et al., 2019).



Wheelchair basketball is one of the most popular sports following SCI. Started in the mid 1940's under the auspices of the US Veteran Administration, it has spread rapidly across the world. Over the last decade, wheelchair racing has also gained widespread popularity. Many marathons now include a wheelchair division and others are specifically organized for wheelchair athletes.

Skill sports are also available for those who can no longer participate in high intensity activities. Archery is one of the few sports in which wheelchair bound people can compete on an almost equal basis with those without impairment. The only difference is that wheelchair archers shoot from their chairs with or without an orthosis. Otherwise, the rules are the same as for everyone else (Noreau et al., 2018).

The relation between fitness, physical activity, and social integration in persons with SCI has not been adequately explored. It has been assumed that a correlation may exist because of findings with other populations that suggest a beneficial effect of sports and activity (Shephard et al., 2016).

**3.1 Study Design**

A cross sectional study was chosen to conduct the study. It is the simplest variety of descriptive or observational epidemiology and also known as surveys are a useful way to gather information on important health related aspects of people's knowledge, attitudes, and practices. Cross sectional study also known as snap short study. A survey is a research technique which involved collecting data from a large number of people, so that a general overview of the group could be obtained.

**3.2 Study Area**

The study was conducted at the Spinal cord injury Unit of Physiotherapy department, Centre for the Rehabilitation of Paralyzed (CRP) Chapain, Savar, Dhaka-1343 and the researcher selected the SCI unit of CRP for data collection.

**3.3 Study Population and sampling**

The study population was the patients who were diagnosed as SCI attended and took treatment in the SCI Unit of Physiotherapy Department at CRP, Savar, Dhaka. A group of people or events drawn from a population are known as sample.

**3.4 Sampling technique**

The researcher selected the convenience sampling technique to draw out the sample from the population. Purposive sampling is a type of probability sampling technique. Probability sampling focuses on sampling techniques that are based on the exclusion and inclusion criteria of the researcher. Purposive sampling is very easy to carry out with few rules governing how the sample should be collected.

### **3.5 Selection Criteria**

#### **3.5.1. Inclusion Criteria**

- Study participants:** Complete and incomplete both paraplegic and tetraplegic SCI patients.
- Age:** Age range 18-60 years (Farajzadeh et al., 2018).
- Gender:** Both male & female patients were included.
- Patients having American Spinal Injury Association (ASIA) Impairment Scale AIS A, B, C or D lesion.
- Patients who had participated in the sports more than one month during the rehabilitation phase in SCI.
- The Patients with intact cognitive function were included.
- The patients who had shown willingness to participate were included. (Trgovcevic et al., 2014) explained that patient need have willingness to participate at the time of data collection for accurate information.

#### **3.5.2. Exclusion Criteria**

- Patients who were diagnosed with a deteriorating medical conditions.
- Patients who did not participate in sports program more than one month in rehabilitation phase of SCI.
- If patients were not willing to participate in the trial (Melin et al., 2018).
- Patients who were psychologically unstable (Post & van Leeuwen, 2012).

### 3.6 Sample Size

In this project study, the researcher selected 127 spinal cord injury patients from the spinal cord injury (SCI) unit of CRP through convenience sampling technique.

The equation of finite population correction in case of cross sectional study is:

$$\begin{aligned}n &= \frac{Z^2 pq}{d^2} \\ &= \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} \\ &= 384\end{aligned}$$

Here,

Z (confidence interval) = 1.96

P (prevalence) = 50%

And, q= (1-p)

$$= (1-0.5)$$

$$= 0.5$$

The actual sample size was, n= 384.

According to this equation the sample should be more than 384 but due to lack of time and opportunity the study was conducted with 127 patients who attended at SCI unit of Physiotherapy department in CRP.

### 3.7 Data collection tools

Record or data collective form

Consent form

Socio-demographic questions

Structured and semi-structured questionnaire

Self-generated WHODAS 2.0 questionnaire.

### **3.8 Data collection**

The face to face interview technique was used to collect the data from the participants. A structured, semi-structured questionnaire and Self-generated WHODAS 2.0 was used for collecting information related to the study. There were sociodemographic questions and questions that find out the objectives of the study and Self-generated WHODAS 2.0 questionnaire had been included to find out the activity score of the participants. The data collection procedure had been performed after taking the consent of the participants. The researcher collected data from both male and female through individual interviewing process in clam environment. The duration of data collection was 10-15 min for every individual patient. For this the materials to successfully complete the interview session and collect the valuable data from the participants were used such as- question paper, consent from, pen, file, etc.

### **3.9 Data analysis**

Data was analyzed with the software named Statistical Package for Social Science (SPSS) version 20.0. The data that the researcher collected is descriptive data. The researcher used the graph technique for analyzing data, calculated as percentages, and presented this using stock, bar and pie charts by SPSS and Microsoft Excel. SPSS is a comprehensive and flexible statistical analysis and data management solution. Data was analyzed by Chi square, Mann Whitney U and Kruskal-Wallis H, Liner regression tests.

### **3.10 Ethical consideration**

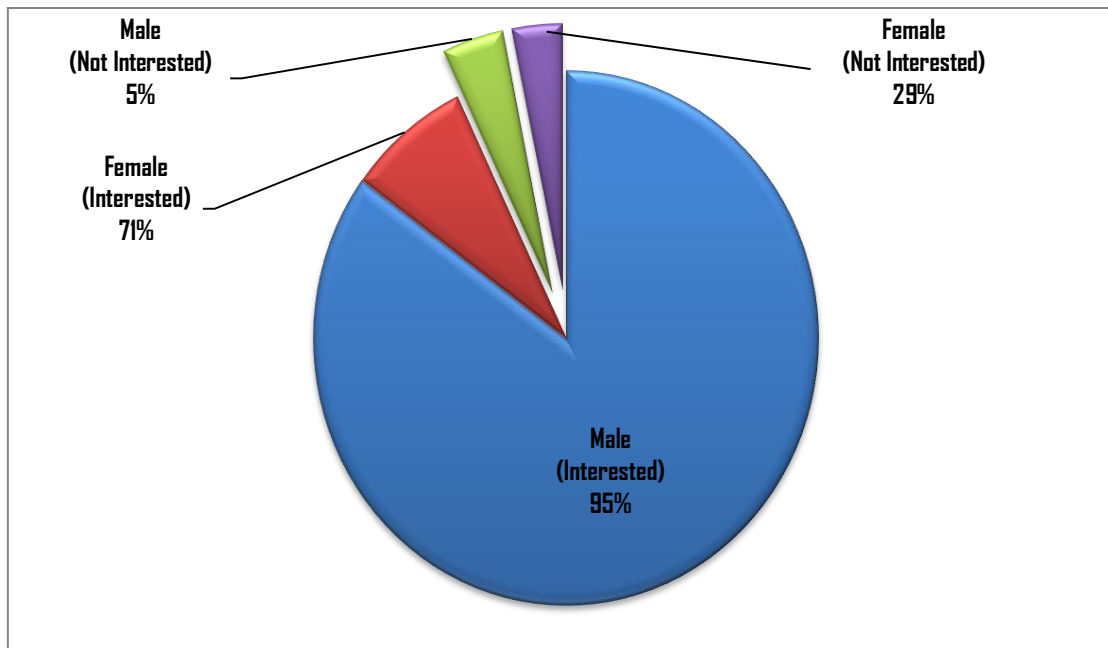
The Research proposal was submitted for approval to the Institutional Review Board of Bangladesh Health Professions Institute (BHPI). Bangladesh Medical Research Council (BMRC) and World Health Organization (WHO) guidelines were also followed. Again Before data collection, permission had been taken from the Head of the Physiotherapy Department. The participants, who were interested to participate in the study, were informed verbally about the topic and purpose of study. They were also informed that each interview can take 10-15 minutes for every participant. The researcher maintained privacy issue and confidentiality. Written consent was given to all participants. The researcher explained about the detail of research questions and about his or her role in this study. The researcher received a written consent form every participants including signature of participants and career. Participants were assured that they could understand about the consent form and their participation was on voluntary basis. The participants were informed clearly that there information would be kept confidential. Participants were assured that the study would not be harmful for them. It was explained that there might not a direct benefit from the study for the participants but in the future SCI patients like them might get benefited from it. The researcher gave the full privacy of participants' related information. The participants have the right to withdraw consent and discontinue participants at any time without prejudice to present or future care at the SCI unit of CRP.

The cross sectional study was conducted to achieve the research objectives. The main objective of the study was to evaluate the sport participation on physical activities for spinal cord injury patients.

#### 4.1 Table no. 1: Sociodemographic Characteristics of participants in the study

<b>Variables</b>	<b>Values, n(%)</b>	<b>Variables</b>	<b>Values, n(%)</b>
<b>Age, median (IQR)</b>	28 (20–36)	<b>Severity of injury</b>	
<b>Gender (male/female)</b>	113 (89%)/14 (11%)	(complete/incomplete)	47 (37%)/80 (63%)
<b>Marital status</b>		<b>AIS classification</b>	
(married/unmarried)	66 (52%)/61 (48%)	(A/B/C/D)	47(37%)/52 (41%)/ 25 (20%)/3 (2%)
<b>Educational Status</b>		<b>Type of paralysis</b>	
No former education	16 (12%)	(paraplegia/tetraplegia)	87 (68%)/40 (32%)
Primary (class 1-5)	17 (13%)	<b>Skeletal level of injury</b>	
Secondary (class 6-10)	54 (42%)	Cervical	38 (31%)
Higher secondary/Diploma	27 (23%)	Thoracic	63 (49%)
Graduate and above	13 (10%)	Lumber	24 (18%)
<b>Occupational Status</b>		Sacral	1 (0.8%)
(employed/unemployed)	87 (69%)/40 (31%)	Coccygeal	1 (0.8%)
<b>Monthly income</b>		<b>Neurological level of injury</b>	
Lower income (<12,000 BDT)	77 (61%)	Complete A	47 (38%)
Higher income (≥12,000 BDT)	50 (39%)	Incomplete B	52 (41%)
<b>Living area</b>		Incomplete C	25 (19%)
(urban/ semi-urban/rural)	30 (23%)/ 14 (11%)/ 83 (65%)	Incomplete D	3 (2%)
<b>Cause of injury</b>		<b>Assistive devices</b>	
Road Traffic Accident	55 (44%)	(Yes/No)	122 (96%)/5 (4%)
Fall from height	47 (38%)		
Carrying Heavy Weight	14 (11%)		
Scarf Injury	4 (2%)		
Shallow dive	1 (0.8%)		
Others	6 (4%)		

