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Secondary Complications in Spinal Cord Injury Paraplegic Wheelchair Basketball Players and Non-Athlete Paraplegic Wheelchair Users

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

SECONDARY COMPLICATIONS IN SPINAL CORD INJURY PARAPLEGIC WHEELCHAIR BASKETBALL PLAYERS AND NON-ATHLETE PARAPLEGIC WHEELCHAIR USERS

Submitted by **Md. Yeasin Miah**, for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).

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DECLARATION

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

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CONTENTS **Page no**

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ACRONYMS

ASIA	American Spinal Injury Association
BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CNS	Central Nervous System
CRP	Centre for the Rehabilitation of the Paralysed
IRB	Institutional Review Board
IWBF	International Wheelchair Basketball Federation
SCI	Spinal Cord Injury
SHC	Secondary Health Condition
SPSS	Statistical Package for the Social Sciences
TSCI	Traumatic Spinal Cord Injury
USA	United States of America
WB	Wheelchair Basketball
WHO	World Health Organization

List of Tables — Page no

List of Figures — Page no

Abstract

Purpose: To find out the secondary complications among the spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users. ***Objectives:*** To explore the association between spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users with secondary complications. ***Methodology:*** The study design was cross-sectional. A total of 110 samples were selected conveniently for this study. Data was collected by using a questionnaire. Descriptive statistics using SPSS software version 22.0 were used for data analysis. ***Result:*** In this study, the maximum age range of the participants were in athletes 26-35 in this range which were 53% and in non-athletes were 47% in age range 18-25. Male were in athletes 65%, female 35% and in non-athletes male were 84% female were 16%. Among the participants, pressure sore in athletes were 14% and non-athletes were 43%, pain were in the athletes 78% and in non-athletes were 74%, muscle tone were in athletes spastic 13% flaccid 7% and in non-athletes were spastic 27% flaccid 22%, stiffness of joint were in athletes 18% and in non-athletes were 42%, muscle atrophy were in athletes were 33% and in non-athletes were 42%, contracture were in athletes 24% and in non-athletes were 20%, urological complications were in athletes were 14% and in non-athletes were 29%, cardio-respiratory complications in athletes 38% and in non-athletes were 34%, autonomic dysreflexia were in athletes 33% and in non-athletes were 40%, heterotopic bone ossification were in athletes 3% and in non-athletes 5%, psychological complications were in athletes 40% and in non-athletes were 73%. The researcher found P Value of secondary complications with athletes and non-athletes were 0.05 which means this are significant with non-athletes. ***Conclusion:*** This study provides a snapshot for secondary complications in paraplegic wheelchair players and non-athletes paraplegic wheelchair users. Here, researchers tried to find out the association between athletes and non-athletes with secondary complications and the result was that there were some association between athletes and non-athletes

Key words: Secondary complications, paraplegic wheelchair player, paraplegic wheelchair users.

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CHAPTER-I INTRODUCTION

1.1 Background

Spinal Cord Injury (SCI) may lead to temporary or permanent loss of function. S CI results in a variable loss of physical and functional capacity. It can be broadly classified into traumatic and non-traumatic SCI based on its etiologies. The worldwide incidence varies by regions or countries. The reported incidence of SCI lies between 10.4 and 83 per million people per year, while the mean age of patients sustaining injury was reported at 33 years old, with men being affected more than women (Wyndaele, M. & Wyndaele, J.J, 2006). Whereas in Europe, the prevalence rate is from 10.4 per million in one year to 29.7 per million, while 27.1 was reported in Asia and also found from a recently published data, the incidence of SCI is 10.5 million per year in Tehran, Iran (Moghimian et al., 2015).

On the other hand, in developing countries the occurrence of SCI is 25.5 million per year and ranges from 2.1 to 130.7 million per year (Rahimi et al., 2013). A cross-sectional study on the epidemiology of SCI in Kuala Lumpur General Hospital between the year 2006 and 2009 revealed more than half of the injuries (57%) were traumatic in origin, involving mainly young males between age 16 and 30 years of age (31%) (Ibrahim et al., 2013). Generally, the trauma of the various methods is acknowledged as the main cause of the SCI and the causes of traumatic spinal cord injury including fall from height, road traffic accident, injury, sports injury occur around the world and the non -traumatic cause are backbone of the tumor, tuberculosis, transverse myelitis seems to the principle non-traumatic cause (Singh et al., 2014).

In Bangladesh, Rahman et al. (2017) shown among 2184 respondents 86.8% (n=1897) were male; most of the patients were in their 3rd decade which consisted 25.7%, 1513 (69.2%) of the respondent were from rural area. About 52% (n=1136) had the diagnosis of traumatic paraplegia and 42.6% (n=932) had traumatic tetraplegia. 992 of the participants (45.4%) had fall from height and road traffic accident was the second common cause having the distribution of 567 patients (25.9%). Regarding the extent of

injury, 59.8% (n=1292) participants had complete injury that is category A in ASIA scale.

Wheelchair users can also participate in different sports activities, such as athletics, basketball, swimming, tennis, marksmanship, rugby, sailing and winter sports. Wheelchair basketball is one of the most popular group sports among paraplegics, among which are individuals with SCI (Frez et al., 2015). Among adapted sports, basketball is a modality that demands great speed on the part of wheelchair athletes and, in addition to quick direction changes, that requires agility and great upper body strength, especially in the specific musculature involved in propelling wheelchairs (Gorgatti et al., 2002). Competitive sport for those with disabilities has been growing rapidly in recent years, and wheelchair basketball (WB) is probably the most popular sport for the disabled (Gil-Agudo et al., 2010).

Wheelchair basketball is one of the most popular sports in the Paralympics Games. Wheelchair Basketball is invented in 1946 in California and New England, USA. Wheelchair sports development at the international level began at the Stoke Mandeville Rehabilitation Hospital. Dr. Ludwig Guttman, in an attempt to help in the rehabilitation of war veterans who had fought in the Second World War, organized Wheelchair Basketball games (IPC, 2008). Competitive sports for individuals with disabilities have experienced an unprecedented growth since the First International Wheelchair Games held in Ayloesbury, England, in 1948 (Steadward, 2003).

Wheelchair basketball is now played in more than 80 countries by some 25,000 men, women and children with a physical disability, which prevents them from playing competitive basketball on their feet. The International Wheelchair Basketball Federation (IWBF) is the governing body for international wheelchair basketball. In 1993, the IWBF became an independent sports federation with 50 member nations. Wheelchair Basketball has been part of the Paralympics program since the Rome 1960 Paralympics (Vasiliadis et al., 2010). It has been demonstrated that involvement in sports by wheelchair users improves their rehabilitation outcome, aids the adjustment to their disability, increases their independence, gives them greater self-confidence, improves their quality of life and gives them aspirations for their further development (Tasiemski et al.,2000).

Sport and leisure begin to become part of the medical treatment due to their crucial role in the process of facing the “disadvantage” by disabled individuals. The benefits of sports practice to individuals with SCI are: improvement of oxygen maximum uptake (O2 maximum), gain in aerobic capacity, reduction of the risk of cardiovascular diseases and of respiratory infections, decrease in the incidence of medical complications (urinary infections, eschars and renal infections), reduction of hospitalizations, increase of life expectancy, increase of the levels of community integration, assistance in the facing of the disability, favoring of independence, self-image, self-esteem and life satisfaction improvement besides decrease in the probability of psychological disorders (Silva et al., 2005).

Physical activities such as sports have been shown to be beneficial to health. Regular physical activity, sports participation, and active recreation are essential behaviors for preventing disease, promoting health, and maintaining functional independence. Engagement in sports leads to improvement in strength, coordination, balance, endurance, pulmonary function, and weight control. It is well established that participation in sports improves psychological well-being of individuals with disabilities, particularly individuals with spinal cord injury (SCI) (McVeigh et al., 2009). A study conducted on the psychological impact of sports activity in SCI patients demonstrated that sports activity is associated with better psychological status, irrespective of tetraplegia and paraplegia. SCI patients who did not practice sports showed higher anxiety and depression scores and lower extraversion scores than sports participants (Gioia et al., 2006). Spinal cord injury (SCI) is often followed by secondary complications as pain, pressure sore, atrophy, urinary tract infection, heterotopic bone ossification etc (Haisma et al., 2007). Secondary complications after spinal cord injury (SCI) have the potential to dramatically impact, not only health, but emotional well-being, community participation, and quality of life (Boschen et al., 2003). Some of the most common secondary complications after spinal cord injury include pressure ulcers,, urinary tract infections, spasticity , pain, autonomic dysreflexia, respiratory complications and psychological complications (Middleton et al., 2004). Joseph & Wikmar (2016) had shown in his study that about 50.3% (n= 71) patients had one or more secondary complication. Pressure ulcer (n=42; 29.8%) was the most common

followed by pulmonary complications 23.4% (n=33) and urinary tract infections 17% (n=24).

Wheelchair users are exposed to many stresses on their upper extremities during pushing their wheelchair, carrying weight and other activities of daily living. Because of these stresses, soft tissue injuries and degenerative joint diseases of the shoulder often occur. For instance, research has shown that repetitive overhead activities with other contributing factors like abnormal positioning of the shoulder, posture, age, compression and ischemia can cause rotator cuff irritations in wheelchair users (Samuelsson et al., 2004). Most wheelchair basketball athletes suffer from a variety of overuse syndromes of the upper extremity in the long term . Although the shoulder is a common source of most complaints, approximately 68% of wheelchair users complain of some type of upper-extremity pain . Generally, the incidence of shoulder injury or pain among wheelchair users is reported to be between 30% and 52% (Curtis & Black, 1999).

Sitting posture in relation to shoulder pain in wheelchair users is not previously discussed. Since many spinal cord-injured wheelchair users, in order to be stable in wheelchair propulsion and other activities, they tend to sit in a kyphotic posture where the scapula changes its vertical alignment. The scapula will rotate in the sagittal plane forward and downward, depressing the acromial process and changing the facing of the glenoid fossa. When there has been a painful shoulder with a painful arc indicating entrapment of the greater tuberosity on the acromial process and the coraco-acromial ligament, the contributory posture of the subject must be evaluated. Due to bad posture and long time sitting they face the most of pain in back side of the body rather others part (Samuelsson et al., 2004).

Overuse, lack of proper warmup, glenohumeral and scapulo-thorasic dyskinesia, lack of dynamic lumbo-pelvic postural control, axial weight bearing forces, poor shoulder flexibility, repetitive overhead arm positioning and fatigue may all contribute to sub-acromial impingement syndrome among wheelchair athletes (Curtis & Black, 1999). Sports injuries have both physical and psychological effects that negatively affect sports performance. Once injured, an athlete may need to abstain from the activity, which may vary from days to months . The longer the withdrawal period, the more common it is to

observe detraining, as well as a loss of strength and agility. In addition, psychological conditions are also related to injuries, such as anxiety, stress, depression, fear of re-injury and low self-esteem (Hsu et al., 2017).

An excessive number of training sessions and competitions with athletes looking for high effectiveness and perfect performances cause an increase in the risk of trauma and sports-related injuries in the competitive sports practice . Injuries while playing sport affect the daily living activities of persons in a wheelchair. Due to the repetitive nature of propulsion, peripheral nerve entrapments, repetitive strain injuries, premature osteoporosis and pressure sores, especially the upper limb injuries are seen mostly in wheelchair sports participants, which may also limit sports participation (Huzmeli et al., 2017).

1.2 Rationale of the Study

Spinal cord injury (SCI) patients are increasing day by day in all over the world as well as in Bangladesh also. The major cause of this injury is road traffic accident, fall from height, gunshot injury, sports injury etc. Every year in Centre for the Rehabilitation of the Paralysed (CRP) a big number of Spinal cord injury patients are admitting for better treatment and rehabilitation. After completed rehabilitation among the paraplegic spinal cord injury patients some of them are taking vocational training, some of are go their house, some of are engage in various sports like wheelchair basketball, volleyball, badminton, cricket. Wheelchair basketball are one of the most popular game for the spinal cord injury paraplegic wheelchair users than the other games. It is playing nationally and internationally and arrange many wheelchair basketball event among them Paralympic is the most valuable event for them. Wheelchair basketball play a vital role to improve quality of life, improve to communicating power to the others, reduce stress, depression. People who are wheelchair-bound are mostly ignored and neglected by the society, but participating in sports and other activities help them feel more accepted and can show their ability what they can do. When the wheelchair basketball players playing wheelchair basketball and the users using wheelchair that time they face some secondary complications like pain, pressure sore, atrophy of the muscle, joint stiffness, urinary tract infections, autonomic dysreflexia, psychological complications etc. The cause of the developing secondary complications is do not stretching properly, do not warm up the body, do not cool down, forget to do lift, not take proper nutrition, laceration, abrasion etc. Though the sector of wheelchair basketball are developing games and day by day it is going more competitive games all over the world and the number of wheelchair users are increasing and they all are facing various secondary complications but there is no research in Bangladesh where describe about the secondary complications in wheelchair basketball players and wheelchair users together, there are lack of information about this sector. After this research people will be able know which secondary complications arises in athletes and non-athletes, why these complications arises, the participants and others will be aware about these complications so that they can prevent themselves from the secondary complications.

1.3 Research Question

What are the secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users?

1.4 Objectives

1.4.1 General objective

to describe the secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users.

1.4.2 Specific objective

- to explain the secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users
- to interpret the association between secondary complications with paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users.

1.5 Conceptual framework

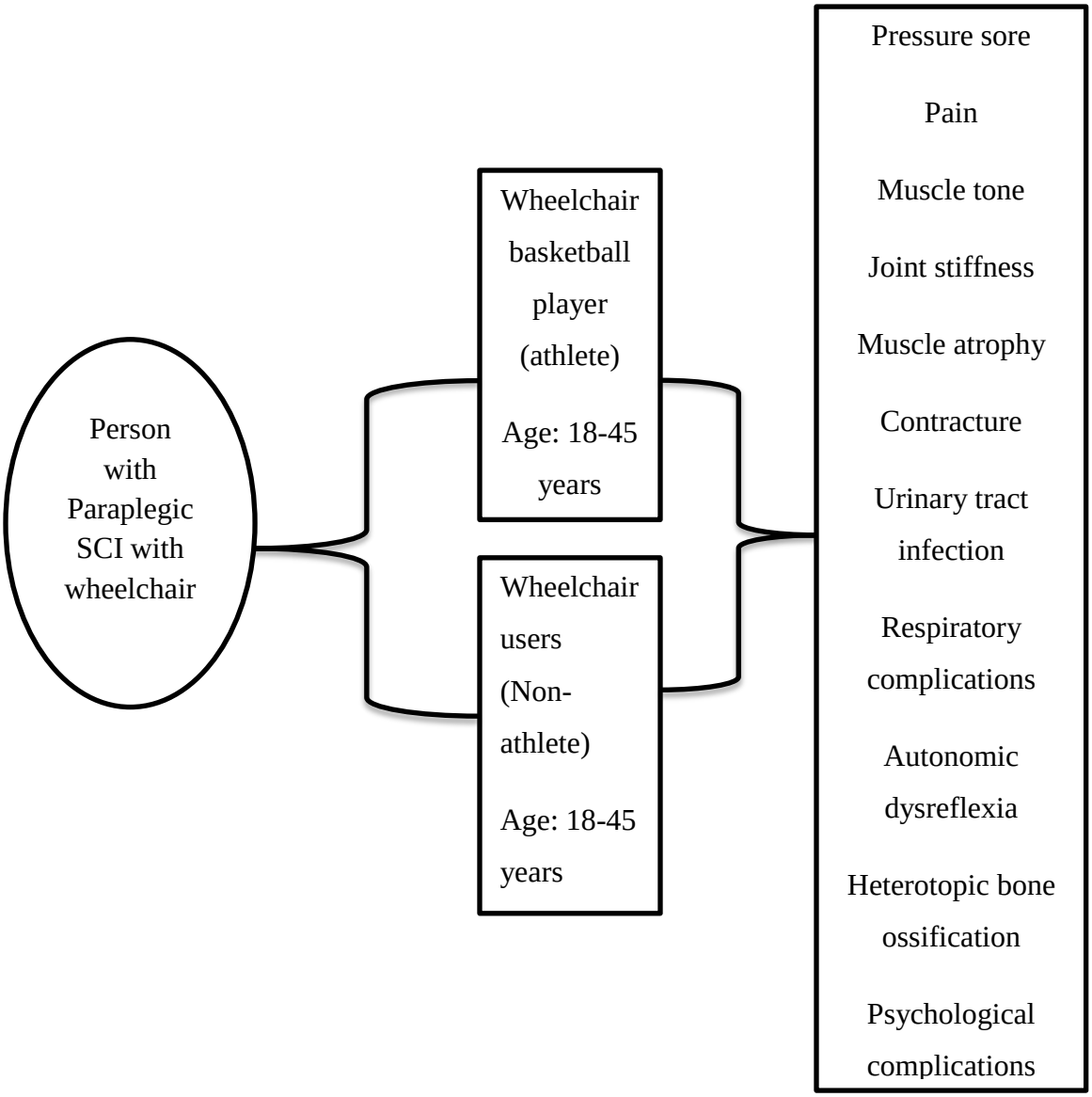

Figure 1: Conceptual Framework

1.6 Operational Definition

Spinal cord injury

Spinal cord injury (SCI) is defined as damage to the neural elements in the spinal canal (spinal cord and cauda-equina) which can be traumatic or non-traumatic and results in temporary or permanent loss of motor and/or sensory function.