## 4.2 Eagerness to participate in sports

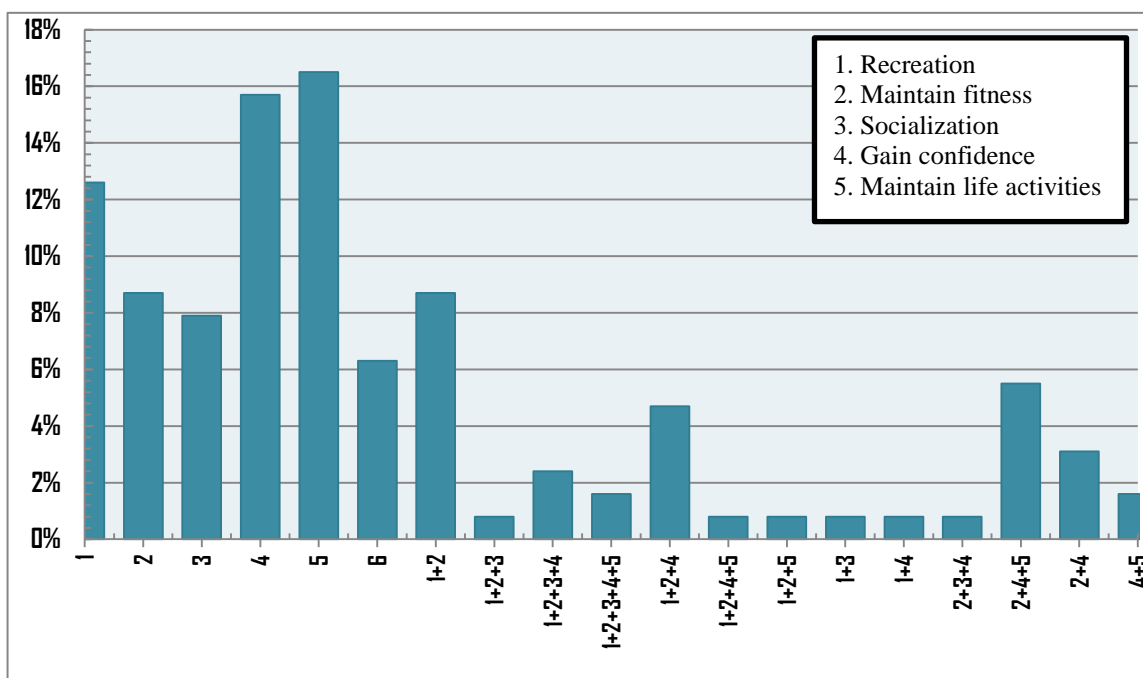


**Figure no. 1 Participants eagerness to participate in sports**

After analyzing the summation of eagerness in the study it had been found that in 127 participants there were 113 male participants in total and 95% male who were interested to participate in the sports in the rehabilitation phase of SCI and there were 5% male participants who were not interested to participate in the sports. Again there were 14 female participants in total and among them there were 71% female who had eagerness to participate in the sports and 29% female participants were not interested to participate in sports in the rehabilitation phase of SCI.



### 4.3 Factors influence to participate in sports

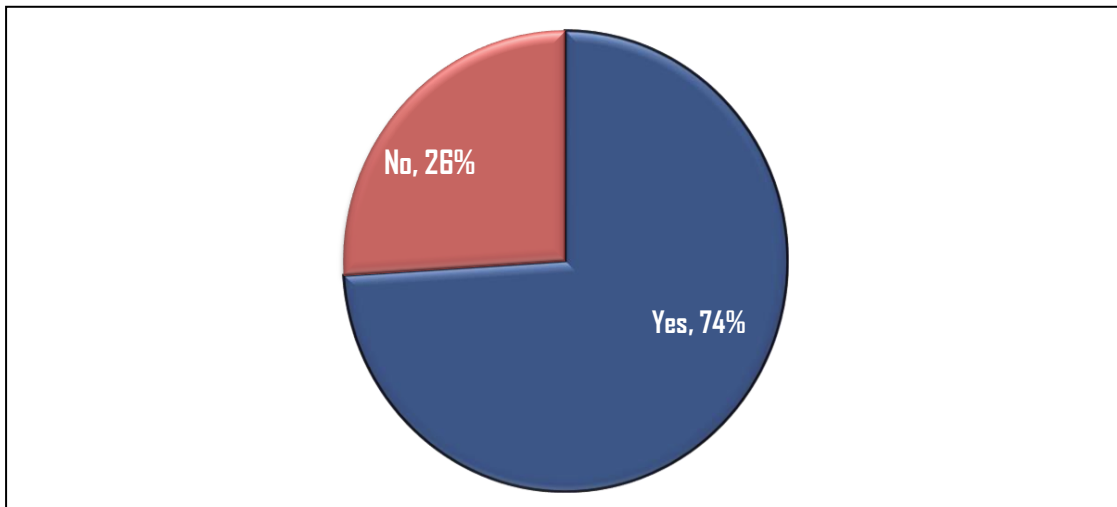


**Figure no. 2 Influencing factors to take participation in sports**

In the analysis of factors influencing to participate in sports it had been found that among 127 participants, 12.6% were influenced to participate in sports for recreation, 8.7% for maintaining fitness, 7.9% for socialization, 15.7% for gaining confidence and 16.5% for maintaining their life activities. Again in the study it had been found that 8.7% participants agreed with that they had been influenced by recreation and maintaining fitness, 0.8% participants were influenced by recreation, fitness maintaining and socialization. With the combination of recreation, fitness maintaining, socialization and gaining confidence 2.4% participants were influenced. Again with all criteria 1.6% participants were agreed that they had been influenced to participate in sports during their rehabilitation phase in SCI. 4.7% participants were influenced by recreation, fitness maintaining and gaining confidence. 0.8% participants influenced by recreation, maintaining fitness and life activities. 0.8% participants were influenced by recreation and socialization and by recreation with gaining confidence, to maintain fitness with socialization and gaining confidence similar summation had been founded. 5.5% participants were influenced by gaining confidence with maintaining fitness and life activities. 3.1% participants were influenced by maintaining fitness and gaining confidence.

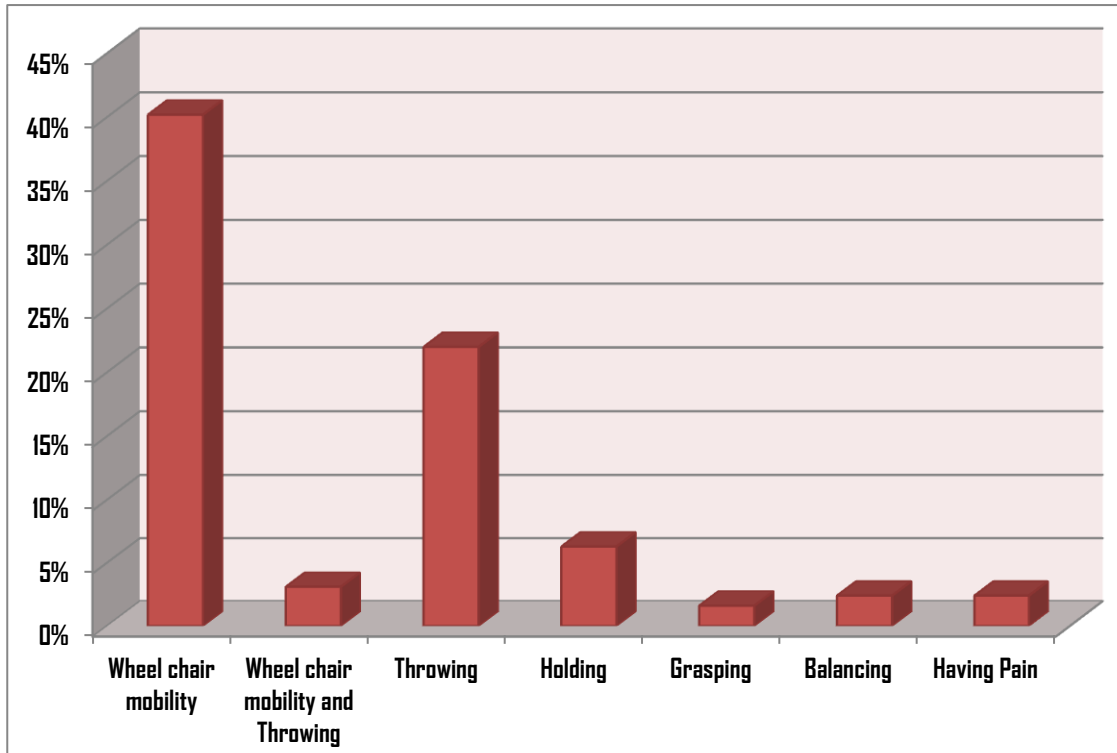
For gaining confidence and maintaining life activities 1.6% participants were influenced to participate in sports and 6.3% participants were not influenced by anything to participate in sports in the rehabilitation phase of SCI.

#### 4.4 Barriers of participating in sports



**Figure no. 3 Frequency of Participants' facing barriers**

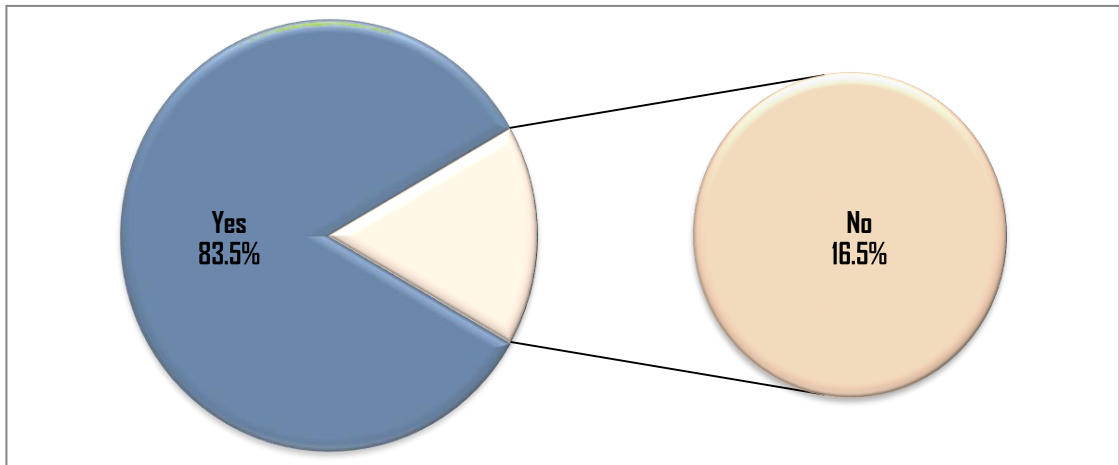
In the study it had been found that among 127 participants 74% were face barriers to participate in sports and 26% were not found any barriers during participation of sports in rehabilitation phase of SCI.



**Figure no. 4 Barriers which the participants are facing to participate in sports**

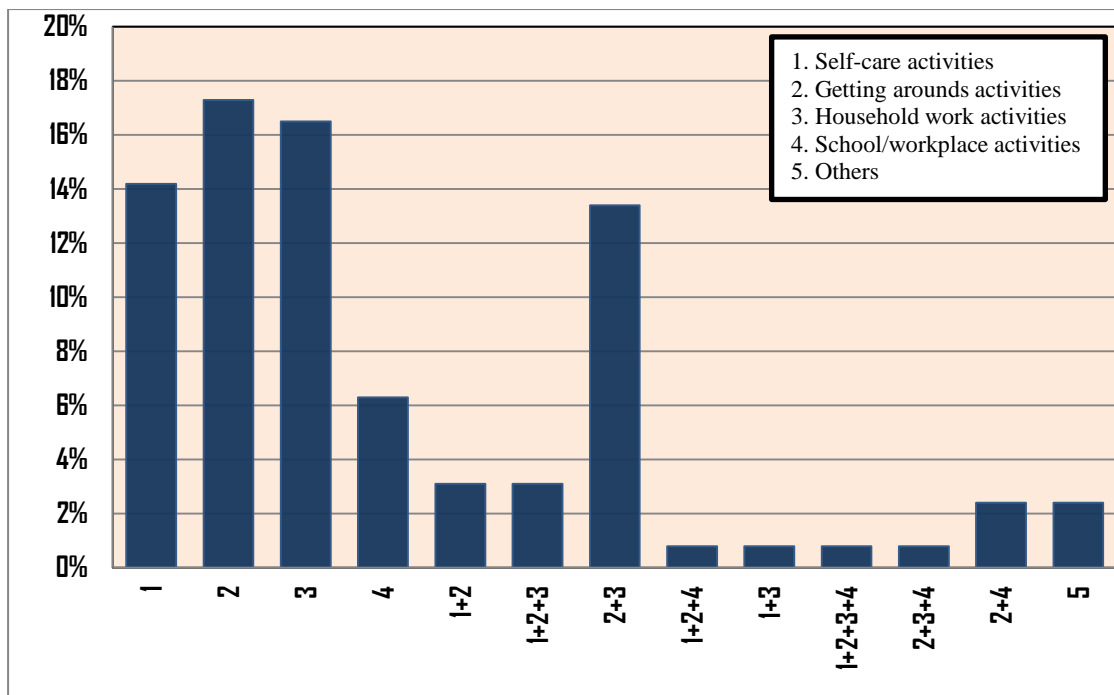
Among 127 participants 40.2% participants were facing complications in wheelchair mobility to participate in the sports, 3.1% participants were facing complications together in wheelchair mobility and throwing activities. Only in throwing activities 22% participants were facing complications. In holding activities 6.3% and 1.6% participants were facing complications in grasping activities. Again 2.4% participants were facing complications specifically in balancing and for having pain to participate in sports.

#### 4.5 Impacts of sports participation on life activities



**Figure no.5 Participants' opinions on impacts of sports participation on life activities**

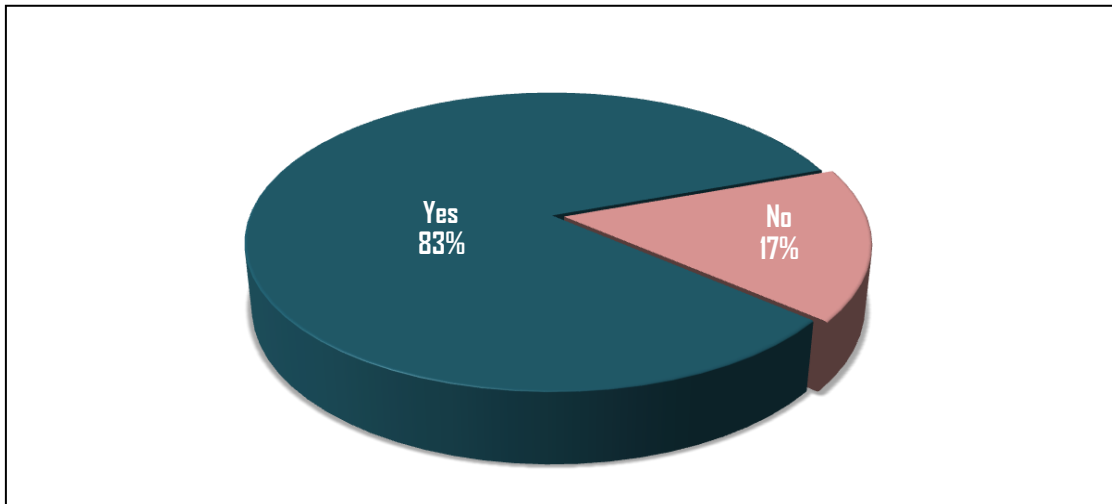
In the study among 127 participants 83.5% agreed with that sports participation had impact on their daily life activities and 16.5% participants did not get any positive impact of sports participation in their daily life activities.



**Figure no.6 Impacts on Life Activities for sport participation**

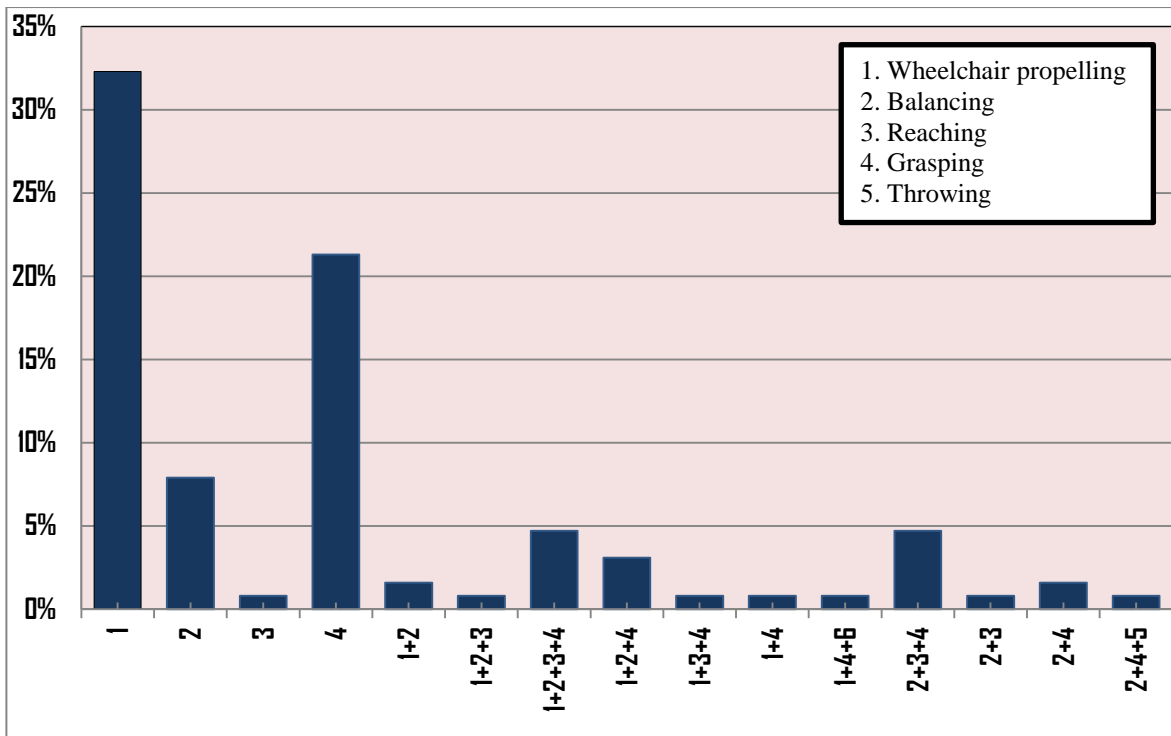
Finding out the impact of sports participation on daily life activities of SCI patients among 127 participants 14.2% had been showed that they were benefited in self-care activities by participating in sports. 17.3% participants were benefited in their getting around activities, 16.5% participants were benefited in household work and 6.3% were benefited in their school or work places activities. In together of self-care and getting around 3.1% participants had been benefited and in similar summation participants had been benefited in self-care, getting around and household works activities. 0.8% participants had been benefited in self-care, getting around, household works activities and school or work places activities; self-care, getting around and school or work places activities; self-care and household works activities; getting around, household works activities and school or work places activities. Again in getting around and household works activities 13.4% participants had been benefited. 2.4% participants had been benefited in getting around and school or workplaces activities and 2.4% participants had been benefited in other ways.

#### 4.6 Impacts of sports participation on Physical activities



**Figure no. 7 Participants' opinions on impacts of sports participation on PA.**

In this study among 127 participants 83% agree with that sports participation had benefits to develop their physical activities and 17% participants thought sports participation did not help in developing their physical activities.



**Figure no. 8 Impacts on Physical Activities for sport participation**

Among all of the participants 32.3% participants thought that their physical activities in wheelchair propelling were developed by participating in sports. In balancing, reaching and grasping activities 7.9%, 0.8% and 21.3% participants were benefited by participating in sports. 1.6% participants thought that they had been benefited together in wheelchair propelling and balancing, 0.8% participants had been benefited in wheelchair propelling, balancing and reaching. Together in wheelchair propelling, balancing, reaching and grasping 4.7% participants were benefited. 3.1% participants were benefited in wheelchair propelling, balancing and grasping. Again 0.8% participants were benefited individually in wheelchair propelling, reaching and grasping; wheelchair propelling and grasping; wheelchair propelling and reaching; wheelchair propelling, grasping and others (standing); balancing, grasping and throwing; balancing and grasping; balancing and reaching. Among the participants 4.7% were benefited in balancing, reaching and grasping where 1.6% participants were benefited in balancing and grasping activities by participating in sports.