Traumatic spinal cord injury

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

Paraplegia

Paraplegia refers to impairment or loss of motor and/or sensory function in the thoracic, lumbar or sacral (but not cervical) segments of the spinal cord, secondary to damage of neural elements within the spinal canal. Through paraplegia, arm functioning is spared but the trunk, legs and pelvic organs may be involved depending on the level of injury. The term is used in referring to cauda equine and conus medullaris injuries, but not to lumbosacral plexus lesions or injury to peripheral nerves outside the neural canal (Nas et al., 2015).

Tetraplegia (preferred to “quadriplegia”)

This term refers to impairment or loss of motor and/or sensory function in the cervical segments of the spinal cord due to damage of neural elements within the spinal canal. Tetraplegia results in impairment of function or paralysis of the arms, usually in the trunk, legs and pelvic organs, with including the four extremities. It does not include brachial plexus lesions or injury to peripheral nerves outside the neural canal (Nas et al., 2015).

Complete injury

Loss of sensory and motor function in the lowest sacral segment resulting in bowelbladder control.

Incomplete injury

Preservation of sensory or motor function below the neurological level of injury that included the lower sacral segment.

Skeletal level

The level of vertebra of mostly injured. Neurological level The most caudal level, where both sensory and motor function are intact.

Complete-A

No sensory or motor function in the sacral segment.

Incomplete-B

Sensory but not any function preserved below the neurological level and includes the sacral segments.

Incomplete-C

Motor function is preserved below the neurological level, and more than half of the key muscles below the neurological level have a grade less than 3.

Incomplete-D

Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscles grade 3 or more.

Incomplete -E

Motor and sensory functions are intact. Complication Complications is a process or event that interrupted or changes the prognosis of the disease and its treatment and kill the time of patient's recovery .

Secondary health conditions (SHCs)

Physical or psychological health conditions that are influenced directly or indirectly by the presence of a disability or underlying physical injury.

Pain

Pain is a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive and social components.

Pressure sore

These develop as a skin rash or redness and progress to an infected sore. Also called skin ulcers, bedsores, and decubitus ulcers.

Contractures

A contracture is a limitation in range of motion caused by a shortening of the soft tissue around a joint, such as an elbow or hip. This occurs when a joint cannot move frequently enough through its range of motion. Pain often accompanies this problem.

Heterotopic bone ossification

This is an overgrowth of bone, often occurring after a fracture. Early signs include a loss of range of motion, local swelling and warmth at the area to the touch.

Urinary tract infections

This includes infections such as cystitis and pseudomonas. Symptoms include pain when urinating, a burning sensation throughout the body, blood in the urine and cloudy urine.

Autonomic dysreflexia

Autonomic dysreflexia,sometimes called hyperreflexia, results from interference in the body's temperature regulating systems. Symptoms of dysreflexia include sudden rises in blood pressure and sweating, skin blotches, goose bumps, pupil dilation and headache. It can also occur as the body's response to pain where an individual doesn't experience sensation.

Respiratory problems

Symptoms of respiratory infections or problems include difficulty in breathing and increased secretions.

CHAPTER-II LITERATURE REVIEW

Khazaeipour et al. (2014) state that many factors such as personality and the social, cultural, and economic situation that affect recovery from the persons with spinal cord injury (SCI) often face serious health problems, such as bladder and bowel disorders, pressure ulcers, self-care, sexuality and neuropathic pain. Secondary health conditions (SHCs) hamper an active lifestyle and quality of life on top of the primary motor and sensory impairments due to the SCI. They are a frequent cause of mortality and re-hospitalizations (Adriaansen et al., 2013). In Razzak et al. (2011) study was found that only 16.4% of the study population survived for 10 years, which was much lower than figures for various developed countries where a 10 year survival rate was observed in around 80% of affected persons. This inconsistency may be due to different causes of injury, inadequate acute management, various secondary complications, lack of proper social reintegration, less attention or care by family & community and inability to treat the co-morbidity of persons with SCI. The study showed that more than 80% of the persons with SCI had died at home. This finding was inconsistent with those of other studies regarding place of death. During spinal cord injury rehabilitation effort was put into the treatment of complications and into the improvement of the physical fitness. Therefore, the period of this rehabilitation not only depends on the severity of the injury, but also depends on the rate of complications and on rehabilitation goals (Post et al., 2005).

Complications were the common causes of interfering with fruitful rehabilitation and although fitness improves during rehabilitation, it remains little (Haisma et al., 2007). There was a complex relations between fitness, the occurrence of complications and the duration of rehabilitation that need to be unravelled and this will provide tools to enhance individual outcome and rehabilitation strategies. A recent study report that, complications were high both during and after inpatient rehabilitation, had mostly occurred (Haisma et al., 2007). A study conducted between January 1, 1995 and December 31, 1999, by Nair et al. (2005), sought to record medical consequences among patients with non-traumatic spinal cord lesions (NTSCL) who were receiving rehabilitation in an in-patient facility. A

total of 297 patients with NTSCL (154 males and 143 women) were included in this research. Spasticity (169), discomfort (149), urine incontinence (147), melancholy (114), respiratory infections (101), constipation (92), pressure ulcers (89), contractures (52), and sleep disturbances were among the most common problems seen in our patients (43). People with tetraplegia were more likely to have complications than those with paraplegia. But in paraplegic patients urinary tract infection and bowel & bladder incontinence were more common than tetraplegic patients. About 74.7% of patients with spinal cord injury were mostly committed pain, spasticity, contractures and heterotopic ossifications.

Patients with spinal cord injury have decreased immune function, impaired nutritional status, and depressed cell adhesion, all of which delay wound healing and impair the body's ability to heal pressure ulcers completely, therefore, spinal cord injury can be a risk factor for deep tissue injuries, even if a person is an elite athlete. Deep tissue damage may be induced through two main mechanisms of external and/or internal pressure forces. External pressure and/or shear force and its counteractive force from bone prominences directly cause tissue ischaemia and deformation, leading to deep tissue necrosis. By contrast, significant swelling can cause ischaemia and tissue necrosis. Local pressure is a very common cause of pressure ulcers, and the distribution of pressure depends to a great extent on the overall functional status (Stekelenburg et al., 2008).

Gupta et al. (2009) showed in a cross-sectional research of non-traumatic spinal cord lesions (NTSCL) after inpatient rehabilitation from June 2005 to January 2008 was designed to investigate the epidemiology, complication, neurological, and functional outcomes following inpatient rehabilitation. Among those who took part in the research, 50 percent had urinary tract infections, with spasticity and urine incontinence rounding out the top three most prevalent side effects (31.25 percent). To investigate the incidence of selected sequelae after traumatic spinal cord injury during acute care and to identify the risk factors for pressure ulcers, Joseph & Wikmar (2016) conducted a prospective research. As a result of the investigation, data from 141 patients were analyzed (about 97 percent). A total of 71 individuals (50.3 percent) suffered at least one problem. Pressure ulcers were the most prevalent (n=42; 29.8%), followed by pulmonary problems (n=33;

23.4%) and urinary tract infections (n=24; 17%). During rehabilitation in Bangladesh Razzak (2013) found that (N=53) Spasticity 52.8 percent, UTI 22.6 percent, Pressure ulcer 7.5 %, Pain 45.2 percent, Depression 16.9 percent, Dependent edema 30.1 percent, and No complication 15.0 percent were the most prevalent medical problems..

People with disabilities are well aware of the health advantages of regular exercise, and sports involvement has also been shown to enhance their quality of life (Blauwet & Willick, 2008). One probable cause for the lack of engagement is the high occurrence of sports-related injuries, which may have a significant impact on everyday life for people in wheelchairs. Athletes with impairments are just as likely to be injured as their peers who are able-bodied (Churton & Keogh, 2013).

Wheelchair basketball players and non-athletic wheelchair users were studied in cross-sectional studies to examine and evaluate their shoulder discomfort, functional ability, and quality of life. All 48 paraplegic spinal cord injury patients who participated in this research were wheelchair basketball players (25), as well as non-athletes (23). This research observed no differences between athletes and non-athletes in the Wheelchair User's Shoulder Pain Index or Satisfaction with Life Scale score ($P > 0.05$). Athletic subjects performed better on functional capacity tests than non-athletes did on height in the vertical reach test, 1-stroke push distance and timed front wheeling (P 0.05). Athletes' wheelchair users had a greater functional capacity than non-athletes', but they report equal levels of shoulder discomfort and overall well-being (Ustunkaya et al., 2007).

According to a cross-sectional research conducted on a total of 16 wheelchair basketball players by Yanci et al. (2015), Wheelchair Basketball (WB) player's physical qualities will be studied using sprint, agility and strength field tests. First, a handgrip strength test was used to quantify WB players' ability to create force, and this is the first research to do so. WB's throwing and passing skills are so prevalent that developing training regimens that focus on them would be a good idea for players looking to enhance their WB skills.

For example, according to Trgovcevic et al. (2014), (n=100) in a cross-sectional research, Researchers aimed to examine the variations in quality of life judgments between those with spinal cord injuries and the general population. the study's findings, Both health-

related and general quality of life were poorer in persons with spinal cord injury than in the control group. However, only a portion of the assessed quality of life may be attributed to the severity of the damage. A cross-sectional research by Vancini et al. (2019) found that of the 39 participants, 23 were wheelchair athletes and 16 were non-athletes. Aims of the current research include comparing the quality of life, symptoms of depression and anxiety, and the mood state profile of wheelchair athletes with those of non-athletes. Non-athletes and athletes did not vary in terms of quality of life, depression and anxiety symptoms, and mood state profiles, according to the findings of the research. Non-athletes and athletes alike, on the other hand, displayed moderate to low levels of anxiety and depression.

According to Hutzler et al. (2013), 33 females and 57 men participated in a prospective cohort study (N=90). Young persons with physical disabilities who participated in various sport modalities were studied to see whether involvement had an influence on their quality of life and perceived social competence . Reverse integrated basketball engagement was shown to be more beneficial than participating in competitive and leisure sports separately. A person's potential to benefit from sports engagement was not hampered by their lack of functional ability. As stated in a Case–Control study(n=65) by Zainudin et al. (2021) to investigate variables that are linked with sports involvement after spinal cord injury (SCI). Traumatic SCI and pre-injury interest in sports were predictors of sports participation post-SCI. Pre-injury sports participation, being employed, and the ability to drive own vehicles were positively associated with sports participation. Findings from this study suggest a few crucial differences in facilitators and barriers to sports participation in Malaysia compared to other countries.

There were 26 athletes and 26 non-athletes (n=52) in Finley & Rodgers (2004) cross sectional study of manual wheelchair users (MWCUs). Athletes and non-athletes who used manual wheelchairs for transportation were evaluated for the presence and kind of shoulder pathology (MWCUs) Athletes and non-athletes were found to have similar rates of shoulder discomfort, both previous and current. 32/52 respondents reported shoulder discomfort, with 29 percent saying that they are now suffering from shoulder pain. Individuals with a history of shoulder discomfort had significantly longer time from

beginning of impairment (p = 0.01) and significantly longer time in a wheelchair (p = 0.01). 44 percent of the sore shoulders evaluated had rotator cuff impingement symptoms, whereas 50 percent had biceps tendonitis symptoms. 28 percent of the achy shoulders were judged to be unstable. Participation in sports had no effect on the likelihood of shoulder discomfort in the manual wheelchair population, according to these studies. The most prevalent condition was bicipital tendinitis with impingement syndrome.

In a cross-sectional research (N=60) Yildirim et al. (2010), wanted to find out how much discomfort wheelchair basketball players with trunk control and those without trunk control experience. The wheelchair basketball classification system of the International Wheelchair Basketball Federation (IWBF) was used to assess the performance of the players. With regard to the duration of their disability, the daily number of transfers made to wheelchair, and Performance Corrected Wheelchair User's Shoulder Pain Index (PC-WUSPI) score (p 0.05), statistically significant differences were found between wheelchair basketball players with trunk control and wheelchair basketball players with trunk control. Players lacking trunk control had a higher PC-WUSPI score (p 0.05). Wheelchair basketball players' shoulder soreness should be studied, according to a recent study. Stabilization of the trunk is the most important aspect in ensuring that the shoulder joint's various articulations are properly loaded.

People with spinal cord injuries (SCI) discharged from a Bangladeshi hospital were studied in a mixed retrospective-prospective cohort research (n=350) to identify their psychological and socioeconomic status, complications and quality of life. As a result of the research, 350 persons were released from the hospital in 2011 with a recent spinal cord injury. There have been 55 deaths at the end of 2014, 283 of those who are still alive were questioned (96 percent follow-up rate). 47 percent of the participants were employed at the time of the interview. Pressure ulcers were seen in 26% of wheelchair-bound patients. It was found that the Mental and Physical Component of the SF12 had mean scores of 32.0 points (5.5), with a standard deviation of 3.9. The SCI Secondary Conditions Scale, Centre for Epidemiologic Studies Depression Scale and World Health Organization Disability Assessment Schedule had median (interquartile range) scores of

15 percent (10 to 19), 11 points (9 to 18), and 26 points (23 to 26) among wheelchair-dependent individuals. There are a large number of persons with SCI who are housebound, jobless, and poor in Bangladesh. Their quality of life is severely impacted, and they report moderate levels of depressive symptoms (Hossain et al., 2016).

In a multicenter longitudinal research (n=212), Haisma et al. (2007) found that problems after spinal cord injury during and after inpatient rehabilitation were more common than previously thought. Multi-level random coefficient analysis of the study's findings indicated that problems after spinal cord damage were widespread. At each examination, the majority of individuals experienced neurogenic and musculoskeletal discomfort, or spasticity. Complications persisted for a year after discharge, affecting 49% of patients with urinary tract infections and 36% with pressure sores. Spasticity increased considerably during inpatient therapy whereas pain reduced dramatically. In general, the risk of problems rose with age, body mass index, severe injury, tetraplegia, and total lesion. Following a spinal cord injury, complications are prevalent. Subpopulations of patients who have been discharged from rehabilitation facilities need special monitoring. There are correlations between secondary health issues and health choice in a group of persons with chronic spinal cord injury, according to Craven et al. (2012) in a cross-sectional telephone survey (n=357) (SCI). Compared to low impact groups, participants in the study who had lower levels of spasm, urinary tract infection, autonomic dysreflexia, circulatory and respiratory issues, chronic pain or joint pain, psychological distress or depression had lower Health Utilities Index-Mark III (HUI-Mark III) scores (P 0.001). The HUI-Mark III scores were also lower in high-impact groups (P 0.05) than in low-impact groups for pressure sores and accidental injuries as well as for contractures, heterotopic bone ossification and sexual dysfunction. People with spinal cord injuries (SCI) have lower health preferences when they have secondary health issues that have a large negative effect.

Among a cross-sectional research (n=89), Samuelsson et al. (2004) examine the impact of shoulder pain on activity and involvement in paraplegic wheelchair users. They also detail the prevalence and kind of shoulder discomfort. the study's findings, Twenty-one of the participants reported having shoulder soreness (37.5 percent). The kind and

implications of shoulder discomfort were described using the data from 13 of these participants. Results of muscle atrophy, discomfort and impaction of tendons have been documented. Using the Klein & Bell adl-index, we observed no differences in activity of daily living performance between those with and without shoulder discomfort (P=0.08). Disabilities, activity constraints, and participation restrictions were not correlated (P>0.08). More than 50 occupational difficulties were found owing to shoulder discomfort, according to the Canadian Occupational Performance Measure (COPM). About 54% of them have to do with taking care of oneself. The effects of paraplegic wheelchair users' shoulder discomfort are mostly tied to their daily activities. Because wheelchair usage is likely to induce shoulder difficulties, this will become a self-fulfilling prophecy. Wheelchair users' shoulder difficulties may be alleviated with further study.

To investigate the prevalence of comorbidities, secondary health disorders (SHCs), and multi-morbidity in the Finnish population with spinal cord injury, Tallqvist et al. (2022) conducted a cross-sectional research (n=884) (SCI). the study's findings, People under the age of 76 had the greatest rate of comorbidities. SHCs were more common in patients with SCIs that fell into severity groups C1–4 of the AIS A, B, and C. Injury is widespread in wheelchair sports, despite the application of contemporary preventative methods. Participation in wheelchair sports provides a broad variety of advantages, including both physical and social ones. Wheelchair sports participation is hampered by the high expense of equipment and the difficulty of getting to and from practices. When it comes to being wounded, the hands are the most often affected body part (Hallaceli, 2017).

CHAPTER-III METHODOLOGY

3.1 Study design

A cross-sectional descriptive study was performed with structured questionnaires and interviews were conducted spinal cord injury (SCI) paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users. This study design was appropriate to find out the objectives. The data was collected all at the same time or within a short time frame.

This study aimed to find out the the association between secondary complications with spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users. For this reason, the type study was chosen Cross-sectional study. In the case of the cross-sectional study, the most important advantage was it needs less time and it is also cheap as there was no follow up, fewer resources required running the study (Nagendrababu et al., 2020).

The defining characteristics of a cross-sectional study are that it can evaluate different population groups at a single point in time and the findings are drawn from whatever fits into the frame. It allows researchers to compare many different variables at the same time for example, we can look at age, gender, income, and educational status about walking (Victorson et al., 2015).

3.2 Study population

Paraplegic wheelchair basketball players and wheelchair users was considered as the study population. Convenience sampling technique was applied to select the sample. A process used in statistical analysis in which a predetermined number of observations was taken from a larger population. The methodology used to sample from a larger population will depend on the type of analysis being performed.

3.3 Study Site

Data was collected from Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka.

3.4 Sample Size

A sample is a group of subjects that will be selected from the population, who are used in a piece of research (Hicks, 2013). A sample is a smaller group taken from the population. Sometimes the sample size may be big and sometimes it may be small, depending on the population and the characteristics of the study (Bettany, 2012).

There is no documented prevalence of secondary complications in paraplegic wheelchair basketball players and non-athletes paraplegic wheelchair users in Bangladesh. So, sample size was estimated according to the following criteria. The expected prevalence was taken to be 50% in athletes and non-athletes. Sampling procedure for cross sectional study done by following equation-

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

Here, Z is the level of significance that corresponds to a 95% confidence level. that is,

Z (confidence interval) = 1.96

P (prevalence) =50% (Ustakyna et al., 2007)

And, d (tolerance error) = 0.05

$$n = \frac{1.96^2(0.5)(1-0.5)}{(0.05)^2}$$

$$= 384$$

So this research aimed to focus 384 samples following the calculation above primarily. During the data collection period there were 55 wheelchair basketball players available. So the study able to conduct 110 paraplegic wheelchair basketball players and wheelchair users within the timeframe.

3.5 Sampling procedure

Finding the appropriate number and type of people to take part in the study is called sampling. In this study, convenience sampling techniques were used to collect the samples.

3.6 Data collection technique

The data was collected by self- structural questionnaire and a face-to-face interview. It is useful because this technique ensures that the researcher will obtain all the information required, while at the same time it gives the participants freedom to respond and illustrate concepts. The sample was taken by using a convenience sampling procedure. 110 participants had been taken for this study through the inclusion criteria. A Bengali questionnaire was used for data collection.

3.7 Inclusion criteria

For wheelchair basketball players:

- Playing wheelchair basketball.
- Paraplegic spinal cord injury patient.
- Both male and female.

For wheelchairs users:

- Having the ability to mobilizing the wheelchair independently.
- Both male and female.

3.8 Exclusion criteria

For wheelchair basketball players:

- Those who are not willingly participant.
- Those who are not Spinal cord injured.

For wheelchairs users:

- Tetraplegic patient.
- Those who are not co-operative.
- Career dependent.
- Those who have traumatic brain injury, acute psychiatric illness.
- Unconscious patient.

3.9 Pilot Study

The investigator had accomplished the pilot study with 10 participants from the paraplegic wheelchair basketball players and wheelchair users before starting the data collection. The test was performed as it helped the investigator to refine the data collection plan, to modify the questionnaire and to result analysis and design.

3.10. Data analysis

Descriptive statistics were used to analyze data. Descriptive statistics refers methods of describing a set of results in terms of their most interesting characteristics (Hicks, 2009). Data were analyzed with the software named Statistical Package for the Social Science (SPSS) version 20.0. The variables were labeled in a list and the researcher established a computer based data definition record file that consist of a list of variables in order. The researcher put the name of the variables in the variable view of SPSS and defined the types, values, decimal, label alignment and measurement level of data. The next step was cleaning new data files to check the inputted data set to ensure that all data has been accurately transcribed from the questionnaire sheet to the SPSS data view. Then the raw data were ready for analysis in SPSS. Data were collected on frequency and contingency tables. For the study of the association of numeric variables chi squared test were used. Data were analyzed by descriptive statistics and calculated as percentages and presented by using table, bar graph, pie charts etc. Microsoft office Excel 2017 was used to decorating the bar graph and pie charts. The results of this study were consisted of quantitative data. A chi-squared test, also written as $\chi 2$ test, is any statistical hypothesis test where the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. The chi-squared test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories.

3.12 Data collection tools

Data was collected by using a semi structured type of questionnaire paper, that was developed by the investigators which was modify from the Spinal cord injury secondary conditions scale (SCI-SCS) and conducting interview to collect information. Questionnaire would provide information about demographic information (age, sex, educational status, occupations and residential area, injury related information, different types of complications after using wheelchair and playing wheelchair basketball), pen, paper, a written questionnaire, calculator, file, and consent paper.

3.13 Level of Significance

To find out the significance of the study, the "p" value was calculated. The p values refer to the probability of the results for the experimental study. A p-value is called the level of significance for an experiment and a p-value of <.05 was accepted as a significant result for health service research.

3.14 Ethical consideration

The researcher maintained some ethical considerations: The research proposal including methodology was submitted to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) for oral presentation and defense was done in front of IRB. Then IRB approved the proposal. A researcher had followed the Helsinki guideline of the world medical association. This protocol presentation was first submitted to the Institutional Review Board (IRB) of BHPI and initial permission was taken. Permission was taken from the Head of the Department of Physiotherapy, BHPI, CRP before data collection. Permission was taken from the In-Charge of SCI Unit, CRP for data collection from the patients. Permission was taken from the Rehab officer of the CRP to collect data from the wheelchair basketball player. The researcher ensured the confidentially of participants and shared the information only with the research supervisor. All rights of the participants were reserved and the researcher was accountable to the participant to answer any type of study-related question. The participants would be informed before inviting participation in the study. The ethical consideration was obtained through an informed consent letter to the participant. Consent was obtained by providing each

participant a clear description of the study purpose, the procedure involved in the study and also informing them that if they wish they could withdraw themselves any time from the study. The necessary information had been kept secure place to ensure confidentiality. All kinds of confidentiality are highly maintained. They were also assured that it would not cause any harm. The researcher also ensured that the organization (CRP) was not hampered by the study. Then they signed the consent form.

3.15 Inform consent

Written consent (appendix) was given to all participants before the completion of the questionnaire. The researcher explained to the participants about his or her role in this study and the aim and objective of this study. The researcher received written consent from every participant including signature. So the participant assured that they could understand the consent form and their participation was voluntary. The participants were informed clearly that their information would be kept confidential. The researcher assured the participants that the study would not be harmful to them. It was explained that there might not be a direct benefit from the study for the participants but in the future cases like them might get benefit from it. The participants had the right to withdraw consent and discontinue participation at any time without prejudice to present or future care at the spinal cord injury (SCI) unit of CRP. Information from this study was anonymously coded to ensure confidentiality and was not personally identified in any publication containing the result of this study.

3.16 The rigor of the study

A rigorous manner was maintained to conduct the study. The study was conducted cleanly and systemically. During the data collection, it was ensured participants were not influenced by experience. No leading questions were asked or no important questions were avoided. The participant information was coded accurately and checked by the supervisor to eliminate any possible errors. The entire information was handled with confidentiality. In the result section, the outcome was not influenced by showing any personal interpretation. Every section of the study was checked and rechecked by the research supervisor.

CHAPTER-IV RESULTS

In this research, a total of 110 participants who were spinal cord injured paraplegic wheelchair basketball players and non-athletes paraplegic wheelchair users were questioned. The results which were found have been showed in different bar chart, pie charts and tables.

Table 1: Socio-demographic characteristics of the participants

Factors	Subgroups	Athletes		Non-athletes	
		n=55	%	n=55	%
Age	18-25	19	35	26	47
	26-35	29	53	19	35
	36-45	7	12	10	18
Gender	Male	36	65	46	84
	Female	19	35	9	16
Occupation	Job	9	16	6	11
	Business	8	15	9	16
	Housewife	9	16	4	7
	Farmer	9	16	9	16
	Unemployed	5	9	8	15
	Others	15	28	19	35
Education	Illiterate	3	6	3	6
	Primary education	6	11	14	25
	Secondary education	26	47	20	36
	Higher secondary	14	25	16	29
	Bachelor or above	6	11	2	4
Marital status	Married	27	49	26	47
	Unmarried	28	51	29	53
Living area	Rural	25	45	35	64
	Semi-urban	13	24	11	20
	Urban	17	31	9	16
Types of injury	Traumatic	45	82	50	91
	Non-traumatic	10	18	5	9
Skeletal level	Thoracic	35	64	32	58
	Lumbar	20	36	23	42
ASIA level	Complete A	23	42	22	40
	Incomplete B	17	31	20	36
	Incomplete C	11	20	10	18
	Incomplete D	4	7	3	6

4.1 Socio- demographic characteristic

4.1.1 Age(n=110)

Among the 55 athletes, maximum athletes were between the 26-35 age range 53%(n=29), age range 18-25 were 35%(n=19) and age range 36-45 were 12%(n=7).In non-athletes 55 maximum age range were between the 18-25 which is 47%(n=26), age range 26-35 were 35%(n=19) and age range 36-45 were 18%(n=10).

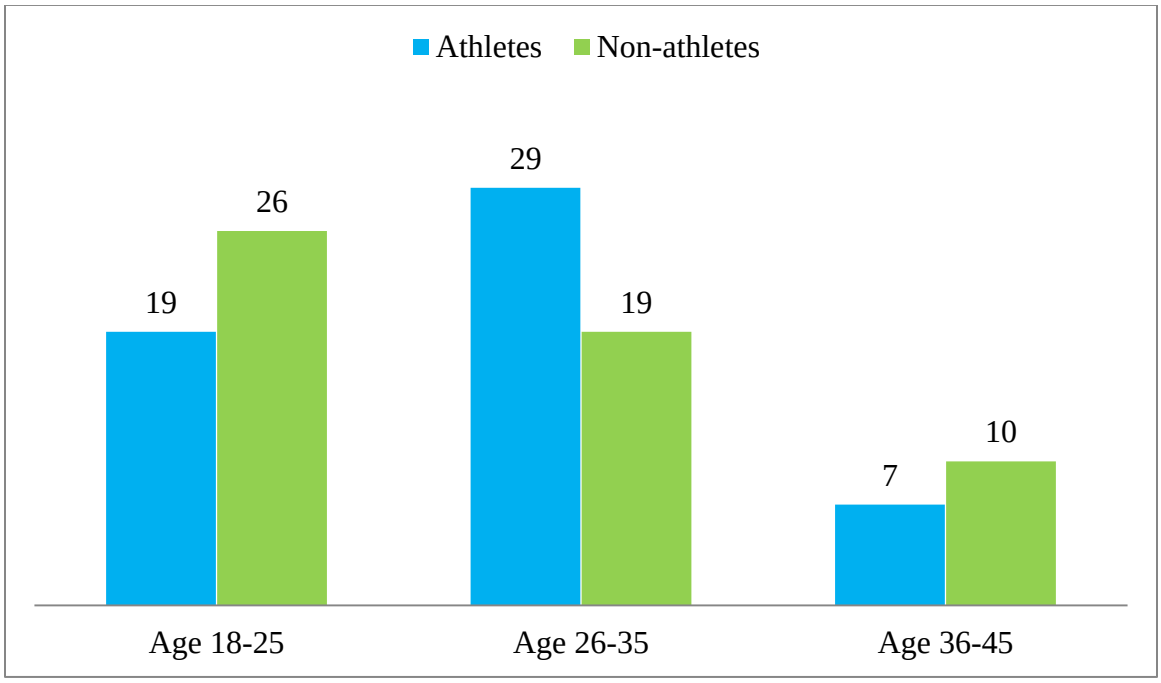

Figure 2: Age range of the participants

4.1.2 Gender(n=110)

Male was predominantly higher than female in both group. In athletes (n=55) male were 65%(n=36) and female were 35%(n=19). In the non-athletes(n=55) male were 84%(n=46) and female were 16%(n=9).