## 4.7 Severity level of disability of participants in daily activities

### 4.7.1 Getting around

By using Self-generated WHODAS 2.0 in this study had been found in getting around that standing for long period 19.7% participants face no difficulties, 25.2% participants face mild difficulties, 37.8% participants face moderate difficulties, 15.7% participants face severe difficulties and 1.6% participants face extreme or cannot perform standing for a long periods. In standing up from sitting down 15% participants had no problems, 42.5% participants had mild problems 26% participants had moderate problems and 10.2% participants had severe problems and 6.3% participants face extreme or cannot perform standing up from sitting down. In moving around inside home 13.4% participants faces no problems, 49.6% participants faces mild problems, 28.3% participants face moderate problems, 4.7% participants had severe problems and 3.9% participants face extreme or cannot move inside his/her home. In getting out from home 7.9% participants face no problems, 46.5% participants face mild problems, 30.7% participants face moderate problems, 10.2% participants had severe problems and 4.7% participants face extreme or cannot getting out of his/her home. While walking a long distance about 1.6% participants face no difficulties, 9.4% participants face moderate difficulties and 56.7% participants face severe difficulties and 32.3% participants extremely face problems or cannot perform walking a long distance.

**Table no. 2- Severity level of disability in getting around domain**

<b>Questions</b>	<b>None n (%)</b>	<b>Mild n (%)</b>	<b>Moderate n (%)</b>	<b>Severe n (%)</b>	<b>Extreme or cannot do n (%)</b>
Standing for long periods, such as 30 minutes?	25(19.7%)	32(25.2%)	48(37.8%)	20(15.7%)	2(1.6%)
Standing up from sitting down?	19(15%)	54(42.5%)	33(26%)	13(10.2%)	8(6.3%)
Moving around inside your home?	17(13.4%)	63(49.6%)	36(28.3%)	6(4.7%)	5(3.9%)
Getting out of your home?	10(7.9%)	59(46.5%)	39(30.7%)	13(10.2%)	6(4.7%)
Walking a long distance, such as a kilometer (or equivalent)?	2(1.6%)	0	12(9.4%)	72(56.7%)	41(32.3%)

### 4.7.2. Self-care

In self-care it is found that 37% participants face no difficulties in washing their body, 26.8% participants face mild difficulties, 33.9% participants faces moderate difficulties and 2.4% participants faces severe difficulties. In getting dressed 29.1% participants had no problems, 36.2% participants had mild problems and 33.1% participants had moderate problems and 2.4% participants had severe problems. While eating about 36.2% participants face no problems, 41.7% participants face mild problems and 21.3% participants face moderate problems and 0.8% participants face severe problems. In staying alone for a few days 15% participants face no problems, 34.5% participants face mild problems, 26.8% participants face moderate problems and 18.9% participants face severe problems.

**Table no.3 Severity level of disability in self-care domain**

<b>Questions</b>	<b>None n (%)</b>	<b>Mild n (%)</b>	<b>Moderate n (%)</b>	<b>Severe n (%)</b>	<b>Extreme or cannot do n (%)</b>
Washing your whole body?	47(37%)	34(26.8%)	43(33.9%)	3(2.4%)	0
Getting dressed?	37(29.1%)	46(36.2%)	42(33.1%)	1(0.8%)	1(0.8%)
Eating?	46(36.2%)	53(41.7%)	27(21.3%)	1(0.8%)	0
Staying by your-self for a few days?	19(15%)	50(39.4%)	34(26.8%)	24(18.9%)	0

### 4.7.3. Life Activities—Household Work

In this domain we can see that among 127 participants many of them face difficulties of their life activities in household work. Frequency shows that during taking care of household responsibilities 15.7% participants face no difficulties, 27.6% participants face mild difficulties, 43.3% participants had moderate difficulties, 12.6% participants face severe difficulties and 0.8% participants face extreme difficulties or cannot perform. While doing most important household tasks well 7.9% participants face no problems, 40.9% participants face mild difficulties, 34.6% participants face moderate difficulties, 14.2% participants face severe and 2.4% participants face extreme difficulties or cannot perform the tasks well. When they try to get all of the household work done needed to do 9.4% participants had no difficulties, 36.2% participants had mild difficulties, 40.2% participants had moderate difficulties and 11.8% participants had severe difficulties and 2.4% participants cannot perform. While doing household work quickly 2.4% participants face no problems, 26% participants had mild difficulties, 48% participants face moderate difficulties and 27% participants face severe difficulties and 2.4% participants face extreme difficulties or cannot perform the work quickly.

**Table no. 4 severity level of disability in life activities (household work) domain**

<b>Questions</b>	<b>None n (%)</b>	<b>Mild n (%)</b>	<b>Moderate n (%)</b>	<b>Severe n (%)</b>	<b>Extreme or cannot do n (%)</b>
Taking care of your household responsibilities?	20(15.7%)	35(27.6%)	55(43.3%)	16(12.6%)	1(0.8%)
Doing most important household tasks well?	10(7.9%)	52(40.9%)	44(34.6%)	18(14.2%)	3(2.4%)
Getting all of the household work done that you needed to do?	12(9.4%)	46(36.2%)	51(40.2%)	15(11.8%)	3(2.4%)
Getting your household work done as quickly as needed?	3 (2.4%)	33(26%)	68(48%)	27(21.3%)	3(2.4%)

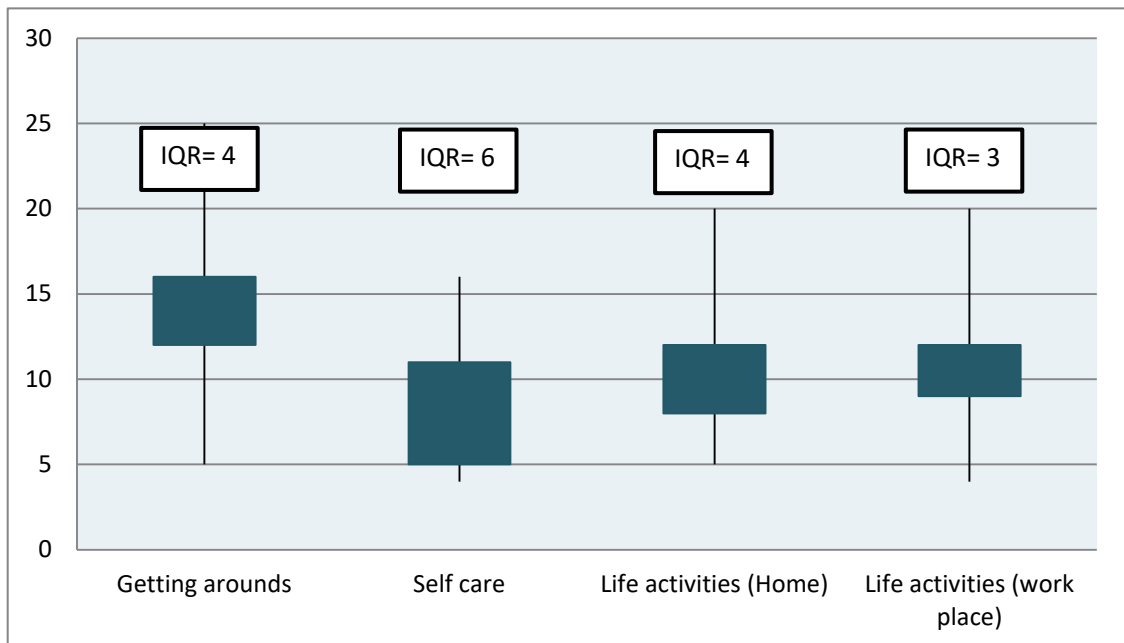
#### 4.7.4 Life activities—School/work

In their day to day school/work 11.8% participants face no difficulties, 31.5% participants face mild difficulties and 46.5% participants face moderate difficulties, 7.9% participants face severe difficulties and 2.4% participants face extreme difficulties or cannot perform. While doing most important school/work tasks well 8.7% participants face no problems, 36.2% participants face mild difficulties, and 45.7% participants face moderate difficulties, 7.1% participants face severe difficulties and 2.4% participants cannot perform tasks well. When they try to get all of the work done needed to do in school or working place 11% participants had no difficulties, 34.6% participants had mild difficulties, 45.7% participants had moderate difficulties and 7.1% participants had severe difficulties and 1.6% participants face extreme difficulties or cannot perform. While doing work quickly in school or in job 3.9% participants face no problems, 22% participants had mild difficulties, 48.8% participants face moderate difficulties, 22% participants faces severe difficulties and 3.1% had extreme difficulties or cannot do the work as quickly as needed.

**Table no. 5 severity level of disability in life activities (school/ workplace) domain**

<b>Questions</b>	<b>None n (%)</b>	<b>Mild n (%)</b>	<b>Moderate n (%)</b>	<b>Severe n (%)</b>	<b>Extreme or cannot do n (%)</b>
Your day-to-day work/school?	15(11.8%)	40(31.5%)	59(46.5%)	10(7.9%)	3(2.4%)
Doing your most important work/school tasks well?	11(8.7%)	46(36.2%)	58(45.7%)	9(7.1%)	3(2.4%)
Getting all of the work done that you need to do?	14(11%)	44(34.6%)	58(45.7%)	9(7.1%)	2(1.6%)
Getting your work done as quickly as needed?	5(3.9%)	28(22%)	62(48.8%)	28(22%)	4(3.1%)

#### 4.8 Limitations of participants in daily activities



**Figure no. 9 Activities limitation of participants**

After analyzing summation of getting arounds mean was 14 and range was 20. In summation of self-care mean was 8 and range was 12. In life activities in household work mean was 10 and range was 15 and life activities in work place mean was 10 and the range was 16. Among all of them getting arounds had higher mean and range which indicates higher limitations. So we can say that among 127 participants their getting arounds has more limitation than the other activities.

#### **4.8 Comparison between mean scores of different WHODAS 2.0 domains with different socio-demographic factors along with significant level:**

In the co-relations between the WHODAS 2.0 and the sociodemographic domains in the study the results from the univariate analyses are presented in the Table no. 6. Of all the independent variables were compared with the domains of Self-generated WHODAS 2.0. In the comparison between the independent age variables and getting around the p-value was 0.757, with self-care the p-value was 0.133, with life activities in household work p- value was 0.503 and in school or work place the p-value was 0.747. In the occupation variables the p-value in getting around it was 0.053, in self-care domain the p-value was 0.248 and in life activities of household work and school/work place the p-value was 0.244 and 0.016. In the independent variable of gender the p-value in getting around was 0.733, where the p-value in self-care domain was 0.689 and in the life activities of household work and school or work place the p-value was 0.538 and 0.123. Again in type of injury variable the p-value of getting around domain was 0.006, in self-care the p-value was 0.000, and in the life activities of household work and school or work place the p-value was 0.019 and 0.025. In educational status of independent variables the p-value of getting around domain was 0.232, the p-value of self-care was 0.369 and in the life activities of household work and school or work place the p-value was 0.351 and 0.128.