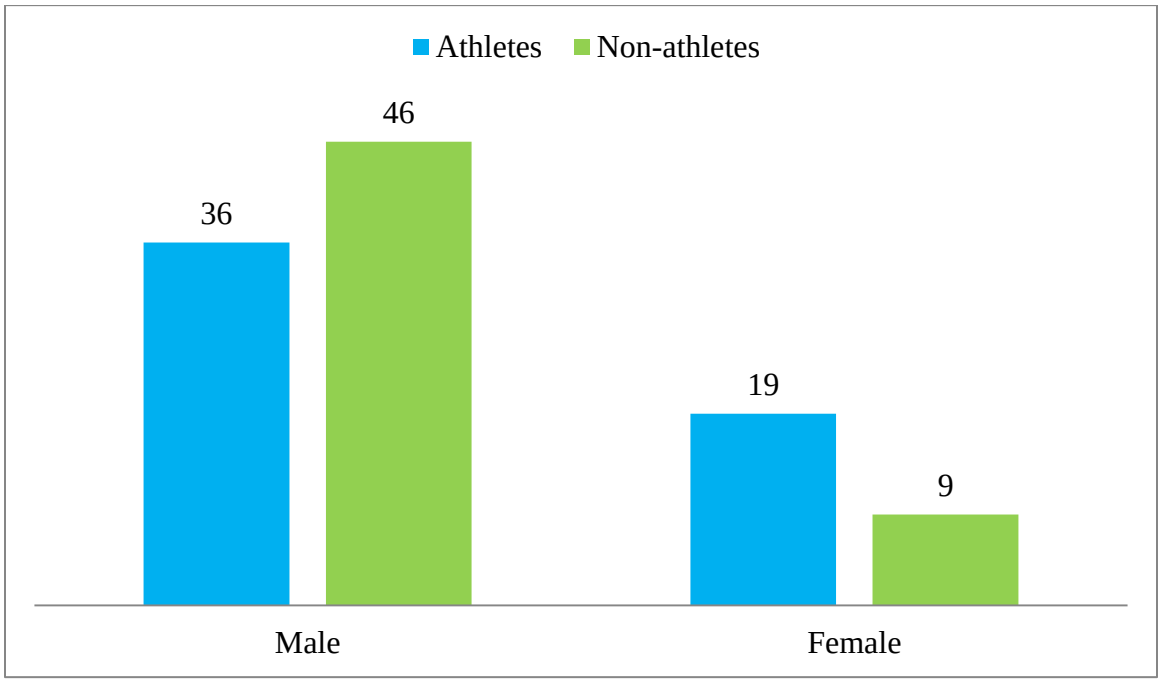

Figure 3: Gender range of the participants

4.1.3 Occupation(n=110)

Occupation of the athletes(n=55), 16%(n=9) were job, 15%(n=8) were business, 16%n=(9) were housewife, 16%(n=9) were farmer, 9%(n=5) were unemployed, 28%(n=15) were others like student, day labour, driver etc. In the non-athletes(n=55) occupation 16%(n=9) were job, 16%(n=9) were business, 7%(n=4) were housewife, 16%(n=9) were farmer, 15%(n=8) were unemployed, 35%(n=19) were students or others occupation.

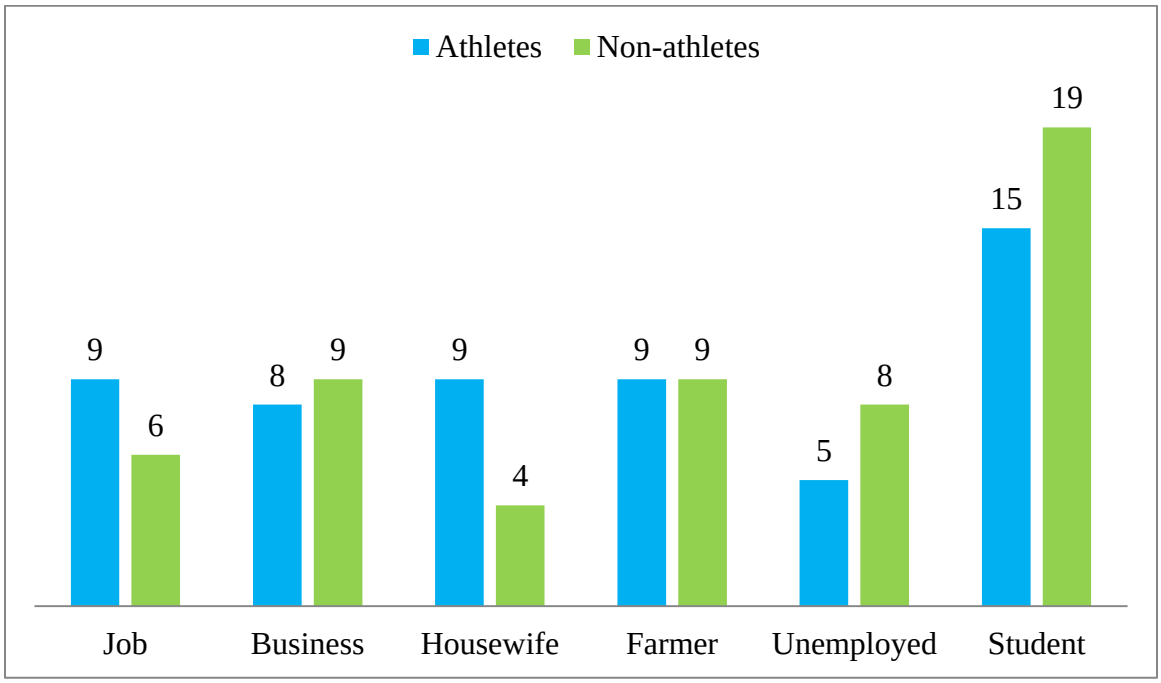

Figure-4: Occupational status of the participants

4.1.4 Educational status(n=110)

Among the athletes(n=55), 6%(n=3) were totally illiterate whereas 11% (n=6) completed primary education, 47% (n=26) completed Secondary School Certificate which is the maximum in number, 25%(n=14) completed higher secondary level education, 11%(n=6) were completed bachelor or above degree. In non-athletes(n=55), 6%(n=3) were totally illiterate whereas 25% (n=14) completed primary education, 36% (n=20) completed Secondary School Certificate which is the maximum in number, 29%(n=16) completed higher secondary level education, 4%(n=2) were completed bachelor or above degree.

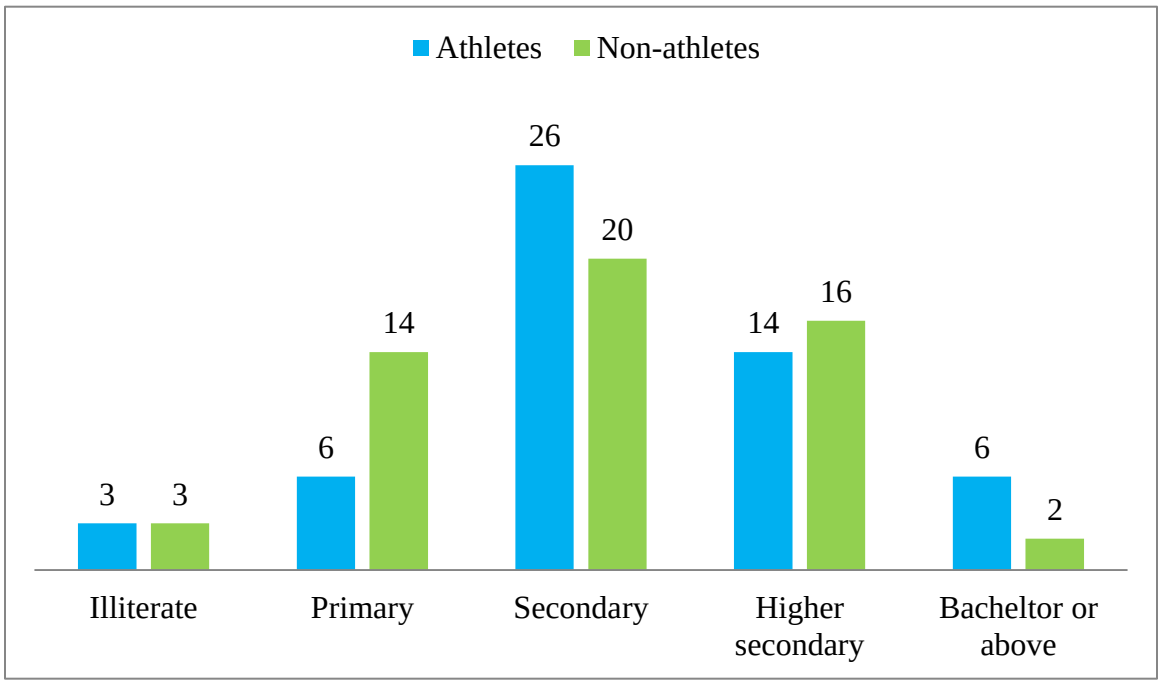

Figure 5: Educational level of the participants

4.1.5 Marital status(n=110)

Among the athletes(n=55), married were 49%(n=27) and unmarried were 51%(n=28). In non-athletes(n=55), married were 47%(n=26) and unmarried were 53%(n=29).

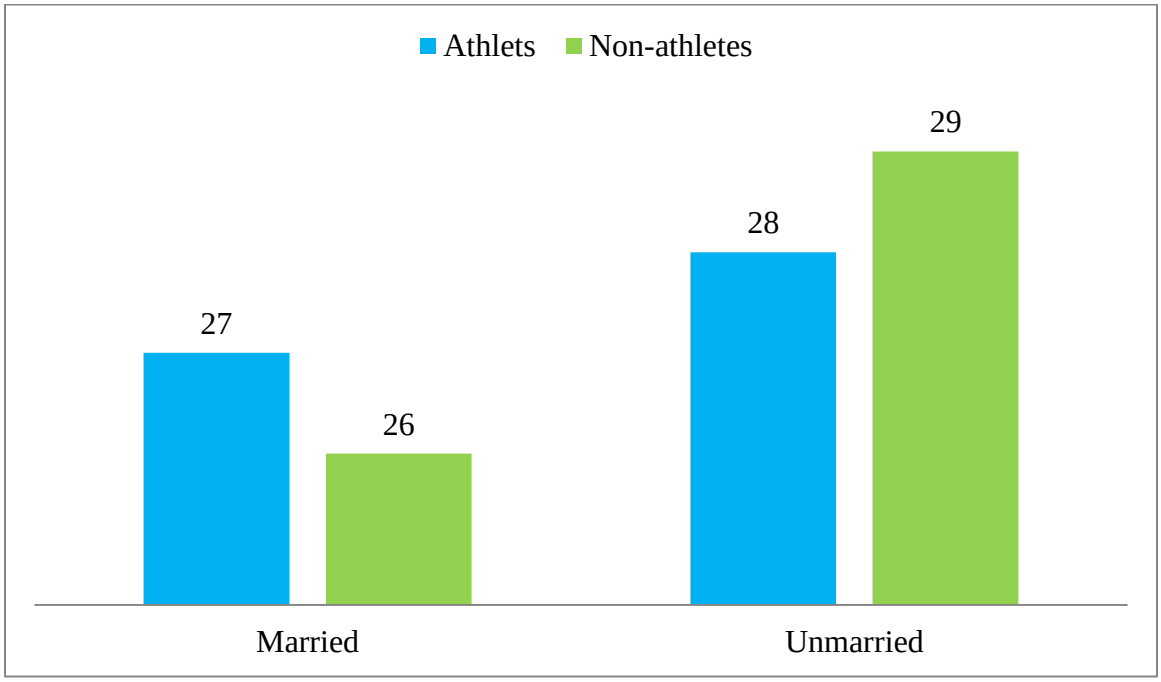

Figure 6: Marital status of the participants

4.1.6 Living area(n=110)

Most of the respondents who are suffering from spinal cord injury were from rural Areas. In athletes(n=55), from rural were 45%(n=25), from semi urban place were 24%(n=13) and from urban were 31%(n=17). In non-athletes(n=55), from rural were 64%(n=35), from semi urban were 20%(n=11) and from urban were 16%(n=9).

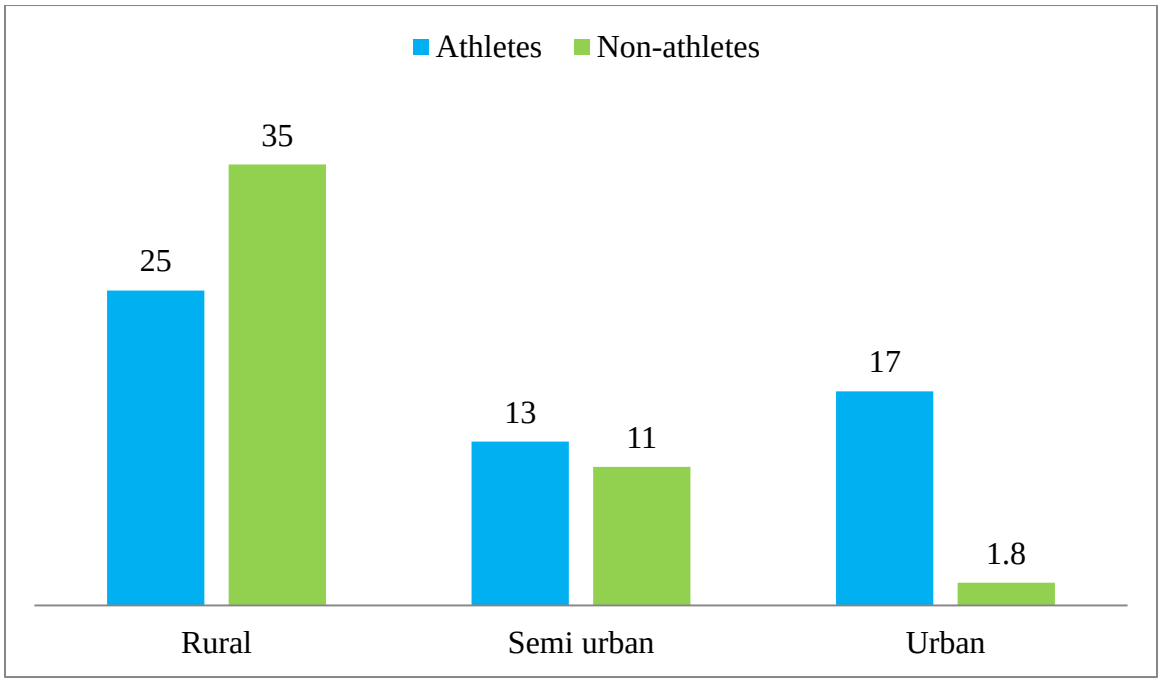

Figure 7: Living Area of the participants

4.1.7 Types of injury(n=110)

Most of the participants were traumatic spinal cord injured patient. In athletes(n=55), traumatic were 82%(n=45) and non-traumatic were 18%(10). In non-athletes(n=55), traumatic were 91%(50) and non-trumatic were 9%(5).