**Table no. 6** Correlations among socio-demographic factors and domains of Self-generated WHODAS 2.0 of participants.

Independent variables	Getting around		Self-care		Life activities (Household work)		Life activities (School/workplace)	
	Mean	P-value	Mean	P-value	Mean	P-value	Mean	P-value
Age								
18-27 year	64.59		62.91		65.20		61.73	
28-37 year	56.98		55.78		54.38		61.05	
38-47 year	71.32	.757	65.37	.133	67.21	.503	73.11	.747
48-57 year	65.83		79.83		75.06		70.78	
58-60 year	66.25		99.50		73.88		64.38	
<b>Occupation</b>								
Student	68.53		63.92		62.88		61.94	
Businessman	62.85		68.26		66.00		67.17	
Driver	89.67		94.83		78.33		89.17	
Teacher	109.50		80.75		106.00		100.50	
Service holder	60.77		45.95		55.27		43.36	
Daily-labor	43.54	.053	61.77	.248	59.23	.244	69.27	.016*
Farmer	54.79		72.93		61.54		74.00	
Technician	58.80		66.10		51.30		49.60	
Housewife	114.50		83.50		67.00		62.50	
Immigrant worker	27.50		20.00		117.50		106.00	
Unemployed	104.00		87.50		105.50		98.00	
<b>Gender</b>								
Male	64.39		64.46		64.70		65.76	
Female	60.86	.733	60.32	.689	58.32	.538	49.82	.123
<b>Type of Injury</b>								
Tetraplegic	77.06		85.19		75.20		74.73	
Paraplegic	57.99	.006*	54.26	.000*	58.85	.019*	59.07	.025*
<b>Education</b>								
No former education	74.91		69.59		77.19		85.06	
Primary education	50.41		76.41		67.71		65.94	
Secondary education	62.26	.232	64.23	.369	57.31	.351	60.20	.128
Higher secondary/ Diploma	63.26		57.39		64.26		56.57	
Graduate/ Above	77.12		53.65		70.15		66.73	

\*Significant P-values.

#### **4.9 Regression with mental resilience and others variables:**

According to linear regression, it was the final analysis to identify the relationship with the domains of WHODAS 2.0 & socio-demographic characteristic that was associated with the participants.

Where, the predictable variable was age, occupation, gender, types of injury and educational status that association with the getting around, self-care and life activities both in household work and workplace/school place of with the SCI participants ( $R^2 = .162$ , Coefficient value  $\beta = .403$ , significant p value = .0001; 95% CI = 1.992, 2.431). Because the coefficient value was both positive and negative the researcher predict that the domains have been linear and reversal relation with the sociodemographic factors (Table no. 7)



**Table.7.** Standard multiple regressions with WHODAS 2.0 domains and the dependent variable with participants:

<b>Dependent variable: Getting Arounds</b>					
<b>Predictable Variable</b>	<b>R<sup>2</sup></b>	<b>β</b>	<b>P</b>	<b>95% CI (confidence interval)</b>	
				Lower bound	Upper bound
Age	.002	.050	.757	-.374	.669
Occupation	.001	-.013	.053	-.223	.192
Gender	.001	-.033	.076	-2.185	1.492
Types of injury	.028	-.169	.006**	-2.405	.041
Education	.001	-.017	.232	-.561	.466
<b>Dependent variable: Self-care</b>					
Age	.024	.155	.133	-.052	.865
Occupation	.001	.002	.248	-.183	.186
Gender	.002	-.039	.689	-1.998	1.274
Types of injury	.156	-.395	.001**	-3.475	-1.446
Education	.024	-.155	.369	-.851	.052
<b>Dependent variable: Life Activities (Household work)</b>					
Age	.001	.029	.503	-.425	.589
Occupation	.004	.067	.244	-.125	.277
Gender	.004	-.059	.538	-2.384	1.184
Types of injury	.044	-.209	.019*	-2.605	-.248
Education	.007	-.082	.351	-.729	.266
<b>Dependent variable: Life Activities (Workplace/school)</b>					
Age	.012	.110	.747	-.179	.770
Occupation	.003	.055	.016*	-.130	.248
Gender	.018	-.133	.123	-2.928	.407
Types of injury	.036	-.190	.025*	-2.328	-.101
Education	.025	-.160	.128	-.887	.040

\*Significant relationship Alpha value (p value) = [\*= <.05, \*\*=<.01, \*\*\*= <.001]

This was a cross-sectional study to investigate the evaluation between socio-demographic and sports participation on physical activity of people with spinal cord injury. The purpose of the study was to evaluate the spinal cord injury patients with their sport participation on their physical activities. To find out the benefits of sports participation on physical activities in this study 127 SCI patients were participated. Gender, marital status, educational status, occupational status, lesion levels, current age all showed similar patterns in both groups and other independent variables were taking to consideration as socio-demographic variables.

In a 2017 research on SCI, it was discovered that there were mostly male members, and that was the commonality between two investigations. Participants in this study and a previous study of traumatic paraplegic patients, on the other hand the same study was also published in 2017, the distinction between the present and the previous study. The difference between this study and the previously published study was that one was a quasi-experimental, whereas the previously published study was a cross sectional study (Rahman et al., 2017). Current study of 2016 showed that the data of organized sports participation and characteristics of participants were slightly more than one third and participants were boys 51.3% than girls 28.3% reported to be involved in organized sports participation (Marques et al., 2016). In a study of 2010, the mean of male and female participants were 29.63 and 20.26 (Ginis et al., 2016). The mean score for males was 17.29 and for females it was 12.39 in a study of 2004 (Tasiemski et al., 2015). In current research of 2018 in Bangladesh the frequency of male and female among all 135 participants were 90% and 10% (Arafat et al., 2018). Where in this study there were 89% (n=113) male and 11% (n=14) female participants. The study showed the sex distribution among the participants in the sociodemographic table.

Among the 127 participants of this study the interquartile range (IQR) of age was 28 and the range of the age were 18 years to 60 years. Related research found that majorities (28.67%) were aged between 30 and 39 years and 23.33% of the respondents were aged from 20 to 29 years (Arafat et al., 2018).

In a current study it showed the mean of participants' age were 35 where the range were 20 years to 49 years (Stevens et al., 2015) and in 2001 a study was published with the participants ages ranged between 18 and 55 years and the mean age 33.3 year and 44% were married or living with a partner (Wu et al., 2017). In a study of 2001 it had showed that among all participants there were 35.4% unmarried or single persons (Ginis et al., 2016). In the current study of Bangladesh At the time of injury, 96 respondents were married, 49 were unmarried, 4 were separated, and 1 was widower (Andalib et al., 2018) and in this study 52% participants were married where 48% participants were unmarried.

In a study of 2018 the educational status among all participants were High school or less 34.7%, College 24.3%, University 17.4%, Postgraduate 6.5% and Other 16.3 (Craven et al., 2018). Again this study of 2018 on Spinal cord Injury patients showed the educational status of participants where the frequencies were illiterate 29.33%, Grade 5- 19.33%, Grade 8- 17.33%, Grade 10- 17.35%, Grade 12- 10% and Masters 6.66%. In this study the educational status showed 12% participants had not any kind of former education, 13% were primarily educated (class 1-5), and 42% participant's educational status was secondary (class 6-10). 23% were attending higher secondary or diploma courses and 10% participants were graduated.

There were 69% employed and 31% unemployed among all 127 participants where 61% had lower income (<12,000 BDT) and 39% had higher income ( $\geq$ 12,000 BDT). Similar to this study 96% participant were car driver; 23% were in full-time employment; 7% had part-time employment (Williams et al., 2014).

The living area of the participants of this study included urban, semi-urban and rural gradually were 23%, 11% and 65% and in a study based on the socio demographic conditions of spinal cord injury it showed that most participants were not living in cities and the percentage were 78% (Gardner et al., 2013).

Related study on spinal cord injury had found the causes of SCI RTA 47.6%, Sports related 18.8%, Falls 14.1%, Medical/surgical complications 7.2%, Disease 1.9%, Violence 1.9% and Other 6.9% (Potter et al., 2012) and this study had found the causes of injury among all the participants RTA were 44%, fall from height 38%, carrying heavy weight 11%, scarf injury 2%, shallow dive 0.8% and others were 4%.

Among 127 participants of this study there were 37% complete and 63% were incomplete SCI patients where the skeletal levels of injury were cervical 31%, thoracic 49%, lumbar 18%, sacral 0.8% and coccygeal 0.8% and among all of the participants the neurological level of injury were 38% complete A, 41% incomplete B, 19% incomplete C and 2% were incomplete D. In the study of Ginis et al. in 2016 on spinal cord injury had showed the injury severity C1–C4, ASIA grade A–C 10.8%; C5–C8 ASIA grade A–C 26.5%; T1–S5, ASIA grade A–C 36.7%; ASIA grade D 24.7%. In a similar study in Bangladesh it had found that the 64% among 150 participants were complete A patient of SCI and incomplete B were 17.33%, incomplete C were 10.67%, incomplete D were 7.33% and Normal E were 0.67% (Ahmed et al., 2018). In this study among 127 participants there were 96% participants using assistive devices and similarly current studies showed that participants were using assistive devices as manual wheelchair 56% and Gait aid 12.2% (Hicks et al., 2017).

In this study Self-generated WHODAS was used to assess the disability severity of the participants. World Health Organization Disability Assessment Schedule (WHODAS 2.0) is a generic assessment instrument developed by WHO to provide a standardized method for measuring health and disability across cultures (World Health Organization., 2010). In WHODAS 2.0 the domain of getting around was showed severity level of the participants in their physical activities. In first domain of getting around the study showed the severity level of disability of participants of this study to getting along with other people (Table no. 02). The self-care domains (Table no. 03) were found the limitations in maintaining the participant's hygiene, dressing, eating and staying alone.

In the Life activities of household work (Table no. 04) it had showed the level of disability severity of the participants in domestic responsibilities, leisure period. And in Table no. 04 the participants in their day to day school/ workplace had showed the severity of disability in participants' workplace and school. In Figure no. 2 the limitations of participations it was showed the severity of disability of the participants through the Self-generated WHODAS 2.0 where the summation of getting around the mean was 14 and range was 20. In summation of self-care the mean was 8 and range was 12. In life activities in household work the mean was 10 and range was 15 and

life activities in work place the mean were 10 and the range was 16. Among all of them getting around had the higher mean and range which indicates higher limitations of participants in getting along with daily physical activities.

After analyzing the summation of eagerness in the study it had been found that in 127 participants there were 113 male participants in total and 95% male who were interested to participate in the sports in the rehabilitation phase of SCI and there were 5% male participants who were not interested to participate in the sports. Again there were 14 female participants in total and among them there were 71% female who had eagerness to participate in the sports and 29% female participants were not interested to participate in sports in the rehabilitation phase of SCI. Similarity was found in a study where researcher found participants were enjoying participation and the mean in the pretest and post-test phase was 55.6 and 45.5 (Imran et al., 2018).