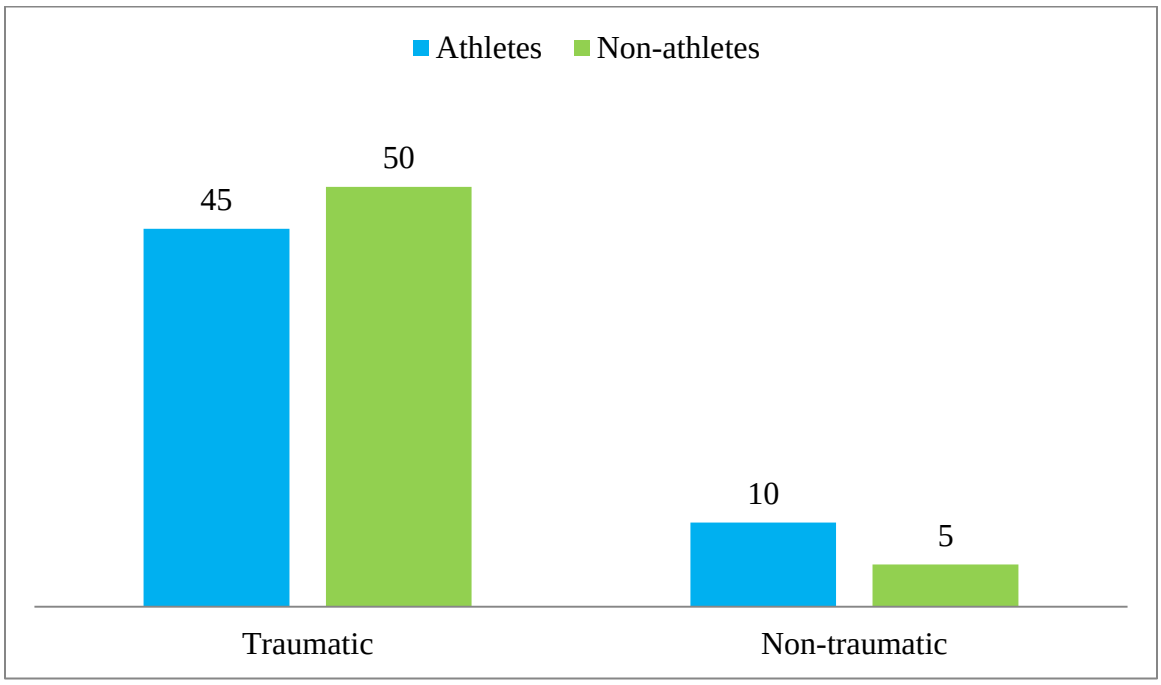

Figure 8: Type of injury into the participants

4.1.8 Skeletal level(n=110)

Most of the participants injury level in thoracic region. In athletes(n=55) group injury level were 64%(35) in thoracic region and 36%(20) were in lumbar region. In non-athletes(n=55) group injury level were 58%(32) in thoracic region and 42%(23) were in lumbar region.

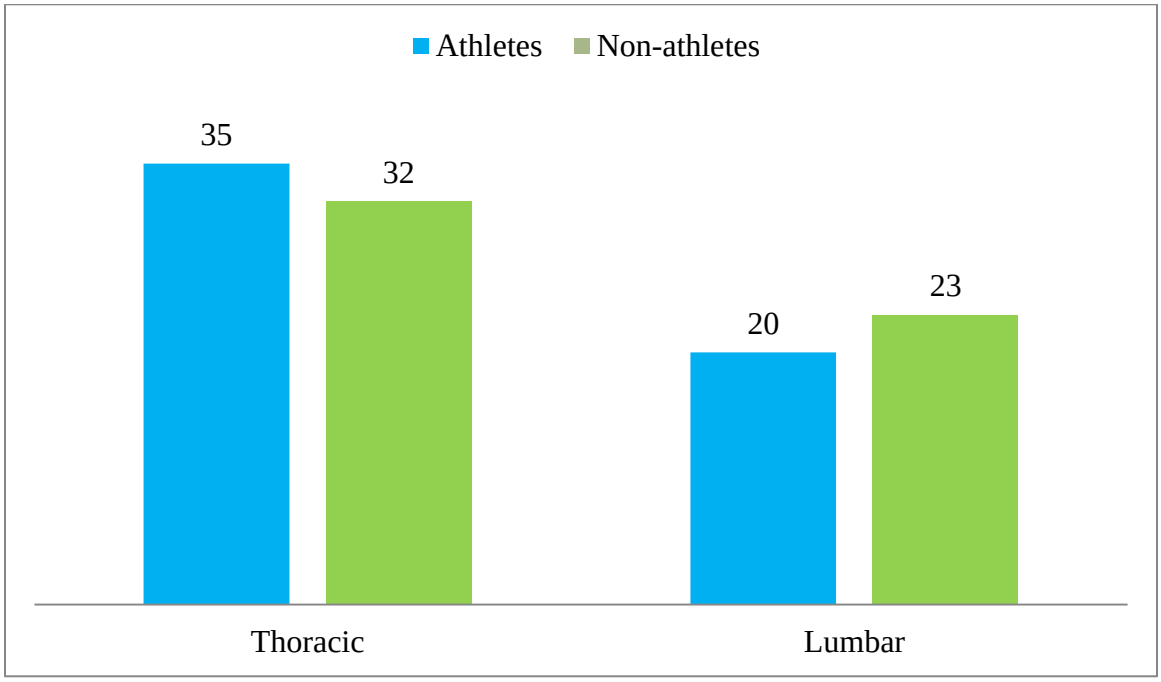

Figure 9: Skeletal level of the participants

4.1.9 ASIA Scale level of the participants(n=110)

Among of all the participants Complete A and Incomplete B were the maximum. In athletes(n=55), ASIA level were 42%(23) were Complete A, 31%(17) were Incomplete B, 20%(11) were Incomplete C, 7%(4) were in Incomplete D and Incomplete E were absent. In the non-athletes(n=55), ASIA level were 40%(22) were Complete A, 36%(20) were Incomplete B, 18%(10) were Incomplete C, 6%(3) were in Incomplete D and Incomplete E were absent.

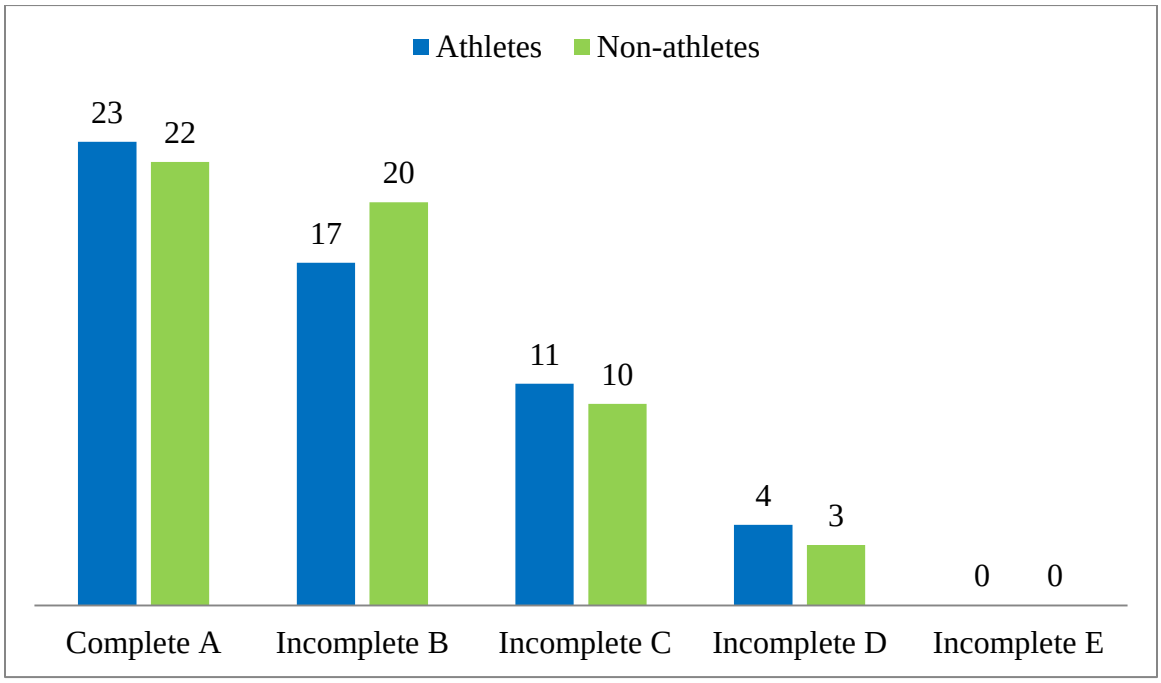

Figure 10: ASIA Scale level injury

4.1.10 Duration of using wheelchair of all the participants

Among the 110 participants , highest number of participants were using wheelchair more than one year 61%(n=67), using wheelchair 15 days 6%(n=7), 1 month 5%(n=6), 3 month 11%(n=12), 6 month 17%(n=18).

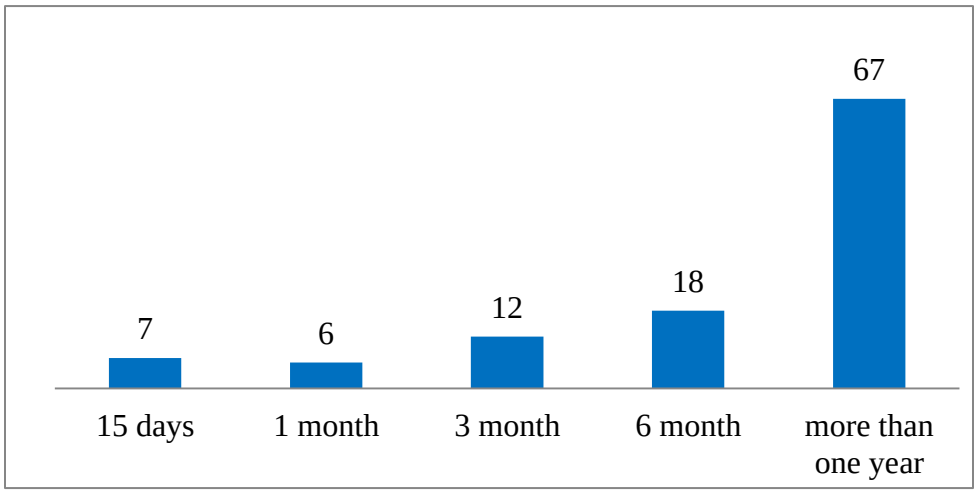

Figure 11: Duration of using wheelchair of all the participants

4.1.11 Difficulties to using wheelchair

Most of the participants faced difficulties to using wheelchair at the initial time. Faces difficulties to operate wheelchair at the beginning 79%(n=87), can used wheelchair easily 21%(n=23). At present some of were faced difficulties to operate wheelchair which number were few (8%) but most of them were easily operate wheelchair at present situation without any problem (92%).

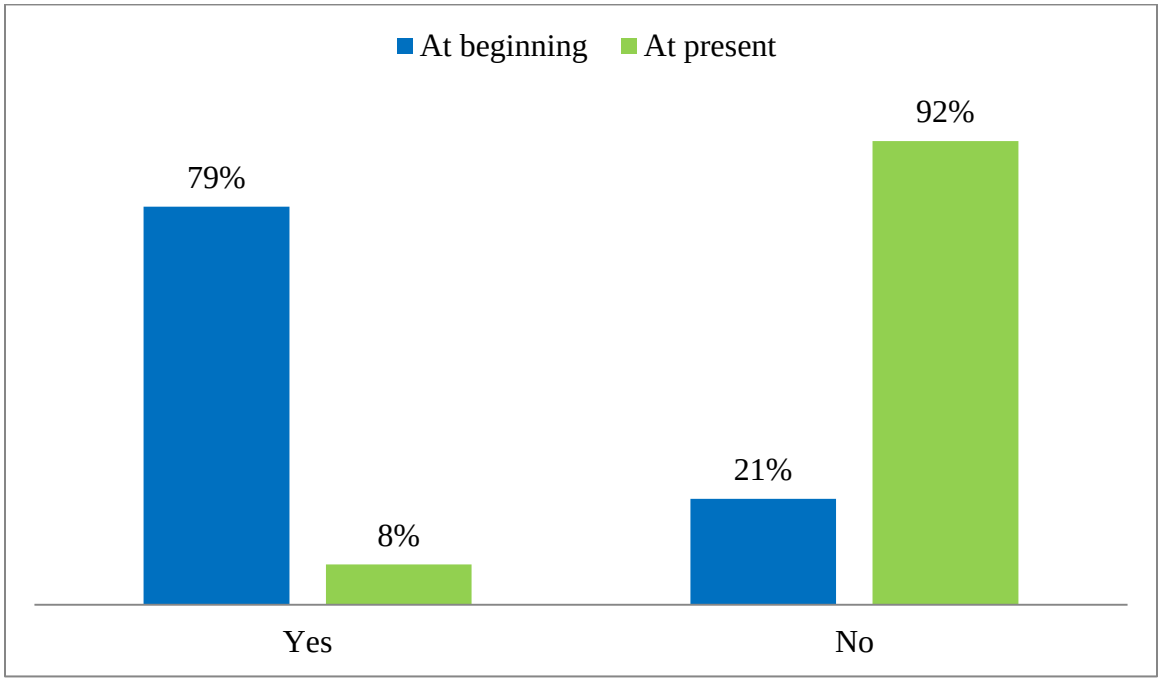

Figure 12: Difficulties to using wheelchair

4.1.12 Duration of playing wheelchair basketball

Among the 55 wheelchair basketball player most of the players have been plying wheelchair basketball more than one year and it is number were 33 player, 1 month 11 player and 3 month 11 player have been playing wheelchair basketball.

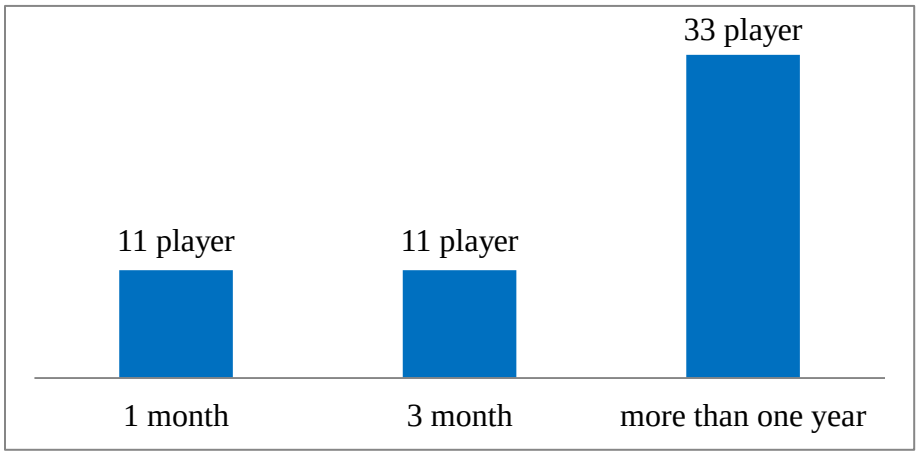

Figure 13: Duration of playing wheelchair basketball

Table 2: Status of secondary complications in wheelchair basketball players and non-athletes wheelchair users:

	Athletes(n=55)	Non-athletes(n=55)
Months of playing wheelchair basketball	1 month 20% (n=11) 3 month 20% (n=11) More than 12 months 60% (n=33)	NA
Pressure sore	14% (n=8)	43%(n=24)
Pressure sore number	One 7%(n=4) Two 7%(n=4)	One 24%(n=13) Two 14% (n=8) More than two 5%(n=3)
Area of pressure sore	Buttock(n=1) Ankle7%(n=4) Hip5%(n=3)	Buttock 23%(n=13) Ankle 13%(n=7) Shoulder 7%(n=4)
Grade of pressure sore	Grade-1(n=2) 3% Grade-2(n=6) 11%	Grade-1(n=15) 27% Grade-2(n=6) 11% Grade-3(n=3) 5%
Causes of pressure sore	Due to long time sitting(n=1) Laceration 9%(n=5) Improper nutrition (n=1) Forgot to do lift(n=1)	Long time sitting 16%(n=9) Laceration 3%(n=2) Abrasion 9%(n=5) Improper nutrition 5%(n=3) Forgot to do lift 9%(n=5)
Pain	78%(n=43)	74%(n=41)
Severity of pain	Mild pain 33%(n=18) Moderate pain 31%(n=17) Severe pain14%(n=8)	Mild pain 34%(n=19) Moderate pain 29%(n=16) Severe pain 11%(n=6)
Site of pain	Cervical 7%(n=4) Thoracic 14%(n=8) Lumbar 11%(n=6) Knee 9%(n=5) Shoulder 29%(n=16) Others 7%(n=4)	Cervical 9%(n=5) Thoracic 11%(n=6) Lumbar 29%(n=16) Knee 7%(n=4) Shoulder 11%(n=6) Others 7%(n=4)
Muscles tone	Spastic 13%(n=7) Flaccid 7%(n=4)	Spastic 27%(n=15) Flaccid 22%(n=12)
Stiffness of joint	18%(n=10)	42%(n=23)
Area of joint stiffness	Knee 7%(n=4) Ankle 11%(n=6)	Knee 22%(n=12) Ankle 19%(n=11)
Muscle atrophy	33%(n=18)	42%(n=23)
Area of affected muscles	Upper limb 3%(n=2) Lower limb 29%(n=16)	Upper limb 9%(n=5) Lower limb 33%(n=18)
Muscle contracture	24%(n=13)	20%(n=11)
Area Muscle contracture	Upper limb 5%(n=3) Lower limb 18%(n=10)	Upper limb 7%(n=4) Lower limb 13%(n=7)
Urological complications	14%(n=8)	29%(n=16)
Control of bowel	No 14%(n=8)	No 29%(n=16)
Control of bladder	No 11%(n=6)	No 29%(n=14)
Cardio-respiratory complications	38%(n=21)	34%(n=19)
What type of respiratory problem	Asthma 18%(n=10) Others 20%(n=11)	Asthma 22%(n=12) Others 13%(n=7)
Autonomic dysreflexia	33%(n=18)	40%(n=22)
Heterotopic ossification	3%(n=2)	5%(n=3)
Psychological complications	40%(n=22)	73%(n=40)

In that table has shown that , wheelchair basketball players were 55 and do not play wheelchair basketball were 55 people who were using wheelchair only and both group were in paraplegic spinal cord injury patient. Among the basketball player they had been playing wheelchair basketball one month were 11 players, three month were 11 players and 33 players were more than twelve month which were the most in number. Between the two groups pressure sore were 8 in wheelchair basketball player and 24 were in wheelchair users. Where the main reason of pressure sore in the wheelchair basketball player were laceration, on the other hand in non-athletes main reason of pressure sore were due to long time sitting, they were not conscious to do lift timely which also the another reason. That's why the non-athletes person face pressure sore in the buttock and ankle more whereas the athletes faces less. Out of 55 athletes 43 athletes were complain of pain because of more activity of their body mainly the shoulder used more and more for moving, shooting, throwing, running purpose that's why shoulder were the predominant part for the pain besides shoulder they were face pain in the cervical, thoracic, lumbar, knee and others organ also in compare to the non-athletes they were face pain little bit less than the athletes the region of body part they face pain in mostly lumbar region 16 due to prolong sitting beside of lumbar they also had complain of pain in the cervical, , thoracic, shoulder, knee and others organ. Muscle tone in athletes 11 and the non-athletes were 27 which indicate the non-athletes were more suffering this complication. Joint stiffness also more seen in the non-athletes compare to the athletes , the athletes were 10 where the non-athletes were 23 the reason of that not using body part properly which clarified to seen the body part more stiffness of the non-athletes that knee were 12 and ankle were 8. Among the athletes and non-athletes the percentage of muscle atrophy were 18 athletes and 23 were non-athletes whereas both group faced this problem in their lower part of the body. Contracture developed in both athletes and non-athletes were more similarly which also most seen in the lower part of the body due to not using this part properly, this part remain in resting position most of the time. Among the 55 athletes 8 were urological complications whereas the non-athletes were 16 which is double from the athletes. Cardio-respiratory complications were in the athletes 21 and non-athletes 19. Autonomic dyereflexia were in the athletes 18 and non-athletes 22 it happen due to the using wheelchair fastly. Heterotopic bone ossification were less seen of

all the complications of the athletes and non-athletes where athletes were 2 and non-athletes were 3. Psychological complications were mostly seen in the non-athletes 40 whereas the athletes were 22 the reason of that in the non-athletes mental, social, environmental, economical, health status, besides of these the athletes tense up about their performance of basketball playing which the main reason of psychological complications in the athletes.

Table 3: Associations between secondary complications in wheelchair basketball players and non-athletes wheelchair users:

Variable	Athletes(55)	Non-athletes(55)	Pearson Chi-square value	P value
Pressure sore	8	24	11.282[a]	0.001***
Pain	43	41	0.201[a]	0.654
Muscle tone	11	27	10.465[a]	0.005*
Joint stiffness	10	23	8.344[a]	0.004*
Muscle atrophy	18	20	0.972[a]	0.324
Contractures	13	11	0.213[a]	0.644
Urinary tract infections	8	16	3.411[a]	0.065
Cardiorespiratory problems	21	19	0.157[a]	0.692
Autonomic dysreflexia	18	22	0.629[a]	0.428
Heterotopic bone ossification	2	3	0.077[a]	0.781
Psychological complications	22	40	11.976[a]	0.001***

Note: *P ≤ 0.05; **P ≤ 0.01; ***P ≤ 0.001.

Among the 110 participants 55 were wheelchair basketball player and rest of 55 were wheelchair user. To see the correlation between athletes and non-athletes and secondary complications researcher done the Pearson Chi-square test. In that test shown, pressure sore were significance with athletes and non-athletes that means non-athletes were more possibility to face pressure sore rather than the athletes where the P value were 0.001 . In pain the P value were 0.654 which were not significant between athletes and non-athletes. So there were no correlation of pain with athletes and non-athletes. Muscle tone were significant between the athletes and non-athletes , P value 0.005. Who were plying wheelchair basketball they were less affected in this complication rather than the wheelchair users. P value of joint stiffness were 0.004 which is significant between athletes and non-athletes. So who were plying wheelchair basketball they have less possibility of muscle tone in correlate with the non-athletes. P value of muscle atrophy were 0.324 which were not significant in the athletes and non-athletes. Contractures were not significant with athletes and non-athletes, p value were 0.644. Urological complication of the athletes and non-athletes were not significant p value 0.065.

Cardiorespiratory complication were not significant, P value 0.692. Autonomic dysreflexia were not significant among the athletes and non-athletes, P value were 0.428. Heterotopic bone ossifications of the athletes and non-athletes were not significant, P value 0.781. Psychological complications were significant among the athletes and non-athletes P value 0.001.

4.1.13 Comparison between significant pressure sore with wheelchair basketball players and non-athletes wheelchair users:

Among 110 participants most of the non-athletes (n=24) suffering pressure sore. To see the association Chi-Square test was done where Pearson Chi-Square were 11.282 and the P-value were 0.001 which is less than the significant P-value of 0.05. So, it is implying that the pressure sore are associated with the non-athletes wheelchair users.

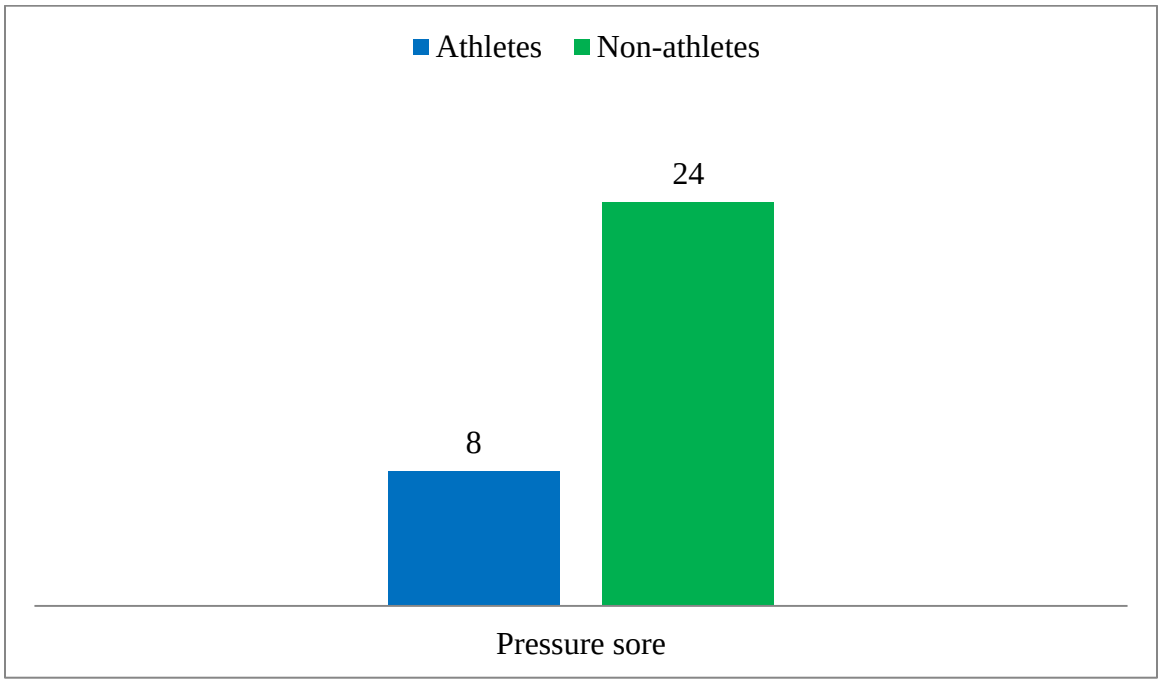

Figure 14: Significant pressure sore with wheelchair basketball players and non-athletes wheelchair users

4.1.14 Comparison between significant muscle tone with wheelchair basketball players and non-athletes wheelchair users:

In **Figure 15** the Chi-Square test was used to examine the relationship between muscle tone with athletes and non-athletes. The Pearson Chi-Square value were 10.465 and the P value were 0.005which is less than the significant P-value of 0.05 . In this case, a bar chart revealed the relationship between muscle tone with athletes and non-athletes.

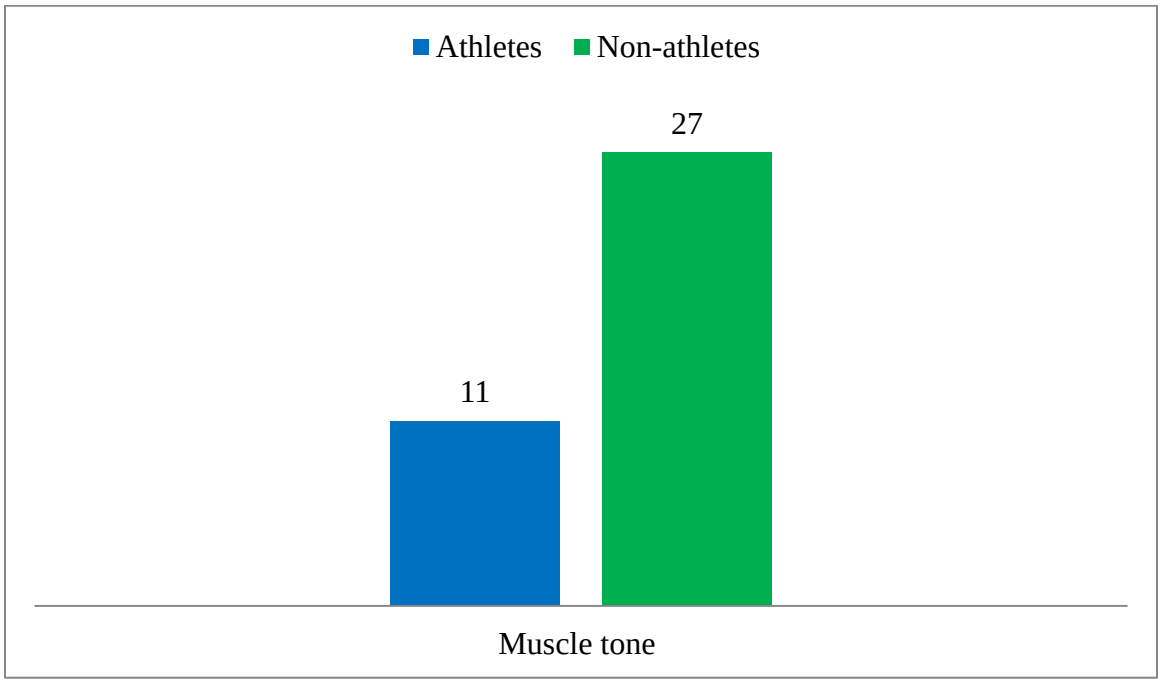

Figure 15: Significant muscle tone with wheelchair basketball players and non-athletes wheelchair users

4.1.15 Comparison between significant joint stiffness with wheelchair basketball players and non-athletes wheelchair users:

The Chi-Square test was used to examine the association between joint stiffness with athletes and non-athletes. The Pearson Chi-Square value were 8.344 and the p value were 0.004 which is less than the significant P-value of 0.05. In this case, a bar chart revealed the relationship between joint stiffness with athletes and non-athletes.

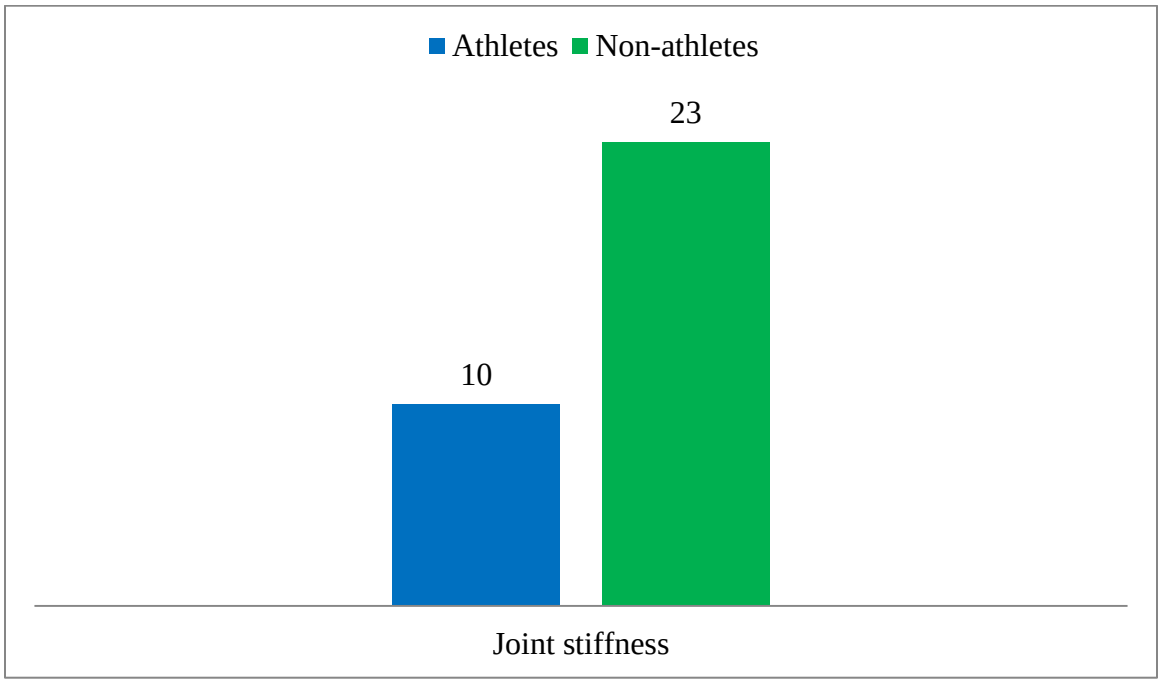

Figure 16: Significant joint stiffness with wheelchair basketball players and non-athletes wheelchair users

4.1.16 Comparison between significant psychological complications with wheelchair basketball players and non-athletes wheelchair users:

Figure 17 illustrated that the association between psychological complications with athletes and non-athletes. The Pearson Chi-Square value were 11.976 and the P value were 0.001 which is less than the significant P-value of 0.05. In this case, a bar chart revealed a relationship between psychological complications with athletes and non-athletes.