Again a study about the sport participation of SCI patients which included the mean number of the eagerness of the participants in a year who were engaged in sports was 10.9, those who were engaged in some sports activities they were totally showed interest to participate in sports. 11.9% were engaged in less than one hour in sports, 13.2% engaged in 1 < 3 hours, 11.0% engaged in 3 < 6 hours and 10.7% engaged in 6 hours or more. The study sample included 63 (6.4%) international athletes, 76 (7.7%) national athletes, and 74 (7.5%) regional athletes (Tasiemski, 2015).

In 2017 WU et al., were found some reasons of SCI patients which influenced them to participate in sports where it showed that patients were influenced to participate in sports for the purposes of Competition, fitness, fun, health, rehabilitation, social aspects and the mean gradually was 3.10, 2.52, 2.66, 2.75, 4.37, 3.78. In the analysis of this study factors influencing to participate in sports it had been found that among 127 participants, 12.6% were influenced to participate in sports for recreation, 8.7% for maintaining fitness, 7.9% for socialization, 15.7% for gaining confidence and 16.5% for maintaining their life activities.

Again in the study it had been found that 8.7% participants agreed with that they had been influenced by recreation and maintaining fitness, 0.8% participants were influenced by recreation, fitness maintaining and socialization. With the combination of recreation, fitness maintaining, socialization and gaining confidence 2.4% participants were influenced. Again with all criteria 1.6% participants were agreed that they had been influenced to participate in sports during their rehabilitation phase in SCI. 4.7% participants were influenced by recreation, fitness maintaining and gaining confidence. 0.8% participants influenced by recreation, maintaining fitness and life activities. 0.8% participants were influenced by recreation and socialization and by recreation with gaining confidence, to maintain fitness with socialization and gaining confidence similar summation had been founded. 5.5% participants were influenced by gaining confidence with maintaining fitness and life activities. 3.1% participants were influenced by maintaining fitness and gaining confidence. For gaining confidence and maintaining life activities 1.6% participants were influenced to participate in sports and 6.3% participants were not influenced by anything to participate in sports in the rehabilitation phase of SCI.

A qualitative study in Bangladesh had showed some barriers that the SCI patients faced during their daily activities, where researcher found the barriers for participants as pain (72.7%), bowel bladder difficulties (72.7%), spasticity (45.4%), Weakness & Balance problem (36.3%), Lack of assistance (72.7%), Equipment issues (72.7%) and others (Akter et al., 2019). In this study researcher found that 74% participants were facing barriers to participate in sports and 26% were not found any barriers during participation of sports in rehabilitation phase of SCI. Among 127 participants 40.2% participants were facing complications in wheelchair mobility to participate in the sports, 3.1% participants were facing complications together in wheelchair mobility and throwing activities. Only in throwing activities 22% participants were facing complications. In holding activities 6.3% and 1.6% participants were facing complications in grasping activities. Again 2.4% participants were facing complications specifically in balancing and for having pain to participate in sports.

Several studies showed that sports participation has benefits in physical activities for spinal cord injury patients. Study elicited that wheelchair user who are engaged with athletic activity has better psychological status than wheelchair user who are not engaged with athletic activities. Whereas sports provided new life, better physical activity, better mobility for a disabled person and it also improved social participation and reintegration (Blauwet et al., 2012). Individuals of SCI people who dynamically involved in sports and physical exercise, they had better quality of life within the physical, psychological, social and context field than physically inactive individuals (Haque et al., 2018). In this study researcher found that 83% participants were agree with that sports participation had benefits to develop their physical activities and 17% participants thought sports participation did not help in developing their physical activities.

Among all of the participants 32.3% participants thought that their physical activities in wheelchair propelling were developed by participating in sports. In balancing, reaching and grasping activities 7.9%, 0.8% and 21.3% participants were benefited by participating in sports. 1.6% participants thought that they had been benefited together in wheelchair propelling and balancing, 0.8% participants had been benefited in wheelchair propelling, balancing and reaching. Together in wheelchair propelling, balancing, reaching and grasping 4.7% participants were benefited. 3.1% participants were benefited in wheelchair propelling, balancing and grasping. Again 0.8% participants were benefited individually in wheelchair propelling, reaching and grasping; wheelchair propelling and grasping; wheelchair propelling and reaching; wheelchair propelling, grasping and others (standing); balancing, grasping and throwing; balancing and grasping; balancing and reaching. Among the participants 4.7 were benefited in balancing, reaching and grasping where 1.6% participants were benefited in balancing and grasping activities by participating in sports.

A study reported that Individuals with acquired SCI who are actively interested in PE and sports differ from those who are not physically active, claim to have a higher wellbeing of physical, psychological, social, and life activities (Smith et al., 2017). Finding out the impact of sports participation on daily life activities of SCI in this study among 127 participants 14.2% had been showed that they were benefited in self-care activities by participating in sports. 17.3% participants were benefited in

their getting around activities, 16.5% participants were benefited in household work and 6.3% were benefited in their school or work places activities. In together of self-care and getting around 3.1% participants had been benefited and in similar summation participants had been benefited in self-care, getting around and household works activities. 0.8% participants had been benefited in self-care, getting around, household works activities and school or work places activities; self-care, getting around and school or work places activities; self-care and household works activities; getting around, household works activities and school or work places activities. Again in getting around and household works activities 13.4% participants had been benefited. 2.4% participants had been benefited in getting around and school or workplaces activities and 2.4% participants had been benefited in other ways.

In the co-relations between the WHODAS 2.0 and the sociodemographic domains in the study the results from the univariate analyses are presented in the Table no. 6 of all the independent variables were compared with the domains of Self-generated WHODAS 2.0. Related study showed correlations with type of injury with the impacts on PA in 2010, the study showed that type of injury includes tetraplegic and paraplegic which bear the mean and SD 35.12 and  $\pm 62.68$  (Ginis et al., 2016).

In the comparison between the independent age variables and getting around the p-value was .757 which is  $p > 0.05$  and the age of the participants had no significant correlation with getting around. In getting around domain the p-value of gender was .733 ( $p > 0.05$ ); in educational status the p-value was .232 ( $p > 0.05$ ) and in occupation variables the p-value was .053 ( $p > 0.05$ ) and these variables were not significantly correlated with getting around. But in type of injury variables researcher got the significant correlation with getting around domain cause the p-value of the variable was .006 ( $p < 0.05$ ).

In self-care domain the p-value for age variable was .133 ( $p > 0.05$ ); for occupation variable p-value was .248 ( $p > 0.05$ ); for gender the p-value was .689 ( $p > 0.05$ ) and for educational status variable the p-value was .369 ( $p > 0.05$ ). In these variables the p-value was  $< 0.05$  which indicated the asymptomatic significant of the variables with self-care domain. But in type of injury variables the significant correlation with self-care domain had found and it showed p-value of the variable was .000 ( $p < 0.05$ ).



In the domain of life activities in household work p-value for age variable was .503 ( $p>0.05$ ); for occupation variable p-value was .244 ( $p>0.05$ ); for gender the p-value was

.538 ( $p>0.05$ ) and for educational status variable the p-value was .351 ( $p>0.05$ ). In these variables the p-value was  $<0.05$  which indicated the asymptomatic significant of the variables with Life activities of household works though researcher had found the significant correlation with the type of injury and the life activities of household work where the p-value was .019 which was  $p<0.05$ .

In school or work place the p-value of age variable was .747 ( $p>0.05$ ); for gender the p-value was .123 ( $p>0.05$ ) and for educational status variable the p-value was .128 ( $p>0.05$ ). In these variables the p-value was  $<0.05$  which indicated the asymptomatic significant and no correlations with the domains of Life activities of school or workplace. Though the analysis showed the significant correlation with the Life activities of school or workplace domain and the variables type of injury and occupation where the p-value were .025 and .016 which were  $p<0.05$ .

### **Limitation of the Study**

This study does not represent the overall image of the SCI patients of Bangladesh in respect and 100% accuracy will not be possible in any research so that some limitation may exist. Regarding this study, there were some limitations or barriers to consider the result of the study. The limitation of this study was small sample size. It was taken only 127 samples. It was so tough to evaluate the sport participation on physical activities through this small sample size. More samples could not able to collect because, there were not adequate subjects and study period was short due to the pandemic condition of epidemic of COVID-19. Time and resources were limited which have a great deal of impact on the study. As the number of participant was limited and the result might not be generalized.

### 6.1 Conclusion

The aim of the study was to evaluate the sports participation on physical activities among the Spinal cord injury patients. There is substantive evidence of many different physical and social health benefits of participation in sport by Spinal Cord Injury patients. The patients' eagerness is reported and the factors which influence the patients to participate in sports have been showed. Though the participants faced many barriers to participate in the sports but they had benefitted both in physical and life activities. Furthermore, there is a general consensus that participation in sport for people with SCI improved physically, above and beyond other forms of leisure-time in Physical Activities. More specifically, there are reports that participation in sports has better individual activities is associated with more benefits. Though the study had some limitations but identified some further step that might be taken for the better accomplishment of further research. From this study researcher concluded the specific variables and the benefits of sports participation of SCI patients in their Physical Activities. This study will help the Physiotherapists and other professionals to motivate the patients to participate in sports in the rehabilitation phase of SCI as well as the patients will be more interested to participate in sports in the rehabilitation phase to improve physical activities.

## **6.2 Recommendation**

The overall concepts of this research project were enhancement of quality of living by introduction of recreational sports activity to increase the physical activities of the SCI patients. In conclusion it can be said that ninety percent sports participants of are benefited by participating in sports. Participants are eager to play sports. But there is some barriers and facing a lot of obstacles and difficulties, like lack of confidentiality for performance, lack of knowledge among people about disability sports and other. Some participants are disappointed about their future, so there have some negative view in participants toward participating in sports. They thought about their past life of independency. So they couldn't find any positivity in disability sports. So it is necessary to improve confidence level among participants. It should be ensure that sports is not only for recreation or entertainment, it also for mental, physical and for social welfare. So, more orientation among the people about sport participation is recommended. There need more specific guideline about working area in sport participation for SCI patients and more specification of sport participation for SCI patients should be included in health policies.