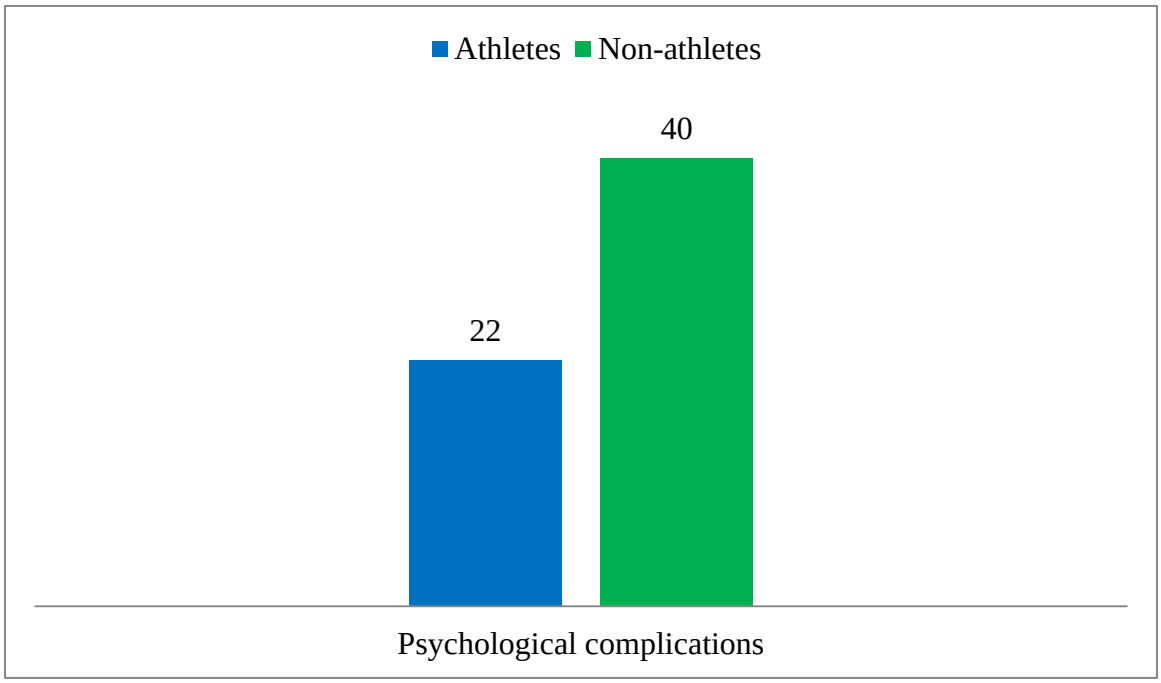

Figure 17: Significant psychological complications with wheelchair basketball players and non-athletes wheelchair users

CHAPTER-V DISCUSSION

5.1 Discussion

In this study was aimed to explore the secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users. The findings of the study showed that non-athletes are faced secondary complications more rather than the athletes. Among the 110 participants, 55 were wheelchair basketball athletes and 55 were non-athletes. Among the athletes, 53% were between the ages of 26-35, traumatic were 82% and non-traumatic were 18%. Thoracic level of injury were maximum 64% and complete A injury were 42% according to ASIA scale. In the non-athletes, 47% were between the ages of 18-25, traumatic were 91% and non-traumatic were 9%. Thoracic level of injury were maximum 58% and complete A injury were 40% according to ASIA scale. A research conducted in Bangladesh, whereas most of the patients were age range between 20-36, traumatic were 95% and non-traumatic were 5% and complete A injury were 74% all of the participants were wheelchair dependent (Hossain et al., 2016). A research conducted to the wheelchair basketball athletes, where 48% of the participants from 20-29 ages, most of them were traumatic 89% and non-traumatic were 11%. Thoracic level of injury were maximum 48% and complete A injury were 38% (Vaslliadis et al., 2010).

In this study male and female were in athletes 65% were male and 35% were female and in non-athletes male were 84% and female were 16%. Men are more likely to be exposed to employment or activities that put them at risk of SCI, whereas women rarely go to work and prefer to stay at home (Razzak et al., 2011). Marital status in athletes and non-athletes were same in athletes 51% were unmarried and in non-athletes 53% were unmarried. Most of the participants were from rural area 45% in athletes were from rural area whereas 64% were from rural in non-athletes. The reason of that injury were road traffic accidents, falls from height, sports injury, diving, physical assaults etc. In athletes 31% were from the urban in compare to the non-athletes this percentage were 16% which indicate that there were a association in participation of sports in urban and rural people in rural area people are involve in work or others activities some of the people are involve

in sports like football, cricket but basketball ground is not available in rural and they are not interest to play this game on the other hand who are from urban they are involve in various sports and most of them are not to do struggle to involve in sports that's why the number of basketball player is comparatively more from the urban. A study conducted where 29 participants were wheelchair basketball player among the 29 athletes they included 28 male athletes and only one female athletes, the athletes 66% were unmarried rest of them were married or divorced or widowed (Vaslliadis et al., 2010). Ustunkaya et al., 2007 showed in a research, 52% wheelchair basketball were married whereas 57% were unmarried in non-athletes. Hossain et al. (2016) showed that 92% wheelchair users were male rest of the 8% were female and 68% were married and 32% were unmarried.

In Japan, study showed that deep tissue injuries(pressure sore) were detected in 45% of male Japanese wheelchair basketball players on the national team particularly in the sacral region, ankle, shoulder region (Mutsuzaki et al., 2014). Rocco & Saito (2006) shown of the 11 spinal cord injured patients, 3(27%) were not playing because of pressure sore. Local pressure can be greater in wheelchair users because they spend a longer time in the wheelchair. The participants who utilize a wheelchair in daily life would be more likely to sustain a deep tissue injury because of the long time spent sitting. Therefore, a prolonged sitting time rather than playing wheelchair basketball seems to be a more influential factor in the development of deep tissue injuries (Gawlitta et al., 2007). Due to the repetitive nature of propulsion, wheelchair sports participants are at greater risk of developing injuries to the upper limb, in addition to peripheral nerve entrapments, repetitive strain injuries, premature osteoporosis, and pressure sores , which also may limit sports participation. Information regarding injury patterns, risk factors and management strategies is limited in wheelchair athletes (Snodgrass et al., 2014). In this study, the researcher had shown that pressure sore in athletes were 14% particularly in the buttock, sacral and ankle region main cause of the pressure sore due to laceration while playing wheelchair basketball and improper nutrition intake.

In Thailand, showed in a research 26.4% of spinal cord injury wheelchair users had pressure sore. The cause of pressure sore prolong sitting (51%), prolonged lying in bed

(22%), transfer (13%), incontinence or use of diaper (13%) and ischium were the main site of pressure sore among of the others region of the body part which was 38% (Kovindha et al., 2015). Hossain et al. (2016) shown in a research among the 168 paraplegic wheelchair dependent patients 26% of the patients were suffering pressure sore. In this study showed that pressure sore in wheelchair users were 43%. The main cause were the pressure sore were due to long time sitting 16%, forgot to do lift 9% and in the buttock (23%) region pressure sore were seen more.

According to Ustunkya et al. (2007), a detailed medical history revealed the following information: shoulder pain before and after becoming a wheelchair user was found to be similar in both groups (athletes and non-athletes – before 12% and 9% and after 60% and 70%, respectively). Of the athletes, 44% reported current shoulder pain, whereas only 17% of the non-athletes had current shoulder pain. Professional medical attention was sought in 72% of the athlete group versus 65% in the non-athlete group. Restriction of daily activities due to shoulder pain within the last week occurred in 6 subjects (24%) in the athlete group, whereas many fewer subjects (2 subjects; 9%) in the non-athlete group reported restriction. When the subjects were further interviewed for the existence of pain at the elbow or hand after becoming a wheelchair user, almost all of the subjects (92%) in the athlete group reported pain in the elbow or hand, and only half of the subjects (52%) in the non-athlete group. In this study, shoulder pain in athletes were 29% and in the non-athletes were 11% which is similar to the previous study about shoulder pain in wheelchair athletes and wheelchair users.

In a studied, Samuelsson et al. (2004) reported from a survey of 451 individuals with SCI that the incidence of wrist pain and/or shoulder pain was 72.7%, that subjects reported a moderate to severe degree of pain upon initiation of activities such as propelling wheelchairs (54%) and transferring to and from wheelchairs (59%). In this study wheelchair users non athletes face pain 74.5% the region of body part they face pain in mostly lumbar region 29.1% due to prolong sitting beside of lumbar they also had complain of pain in the cervical 9.1%, thoracic 10.91%, knee 7.27%, shoulder 10.91% and others part of the body 7.27%.

In Germany, study showed that biomechanics can play a role in the cause of injuries in wheelchair athletes. Elbow and wrist injuries are predictable in wheelchair athletes based on the biomechanics of the sport. The throwing motion, wheelchair racing, racquet sports, and field events can repetitively stress the hand, wrist, and elbow. This type of repetitive stress can lead to overuse injuries such as muscle-tendon imbalances, strains, and abrasions. Correction of these muscle-tendon imbalances is accomplished by maintaining strength and flexibility of the shoulder, triceps, forearms flexors and extensors. More injuries were incurred during matches (n = 68) than during training. Most injuries affected the neck/cervical spine (16%), thoracic spine/upper back (15%), and shoulder (14%) (Hollander et al., 2020). Because of the injury, a person's independence and physical function are harmed, and various issues arise as a result of the injury. Joint and muscular pain (81%), muscle spasms (74%), chronic pain (71%) and gastrointestinal issues (71%) were the most prevalent SHCs, according to one of the articles (Tallqvist et al., (2022). Huzmeli et al. (2017) reported in their study that players' mean training periods were 21 hours weekly in 26 male wheelchair basketball athletes. Their sport practice varied from 2 months to 13 years, with an average of 6.5 years. Pain complaint was present in 54% of these athletes, being mostly localized in the upper limbs (79%). Only 6% of the sample had never had an injury during a game or training. In this study showed that pain in athletes were 78%. Athletes face pain in the shoulder region most (29%), thoracic region 14%, lumbar 11%.

Muscle tone were in the athletes 20% and in non-athletes were 49%, stiffness of joint were in athletes 18% and in non-athletes were 42%, muscle contracture in athletes were 24% and in non-athletes were 20%. The reason of these complications were due to prolong sitting, less activity in the lower limb, do not stretching properly, less mobility. Nas et al. (2015) showed in a study that, The most common and important complication is the development of joint contractures and stiffness during this period. At least one joint contracture (43% shoulder, 33% elbow, 41% forearm and wrist, 32% hip, 11% knee, 40% foot and ankle) has been reported in about 66% of patients within 1 year. Hossain et al. (2016) shown that spasticity among the paraplegic wheelchair dependent people 23%. There are a association with muscle tone and joint stiffness between athletes and non-

athletes. The athletes were less risk in muscle tone and joint stiffness but the non-athletes are at high risk in muscle tone and joint stiffness the cause of this they are less active , do not using the affected part properly. Most of the time staying at home. In this study researcher found that in athletes bowel problem had 14%, bladder problem had 11%, autonomic dysreflexia had 33% and psychological complications had 40%. In non-athletes athletes bowel problem had 29%, bladder problem had 25%, autonomic dysreflexia had 40% and psychological complications had 73%. Whereas Hossain et al. (2016) shown that bowel problem had 26%, bladder problem had 36%, autonomic dysreflexia had 5% and psychological complications had 34% were in the paraplegic wheelchair dependent people. A research conducted in Italy where they showed that, the psychological well-being Scale showed significant differences in all 6 dimensions: positive relations with others, environmental mastery, personal growth, purpose in life and self-acceptance ($p < 0.01$), and autonomy ($p < 0.05$), with better scores in the basketball participants. The symptom checklist 90-R scores were significantly lower for the basketball group in the following 6 symptomatic dimensions: depression, phobic anxiety, and sleep disorder ($p < 0.01$), somatization, interpersonal sensitivity and psychoticism (with $p < 0.05$). It was concluded that competitive wheelchair basketball participants showed better psychological well-being and social skills than those non-participants (Fiorilli et al., 2013). Which is similar that psychological complications were seen more in this study also.

5.2 Study Limitations

There are some limitations that have found in the study. One of the limitation was the data were collected from an organization (Centre for the rehabilitation of the paralysed) did not collected from the others organizations or hospitals, absence of reference values separately for the test to be compared. Another most affected limitation was the sample size of the study. Difficulty to identify the participants with paraplegic spinal cord injury who is using wheelchair and playing wheelchair basketball was another limitation that found during the study because in the wheelchair basketball team there were people with others conditions also. Moreover, study was not able to achieve the proposed sample size for the study because during the data collection time 55 wheelchair basketball players were available. If the study had an adequate number of samples, the comparison between different groups within the study may also have more strong result. During the study investigators found that it was really difficult task to find participants who match with the study inclusion and exclusion criteria and was not able to achieve exact number of study participants. No research has been done before on this topic specifically in the context of Bangladesh. So there was little evidence to support the result of this project on the perspective of Bangladesh.

CHAPTER-VI CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Secondary complications are common in wheelchair users and wheelchair basketball players. The study revealed that most of the participants were in young ages. Majority of the participants were from the rural area and most of the participants completed secondary education. Among the secondary complications pain were seen in most of the participants as they operate wheelchair regularly and playing wheelchair basketball. Psychological complications also seen in higher number in the wheelchair users and wheelchair basketball players beside it the others complications were also seen. Pressure sore, muscle tone, joint stiffness, psychological complications has a significant association between the athletes and non-athletes, these complications were more seen in the non-athletes. Pain, contractures, urinary tract infections, cardiorespiratory problems, autonomic dysreflexia, heterotopic bone ossifications had no significant association between the athletes and non-athletes. So secondary complications can happen both athletes. In this study the level of secondary complications were more in non-athletes.

6.2 Recommendation

- As there are very few studies on persons with paraplegic wheelchair basketball players and wheelchair users, the study recommending future investigators to conduct more research in this area with large number of samples to have more accurate conclusions.

- Further study can discuss why these complications are arises within the wheelchair users and wheelchair basketball players.

- Future study can be case control study to compare who are at risk in these secondary complications.

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ANNEXURE

Verbal Consent Statement

(Please read out to the participants)

Assalamualaikum / Adab, I am Md. Yeasin Miah. I am conducting this study as a part of my academic work of 4th professional B.sc in Physiotherapy under Bangladesh Health Professions Institute (BHPI), which is affiliated by University of Dhaka. My dissertation title **is "Secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users".** Now I want to ask some personal and complications related questions. This will take approximately 20 to 30 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. Your participation in the research will have no impact on your present or future life. All information provided by you will be kept in confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me and or my Supervisor S.J.M. Ummul Ambia, Lecturer Department of Rehabilitation Science, BHPI, CRP, Savar, Dhaka-1343, Bangladesh.

Do you have any questions before I start?

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

☐ Yes ☐ No

Signature of the Participant's.....Date……..