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## Appendix-A

### সম্মতিপত্র

আসসালামু আলাইকুম,

আমি মোঃ ইমরান হোসেন, বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট (বিএইচপিআই), সিআরপি, ডিপার্টমেন্ট অব ফিজিওথেরাপি - তে অধ্যয়নরত ছাত্র। আমি একটি গবেষণা পরিচালনা করছি যা আমার কোর্সের অস্তুর্ভুক্ত, যার শিরোনাম,

"স্পাইনাল কর্ড ইনজুরিতে আক্রান্ত ব্যক্তিদের শারীরিক ক্রিয়াকলাপে খেলাধুলার অংশগ্রহণে প্রভাবিত কারণসমূহ"।

এই গবেষণার মাধ্যমে, আমি স্পাইনাল কর্ড ইনজুরি রোগীদের শারীরিক ক্রিয়াকলাপে খেলাধুলার অংশগ্রহণের কার্যকারিতা বের করব। এই উদ্দেশ্যে, আমাকে স্পাইনাল কর্ড ইনজুরিতে আক্রান্ত রোগীর কাছ থেকে তথ্য সংগ্রহ করতে হবে। গবেষণার ক্ষেত্র বিবেচনা করে, আমি আপনাকে এই গবেষণায় অংশগ্রহণকারী হিসাবে আমন্ত্রণ জানাতে চাই। আপনি যদি এই গবেষণায় অংশগ্রহণ করেন, আমি আপনাকে আপনার দৈনিক কার্যক্রম এবং খেলাধুলায় অংশগ্রহণের সুবিধা সম্পর্কিত কিছু প্রশ্ন জিজ্ঞাসা করব। আপনার সমস্ত তথ্য গোপন রাখা হবে। আপনার অংশগ্রহণ স্বেচ্ছায় হবে এবং যে কোন সময় সম্মতি প্রত্যাহার এবং অংশগ্রহণ বন্ধ করার অধিকার আপনার থাকবে।

যদি এই গবেষণা সম্পর্কে বা অংশগ্রহণকারী হিসেবে আপনার কোন প্রশ্ন থাকে, তাহলে যোগাযোগ করতে পারেন,

গবেষক মোঃ ইমরান হোসেন অথবা আমার সুপারভাইজার, অধ্যাপক মোঃ ওবায়দুল হক, ভাইস-প্রিন্সিপাল, বিএইচপিআই, সিআরপি, সাভার, ঢাকা -১৩৪৩।

প্রশ্নাবলী শুরু করার আগে আপনার কোন প্রশ্ন আছে?

তাহলে ইন্টারভিউতে এগিয়ে যাওয়ার জন্য আমি কি আপনার সম্মতি পেতে পারি?

হ্যাঁ .....

আমি ..... ফর্মের বিষয়বস্তু পড়েছি এবং বুঝেছি। আমি স্বেচ্ছায় এই গবেষণায় অংশগ্রহণ করতে সম্মত।

অংশগ্রহণকারীর স্বাক্ষর .....

তারিখ .....

সাক্ষীর স্বাক্ষর.....

তারিখ .....

Appendix-B

**CONSENT FORM**

Assalamu-alaikum

My name is Md. Emran Hossain, student of B.Sc in physiotherapy at Bangladesh Health Professions Institute (BHPI), CRP. I am conducting a study for partial fulfillment of Bachelor of Science in Physiotherapy, titled,

**“Factors Influencing Sports Participation for Physical Activities of People with Spinal Cord Lesion”**

Through this research, I will find out the efficacy of sport participation on physical activities for Spinal Cord Injury Patients. For this purpose, I would need to collect data from the patient having Spinal Cord Injury, Considering the area of research, you have met the inclusion criteria and I would like to invite you as a participant of this study. If you participate in this study I will ask you some questions related on your sport participation and physical activities. Your participation will be voluntary. You may have the right to withdraw consent and discontinue participation at any time. If you have any query about the study or your right as a participant, you may contact with, researcher Md. Emran Hossain or my supervisor, Professor Md. Obaidul Haque, Vice-Principal, BHPI, CRP, Savar, Dhaka-1343.

Do you have any questions before I start?

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

Yes.....

I..... have read and understand the contents of the form. I agree to participant in the research without any force.

Signature of the participant..... Date.....

Signature of the Interviewer..... Date.....

## Appendix-C

### প্রশ্নপত্র

সাক্ষাৎকারের অনুসূচি	
পর্ব-১: অংশগ্রহণকারীর পরিচয় ও আর্থ-সামাজিক প্রশ্নসমূহ (হাসপাতালের রেকর্ড/রোগী/সেবাকারী দ্বারা প্রদত্ত)	
১.১	সাক্ষাৎের তারিখ
১.২	অংশগ্রহণকারীর নাম
১.৩	ঠিকানা:
১.৪	মোবাইল নাম্বার
১.৫	অনুমতি গ্রহণ: হ্যাঁ /না

দয়া করে সঠিক উত্তরটি বৃত্ত "  " দ্বারা চিহ্নিত করুন

ক্রমিক নং	প্রশ্ন	উত্তর	কোড
১.৬	বয়স-	বছর	
১.৭	লিঙ্গ	পুরুষ মহিলা	০১ ০২
১.৮	বৈবাহিক অবস্থা	বিবাহিত অবিবাহিত বিবাহ বিচ্ছেদ বিপত্তি/বিপত্তীক	০১ ০২ ০৩ ০৪
১.৯	পেশা		
১.১০	মাসিক আয়	টাকা	
১.১১	পরিবারের সদস্য সংখ্যা	জন	
১.১২	উপার্জনক্ষম ব্যক্তি	নিজেই বাবা মা স্বামী স্ত্রী ছেলে মেয়ে অন্যান্য (উল্লেখ করুন) .....	০১ ০২ ০৩ ০৪ ০৫ ০৬ ০৭ ০৮
১.১৩	বসবাসরত এলাকা	গ্রাম মফস্বল শহর	০১ ০২ ০৩

পর্ব-২

(হাসপাতালের রেকর্ড/রোগী/সেবাকারী দ্বারা প্রদত্ত)

ক্রমিক নং	প্রশ্ন	উত্তর	কোড
২.১	আঘাতের কারণ	সড়ক দুর্ঘটনা	০১
		উঁচু স্থান থেকে পড়ে যাওয়া	০২
		ভারী বোঝা বহনের সময় পড়ে যাওয়া	০৩
		ওড়না পেঁচিয়ে দুর্ঘটনা	০৪
		অল্প পানিতে ঝাঁপ দেয়া	০৫
		অন্যান্য (উল্লেখ করুন). . . . .	০৬
২.২	আঘাতের তারিখ		
২.৩	Initial Neurological Level by ASIA	Complete A	০১
		Incomplete B	০২
		Incomplete C	০৩
		Incomplete D	০৪
২.৪	Skeletal level of injury	Cervical	০১
		Thoracic	০২
		Lumber	০৩
		Sacral	০৪
		Coccygeal	০৫
২.৫	ডায়াগনোসিস (ভর্তির সময়)	Tetraplegia	০১
		Paraplegia	০২
২.৬	কোনো সাহায্যকারী যন্ত্র	হ্যাঁ	০১
		না	০২
২.৭	অন্যান্য বড় কোনো রোগ	ডায়াবেটিস	০১
		উচ্চরক্তচাপ	০২
		ফুসফুসের রোগ	০৩
		হৃদরোগ	০৪
		খিঁচুনি	০৫
		নেই	০৬
অন্যান্য (উল্লেখ করুন). . . . .	০৭		

**পর্ব-৩:**

(হাসপাতালের রেকর্ড/রোগী/সেবাকারী দ্বারা প্রদত্ত)

ক্রমিক নং	প্রশ্ন	উত্তর	কোড
৩.১	আপনি কি খেলাধুলায় অংশগ্রহণ পছন্দ করেন	হ্যাঁ না	০১ ০২
৩.২	আপনার পুনর্বাসন প্রক্রিয়ার খেলাধুলায় অংশগ্রহণ করেছেন কি?	হ্যাঁ না	০১ ০২
৩.৩	খেলাধুলায় অংশ নিতে স্বাচ্ছন্দবোধ করেন কি?	হ্যাঁ না	০১ ০২
৩.৪	কোন খেলায় আপনি অংশগ্রহণ করেন/ করেছেন?	হুইলচেয়ার বাস্কেটবল হুইলচেয়ার ভলিবল হুইলচেয়ার টেবিল টেনিস ব্যাডমিন্টন ফুটবল অন্যান্য (উল্লেখ করুন) . . .	০১ ০২ ০৩ ০৪ ০৫
৩.৫	আপনি কতদিন যাবত খেলায় অংশগ্রহণ করছেন/করেছিলেন?	মাস	
৩.৬	আঘাতের কারণে প্রতিদিনের কাজকর্মে বাধার সম্মুখীন হয়েছেন?	হ্যাঁ না	০১ ০২
৩.৬.১	হ্যাঁ হলে,	হুইলচেয়ার চালানো ধরা মুঠো করা ছুড়ে মারা অন্যান্য (উল্লেখ করুন) . . .	০১ ০২ ০৩ ০৪ ০৫
৩.৭	খেলাতে অংশগ্রহণে আপনার শারীরিক উন্নতি হয়েছে কি?	হ্যাঁ না	০১ ০২
৩.৭.১	হ্যাঁ হলে, কিভাবে সাহায্য করেছে?	হুইলচেয়ার চালানো ধরা মুঠো করা ছুড়ে মারা অন্যান্য (উল্লেখ করুন) . . .	০১ ০২ ০৩ ০৪ ০৫
৩.৮	খেলাধুলায় অংশগ্রহণ আপনার দৈনন্দন কার্যক্রমে সহযোগিতা করছে বলে আপনি মনে করেন?	হ্যাঁ না	০১ ০২
৩.৮.১	হ্যাঁ হলে, কিভাবে সহযোগিতা করেছে?	চলোফেরায় নিজের যত্নে গৃহস্থলি কাজে স্কুল/অফিসের কাজে অন্যান্য (উল্লেখ করুন) . . .	০১ ০২ ০৩ ০৪ ০৫
৩.৯	কোন কোন বিষয় আপনাকে খেলাধুলায় অংশগ্রহণ করতে প্রভাবিত করে?	বিনোদন ফিটনেস বজায় রাখার জন্য সামাজিকীকরণ আত্মবিশ্বাস অর্জনের জন্য জীবন কার্যক্রম বজায় রাখায় অন্যান্য (উল্লেখ করুন).....	০১ ০২ ০৩ ০৪ ০৫ ০৬

পর্ব- ৪ঃ বিশ্ব সাস্থ্য সংস্থা অক্ষমতার মূল্যায়ন পদ্ধতি ২.০

প্রতিটি তথ্যের জন্য নির্ধারিত নাম্বার	১	২	৩	৪	৫	
বিগত ৩০ দিনে আপনি কতটুকু সমস্যায় পড়েছেন?						
চলাফেরা						
৪.১	একটানা ৩০মিনিট দাঁড়িয়ে থাকতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৪.২	বসা থেকে দাঁড়াতে পাড়েন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৪.৩	বাড়ির ভিতরে চলা-ফেরা করতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৪.৪	বাড়ি থেকে বাইরে যেতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৪.৫	একটানা এক কিলোমিটার হাঁটতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৪.৪	বাড়ি থেকে বাইরে যেতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা



নিজের যত্ন						
৫.১	নিজে নিজে গোসল করতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৫.২	নিজে নিজে কাপড় পরতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৫.৩	নিজে নিজে খেতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৫.৪	দিন কয়েক একা থাকতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা

জীবনযাপন প্রশালী - গৃহস্থলি কার্যাবলী						
৬.১	গৃহস্থলির দায়িত্বগুলো পালন করতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৬.২	সবচেয়ে গুরুত্বপূর্ণ গৃহস্থলি কাজ গুলো ভালো ভাবে করতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৬.৩	প্রয়োজনীয় সকল গৃহস্থলি কাজগুলো সমাপ্ত করতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৬.৪	গৃহস্থলি কাজগুলো যথাসম্ভব দ্রুত করতে পারেন?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
জীবনযাপন প্রশালী পেশাগত বা স্কুলের কাজকর্ম						
৬.৫	আপনার দৈনন্দিন বা স্কুলের কাজ করতে?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৬.৬	আপনার পেশাগত বা স্কুলের জরুরী কোনো কাজ সমাধান করতে?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৬.৭	আপনার প্রয়োজনীয় সকল কাজগুলো করতে?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
৬.৮	আপনার কাজগুলো নির্দিষ্ট সময়ে প্রয়োজনীয় দ্রুততার সাথে শেষ করতে?	কোনো সমস্যা নেই	খুব অল্প সমস্যা	মাঝারি সমস্যা	তীব্র সমস্যা	প্রচণ্ড সমস্যা বা কোনো কিছুই করতে না পারা
মোট অক্ষমতার মান						

## Appendix-D

### Questionnaire

#### Interview Schedule

Part I: Patient's Identification & Socio-demographic questions  
(To be provided by Record/Patient/Care-giver)

<b>1.1</b>	Date of interview:	
<b>1.2</b>	Name of Participant:	
<b>1.3</b>	Address:	
<b>1.4</b>	Mobile number:	
<b>1.5</b>	Consent Taken:	Yes / No

Please marked the correct answer with a circle “ ”

QN	Questions	Response/Answer	Code
<b>1.6</b>	Age	In Years	
<b>1.7</b>	Sex	Male Female	01 02
<b>1.8</b>	Marital Status	Married Unmarried Divorced Widow	01 02 03 04
<b>1.9</b>	Occupation		
<b>1.10</b>	Average Monthly Income	In BDT	
<b>1.11</b>	Total family members		
<b>1.12</b>	Earning members	Own Father Mother Husband Wife Son Daughter Others (Specify)	01 02 03 04 05 06 07 08
<b>1.13</b>	Residential area	Rural Semi-Urban Urban	01 02 03

**Part II: Clinical Information**  
(To be provided by Record/Patient/Care giver)

<b>QN</b>	<b>Questions</b>	<b>Response/Answer</b>	<b>Code</b>
<b>2.1</b>	Cause of Injury	Road Traffic Accident Fall from High Fall while carrying heavy load Scarf Injury Shallow Diving Others (Specify)	01 02 03 04 05 06
<b>2.2</b>	Date of Injury		
<b>2.3</b>	Initial Neurological Level by ASIA	Complete A Incomplete B Incomplete C Incomplete D	01 02 03 04
<b>2.4</b>	Skeletal level of injury	Cervical Thoracic Lumbar Sacral Coccygeal	01 02 03 04 05
<b>2.5</b>	Diagnosis (During admission)	Tetraplegia Paraplegia	01 02
<b>2.6</b>	Any Assistive Device	Yes No	01 02
<b>2.7</b>	Any Major Disease	Diabetes Mellitus Hypertension Lung disease Cardiovascular disease Epilepsy No Others	01 02 03 04 05 06 07

### Part III: Objective Findings

(To be provided by Record/Patient/Care giver)

QN	Questions	Response/Answer	Code
3.1	Do you like to participate in Sports?	Yes	01
		No	02
3.2	Do you participate in sports regularly in your rehabilitation program?	Yes	01
		No	02
3.3	Do you feel comfort to participating in sports?	Yes	01
		No	02
3.4	Which type of sports did you participate in?	Wheelchair Basketball	01
		Wheelchair Volleyball	02
		Wheelchair table tennis	03
		Balance football	04
		Others (Specify).....	05
3.5	How many days are you participating in sports?	Months	
3.6	Do you face any barriers in daily activities for yours injury?	Yes	01
		No	02
3.6.1	If yes, What are the complications do you face?	Wheelchair propelling	01
		Balancing	02
		Reaching	03
		Grasping	04
		Throwing	05
		Others (specify).....	06
3.7	Do you think that participating in sports helping you in your physical activities?	Yes	01
		No	02
3.7.1	If yes, then how it helps you?	Wheelchair propelling	01
		Balancing	02
		Reaching	03
		Grasping	04
		Throwing	05
		Others (specify).....	06
3.8	Do you think that participating in sports helping you in your life activities?	Yes	01
		No	02
3.8.1	If yes, then how it helps you?	Self-care	01
		Getting arounds	02
		Household work	03
		School/work place	04
		Others	05
3.9	Which factors influence you to participate in sports?	Recreation	01
		To maintain fitness	02
		Socialization	03
		To gain confidence	04
		To maintain life activities	05
		Others (specify).....	06

**Part- IV: WHODAS 2.0 Questionnaire**

Numeric scores assigned to each of the items		1	2	3	4	5
<b>In the last 30 days, how much difficulty did you have in:</b>						
<b>Getting around</b>						
4.1	Standing for long periods, such as 30 minutes?	None	Mild	Moderate	Severe	Extreme or cannot do
4.2	Standing up from sitting down?	None	Mild	Moderate	Severe	Extreme or cannot do
4.3	Moving around inside your home?	None	Mild	Moderate	Severe	Extreme or cannot do
4.4	Getting out of your home?	None	Mild	Moderate	Severe	Extreme or cannot do
4.5	Walking a long distance, such as a kilometer (or equivalent)?	None	Mild	Moderate	Severe	Extreme or cannot do
<b>Self-care</b>						
5.1	Washing your whole body?	None	Mild	Moderate	Severe	Extreme or cannot do
5.2	Getting dressed?	None	Mild	Moderate	Severe	Extreme or cannot do
5.3	Eating?	None	Mild	Moderate	Severe	Extreme or cannot do
5.4	Staying by yourself for a few days?	None	Mild	Moderate	Severe	Extreme or cannot do

<b>Life activities—Household</b>						
6.1	Taking care of your household responsibilities?	None	Mild	Moderate	Severe	Extreme or cannot do
6.2	Doing most important household tasks well?	None	Mild	Moderate	Severe	Extreme or cannot do
6.3	Getting all of the household work done that you needed to do?	None	Mild	Moderate	Severe	Extreme or cannot do
6.4	Getting your household work done as quickly as needed?	None	Mild	Moderate	Severe	Extreme or cannot do
<b>Life activities—School/Work</b>						
6.5	Your day-to-day work/school?	None	Mild	Moderate	Severe	Extreme or cannot do
6.6	Doing your most important work/school tasks well?	None	Mild	Moderate	Severe	Extreme or cannot do
6.7	Getting all of the work done that you need to do?	None	Mild	Moderate	Severe	Extreme or cannot do
6.8	Getting your work done as quickly as needed?	None	Mild	Moderate	Severe	Extreme or cannot do
General Disability Score (Total):						

## Appendix-E

### IRB Permission Letter



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

Ref:

CRP/BHPI/IRB/06/2021/459

Date:

14<sup>th</sup> June 2021

To  
Md. Emran Hossain  
B.Sc. in Physiotherapy  
Session: 2015-2016, Student ID: 112150317  
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

**Subject:** Approval of the thesis proposal “Factors influencing Sports Participation for Physical Activities of People with Spinal Cord Injury Lesion” by ethics committee.

Dear Md. Emran Hossain,  
Congratulations.

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

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

The purpose of the study is to find out the factors influencing sports participation for physical activities of people with spinal cord injury lesion. The study involves use of a questionnaire to find out the factors that influencing sports participation for physical activities of people with spinal cord injury lesion and there is no likelihood of any harm to the participants. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. The members of the Ethics committee approved the study to be conducted in the presented from at the meeting held at 8.30AM on 1<sup>st</sup> March, 2020 at BHPI (23<sup>rd</sup> IRB Meeting).

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

Best regards

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

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404  
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd, www.crp-bangladesh.org



## Appendix-F

### Permission Letter

Date: 09.08.21

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka. -1343.

**Through:** Head, Department of Physiotherapy, BHPI.

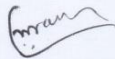
**Subject: Prayer for seeking permission to collect data for conducting research project.**

Sir,

With due respect and humble submission to state that I am Md. Emran Hossain, a student of 4<sup>th</sup> year B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled: **“Factors influencing Sports Participation for People with Spinal Cord Injury Lesion”** under the supervision of Professor Md. ObaidulHaque, Vice-Principal, BHPI. I want to collect data for my research project from the Spinal Cord Injury Unit, Department of Physiotherapy at CRP. So, I need permission for data collection from the Spinal Cord Injury (SCI) unit of Physiotherapy Department at CRP (CRP, Savar, Dhaka. -1343). I would like to assure that anything of the study will not be harmful for the participants.

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

Yours faithfully,



Md. Emran Hossain

4<sup>th</sup> year

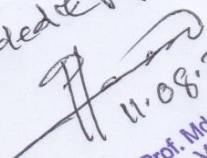
B.Sc. in Physiotherapy

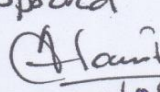
Class Roll: 46, Session: 2015-16

Bangladesh Health Professions Institute (BHPI)

(An academic Institution of CRP)

CRP-Chapain, Savar, Dhaka. -1343.

Forwarded & Recommended  
  
11.08.21  
Prof. Md. Obaidul Haque  
Vice-Principal  
BHPI, CRP, Savar, Dhaka.

Approved  
  
MOHAMMAD ANWAR HOSSAIN  
Senior Consultant &  
Head of Physiotherapy Dept  
Associate Professor, BHPI  
CRP Savar Dhaka-1343