Signature of the Witness's……Date……

Signature of the data collector's……Date……

সম্মতিপত্র

আসসালামু আলাইকুম/ আদাব,

আমি মোঃ ইয়াছিন মিয়া, বাংলাদেশ হেলথ প্রফেশন্স ইন্সটিটিউট এর বি.এস.সি ইন ফিজিওথেরাপি কোর্সের ৪র্থ বর্ষের একজন শিক্ষার্থী। অধ্যায়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটা অংশ। আমার গবেষণার বিষয় হল "মেরুরজ্জুতে আঘাতপ্রাপ্ত প্যারাপ্লেজিক হুইলচেয়ার বাস্কেটবল খেলোয়াড় এবং প্যারাপ্লেজিক নন-এথলেটস হুইলচেয়ার ব্যবহারকারীরা কি কি জটিলতায় ভুগেন "। এখন আমি আপনাকে ব্যক্তিগত, শারীরিক এবং মানসিক জটিলতা সম্পর্কে আনুষাঙ্গিক কিছু প্রশ্ন করতে চাচ্ছি। এতে আনুমানিক ২০- ৩০ মিনিট সময় নিবো।

গবেষণাটি সম্পাদনের জন্য, আমার তথ্য সংগ্রহ করা প্রয়োজন হবে। গবেষণার ক্ষেত্র বিবেচনা করে আপনার মাঝে আমার গবেষণায় অংশগ্রহণ করার জন্য প্রয়োজনীয় বৈশিষ্ট্য লক্ষ্য করা গেছে। এজন্য, আপনি আমার গবেষণার একজন সম্মানিত অংশগ্রহণকারী হতে পারেন এবং আমি আপনাকে আমার গবেষণায় অংশগ্রহন করতে অনুরোধ জানাচ্ছি।

আমি আপনাকে অবগত করছি যে, এই গবেষণা আপনার জন্য ঝুঁকিপূর্ণ হবে না অথবা আপনার কোন ক্ষতি করবে না। গবেষণা চলাকলীন সময়ে কোন রকম দ্বিধা বা ঝুঁকি ছাড়াই যেকোন সময়ে আপনি এটাকে বাদ দিতে পারবেন। এই গবেষণার প্রাপ্ত তথ্য সম্পূর্ণভাবে গোপনীয় থাকবে এবং অংশগ্রহণকারীর ব্যক্তিগত তথ্য অন্য কোথাও প্রকাশ করা হবে না।

যদি আমার গবেষণা সম্পর্কে আপনার কোনোকিছু জিজ্ঞসা থাকে তবে আপনি আমার সাথে অথবা আমার সুপারভাইজার এস.জে.এম. উম্মুল আম্বিয়া, প্রভাষক, রিহ্যাবিলিটেশন সাইন্স বিভাগ, বিএইচপিআই, সিআরপি, সাভার, ঢাকা- ১৩৪৩ এর সাথে যোগাযোগ করতে পারেন।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে ?

আমি কি শুরু করতে পারি ?

হ্যাঁ	না

অংশগ্রহনকারীর স্বাক্ষর..... তারিখ.....

সাক্ষীর স্বাক্ষর..... তারিখ.....

তথ্য সংগ্রহকারীর স্বাক্ষর..... তারিখ.....

Questionnaire in English:

Part-A: Socio- demographic informations:

1.1. Patients name:

1.2. Gender:

1) Male 2) Female

1. 3. Age:

1) 15-25 2) 26-35 3) Above 36

1.3. Address:

1.5. Occupation: 1) Job 2) Bussiness 3) Housewife 4) Farmer
5) Unemployed 6) Others

1.6. Educational status: 1) Illiterate 2) Primary education 3) Secondary education
4) Higher secondary 5) Honurs/ Masters

1.7. Marital status:

1) Married 2) Unmarried 3) Divorce/Separated

1.8.Living area:

1) Rural 2) Semi-urban 3) Urban

Part-2: History of spinal cord injury: (Informations taken from patients note book)

2.1. Type of injury:

1) Traumatic 2) Non-traumatic

2.2. Skeletal level of injury:

1) Thoracic 2) Lumbar

2.3. Neurological level according to ASIA scale:

1) Complete A 2) Incomplete B 3) Incomplete C

4) Incomplete D 5) Incomplete E

Part-3: Wheelchair related questionnaire:

3.1. How long have you been using wheelchair?

1) 15 days 2) 1 month 3) 3 month 4) 6 month 5) More than 1 year

3.2. Which type of wheelchair are you using during daily life activities?

1) Electric 2) Manual

3.3. Did you experience it as (physically) difficult to move in a wheelchair in the beginning?

1)Yes 2) No

3.4. At that moment, do you face any problem during wheelchair using?

1) Yes 2) No

3.5. Do you play wheelchair basketball?

1)Yes 2) No

3.6. How long have you been playing wheelchair basketball?

1) 15 days 2) 1 month 3) 3 month 4) 6 month 5) More than 1 year

Part-4: Complications related questionnaire:

4.1. Are you suffering from pressure sore?

1)Yes 2) No

4.2. Number of pressure sore?

1)One 2) Two 3) More than two

4.3. Area of pressure sore?

1) Buttock 2)Ankle 3)Hip 4) Elbow 5) Shoulder 6) Others

4.4. Grade of pressure sore?

1. Grade –I 2. Grade –II 3. Grade –III 4. Grade –IV

4.5. Causes of pressure sore?

1)Due to long time sitting 2) Laceration 3) Sweating 4) Abrasion

5) Improper nutrition intake 6) Urinary tract infarction 7) Forget to do lift

4.6. Are you suffering from pain?

1)Yes 2)No

4.7.. Severity of pain:

0 10

1) 0= no pain 2)1 - 4= mild pain 3)5 – 7= moderate pain. 4)8 – 10= severe pain.

4.8. Site of pain?

1)Cervical 2) Thoracic 3) Lumbar 4) Hip 5) Knee

6) Ankle 7) Shoulder 8) Others

4.9. Muscles tone?

1) Spastic 2) Flaccid 3) Normal

4.10.Are you suffering from any complications of muscle & joint?

1) Yes 2) No

4.11. Have your any stiffness of joint?

1) Yes 2) No

4.12. Location of joint stiffness?

1)Shoulder 2) Elbow 3) Wrist 4) Hip

5) Knee 6) Ankle 7) Others

4.13. Is there present any muscle atrophy?

1) Yes 2) No

4.14. Area of affected muscles?

1) Upper limb muscle 2) Lower limb muscle

4.15. Is there any muscle contracture?

1) Yes 2) No

4.16. Area Muscle contracture?

1) Upper limb muscle 2) Lower limb muscle

4.17. Do you have any sense about bowl and bladder movements?

1) Yes 2) No

4.18. Can you control your bowl movements?

1) Yes 2) No

4.19. Do you have bladder incontinence?

1) Yes 2) No

4.20. Are you suffering with any Cardio-respiratory complications?

1) Yes 2) No

4.21.What type of respiratory problem?

1) SOB- Yes/ No 2) Other

4.22. Autonomic Dysreflexia?

1) Yes 2) No

4.23. Are you suffering from any psychological complications?

1) Yes 2) No

4.24. Heterotopic bone ossification?

1)Yes 2) No

4.25) Are you suffering from any other complications- such as:

a) Fall- Yes/No b) Poor transferring & bed mobility- Yes/No c) Others

প্রশ্নপত্র

(বাংলা)

পার্ট-১ : সামাজিক -জনসংখ্যাতাত্ত্বিক তথ্যসূত্র ঃ

১.১। রোগীর নামঃ

১.২। লিঙ্গঃ

১) পুরুষ ২) মহিলা

১.৩। বয়সঃ

১) ১৫-২৫ ২) ২৬-৩৫ ৩) ৩৬ বা এর বেশি

১.৪। ঠিকানাঃ

১.৫। পেশাঃ

১) চাকরি ২) ব্যবসা ৩) গৃহিণী ৪) কৃষক ৫) বেকার ৬) অন্যান্য

১.৬। শিক্ষাগত যোগ্যতাঃ

১) কোন প্রাতিষ্ঠানিক শিক্ষা নেই ২) প্রাথমিক শিক্ষা ৩) মাধ্যমিক শিক্ষা

৪) উচ্চ মাধ্যমিক শিক্ষা ৫) স্নাতক ডিগ্রি / স্নাতকোত্তর

১.৭। বৈবাহিক অবস্থাঃ

১) বিবাহিত ২) অবিবাহিত ৩) বিধবা / বিপত্নীক ৪) বিবাহ বিচ্ছেদ

১.৮। বসবাসের এলাকাঃ

১) গ্রাম ২) উপ-শহর ৩) শহর

পার্ট-২ মেরুদণ্ডের আঘাত সম্পর্কিত তথ্য (রুগীর ফাইল থেকে নেওয়া) ঃ

২.১। আঘাতের প্রকারভেদ ঃ

১) ট্রমাটিক ২) নন- ট্রমাটিক

২.২। আঘাতের স্কেলিটাল লেভেল ঃ

১) থোরাসিক ২) লাম্বার

২.৩। এশিয়া লেভেল অনুযায়ী স্কেলিটাল লেভেল ঃ

১) কমপ্লিট-এ ২) ইনকমপ্লিট-বি ৩) ইনকমপ্লিট-সি

৪) ইনকমপ্লিট-ডি ৫) ইনকমপ্লিট-ই

পার্ট-৩ হুইলচেয়ার সম্পর্কিত প্রশ্নাবলী ঃ

৩.১। আপনি কতদিন যাবত হুইলচেয়ার চালান ?

১) ১৫ দিন ২) ১ মাস ৩) ৩ মাস ৪) ৬ মাস ৫) ১ বছরেরও অধিক সময়

৩.২। আপনি কোন ধরণের হুইলচেয়ার ব্যবহার করেন ?

১) ম্যানুয়াল ২) ইলেকট্রিক

৩.৩। হুইলচেয়ার ব্যবহার করার শুরুর দিকে আপনি কি কোন প্রতিবন্ধকতার সম্মুখীন হয়েছেন ?

১) হ্যাঁ ২) না

৩.৪। এখন হুইলচেয়ার ব্যবহার করতে আপনার কি কোন সমস্যা হচ্ছে ?

১) হ্যাঁ ২) না

৩.৫। আপনি কি হুইলচেয়ার বাস্কেটবল খেলেন ?

১) হ্যাঁ ২) না

৩.৬। আপনি কতদিন যাবত হুইলচেয়ার বাস্কেটবল খেলেন ?

১) ১৫ দিন ২) ১ মাস ৩) ৩ মাস ৪) ৬ মাস ৫) ১ বছরেরও অধিক সময়

পার্ট-৪ জটিলতার সম্পর্কিত প্রশ্নাবলীঃ

৪.১। আপনি কি কোন চাপজনিত ক্ষতের সমস্যায় ভুগেছেন ?

১) হ্যাঁ ২) না

৪.২। চাপজনিত ক্ষতের সংখ্যা ?

১) এক ২) দুই ৩) দুইয়ের অধিক

৪.৩। চাপজনিত ক্ষতের স্থান ?

১) পশ্চাৎদেশে ২) পায়ের কব্জি ৩) উরু

৪) কনুই ৫) কাঁধ ৬) অন্যান্য

৪.৪) চাপজনিত ক্ষতের গ্রেড ?

১) গ্রেড-১ ২)গ্রেড-২ ৩) গ্রেড-৩ ৪) গ্রেড-৪

৪.৫। চাপজনিত ক্ষতের কারণ ?

১) অনেকক্ষণ বসে থাকার কারণে ২) ছিলে যাওয়ার কারণে ৩)ঘামের কারণে

৪) ঘষা লাগার কারণে ৫) পুষ্টিযুক্ত খাবার কম খাওয়ার কারণে

৬)মুত্রনালিতে সমস্যার কারণে ৭) লিফট দিতে ভুলে যাওয়ার জন্য

৪.৬। আপনি কি কোন ব্যথায় ভুগছেন ?

১) হ্যাঁ ২) না

৪.৭। ব্যথার তীব্রতাঃ

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১) ০ = ব্যথা নাই ২) ১-৪ = অল্প ব্যথা ৩) ৫-৭ = মাঝারি ব্যথা ৪) ৮-১০ = তীব্র ব্যথা

৪.৮। ব্যথার স্থান ?

১) সারভাইক্যাল ২) থোরাসিক ৩) লাম্বার ৪) ঊরু

৫) হাঁটু ৬) গোড়ালি ৭) কাঁধ ৮) অন্যান্য

৪.৯। মাংসপেশীর টোন ?

১) স্পাসটিক বা খিঁচুনির মতো ২) ফ্লাসিড বা নরম ৩) নরমাল

৪.১০। আপনি কি কোন মাংসপেশী এবং জয়েন্ট এর জটিলতায় ভুগছেন ?

১) হ্যাঁ ২) না

৪.১১। আপনার কি জয়েন্ট শক্ত হয়ে গেছে ?

১) হ্যাঁ ২) না

৪.১২। জয়েন্ট শক্ত হয়ে যাওয়ার স্থান ?

১) কাঁধ ২) কনুই ৩) কব্জি ৪) উরু

৫) হাঁটু ৬) গোড়ালি ৭) অন্যান্য

৪.১৩। আপনার কি কোন মাংসপেশী শুকিয়ে হয়ে গেছে ?

১) হ্যাঁ ২) না

৪.১৪। আক্রান্ত মাংসপেশীর স্থান ?

১) শরীরের উপরিভাগের মাংসপেশী ২) শরীরের নিম্নভাগের মাংসপেশী

৪.১৫। আপনার কি মাংসপেশী শক্ত হয়ে গেছে ?

১) হ্যাঁ ২) না

৪.১৬। মাংসপেশী শক্ত হয়ে যাওয়ার স্থান ?

১) শরীরের উপরিভাগের মাংসপেশী ২) শরীরের নিম্নভাগের মাংসপেশী

৪.১৭। আপনি কি প্রসাব-পায়খানা সংক্রান্ত জটিলতায় ভুগছেন ?

১) হ্যাঁ ২) না

৪.১৮। আপনি কিপায়খানার চাপ ধরে রাখতে পারেন ?

১) হ্যাঁ ২) না

৪.১৯। আপনি কি প্রসাবের নিয়ন্ত্রণ হারিয়েছেন ?

১) হ্যাঁ ২) না

৪.২০। আপনি কি হৃৎযন্ত্র- শ্বাসকষ্টের জটিলতায় ভুগছেন ?

১) হ্যাঁ ২) না

৪.২১। কি ধরণের হৃৎযন্ত্র-শ্বাসকষ্টের জটিলতায় ভুগছেন ?

১) শ্বাসকষ্ট- হ্যাঁ/না ২) অন্যান্য

৪.২২। হটাৎ করে তাপমাত্রা ও হাটবিট বেড়ে যাওয়া , মাথাব্যাথা, চোখের পাতা নড়াচড়া করা (অটোনোমিক ডিসরিফ্লেক্সিয়া)?

১) হ্যাঁ ২) না

৪.২৩) কোথাও কি আলাদা করে হাড় দেখা দিয়েছে (হেটারোটপিক বোন অসিফিক্যাশান) ?

১) হ্যাঁ ২) না

৪.২৪। আপনি কি কোন মানসিক জটিলতায় ভুগছেন (যেমনঃ দুশ্চিন্তা, অবসাদ, উদ্বিগ্ন ?

১) হ্যাঁ ২) না

৪.২৫। আপনি কি অন্য কোন জটিলতায় ভুগছেন ?

যেমন-

১) পড়ে যাওয়া হ্যাঁ----/না----

২) স্থানান্তর এবং বিছানাতে নড়াচড়াতে জটিলতা হ্যাঁ----/না----

৩) অন্যান্য

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

Ref: CRP/BHPI/IRB/02/2022/550 *Date:* 20/02/2022

Md. Yeasin Miah
4th Year B.Sc. in Physiotherapy
Session: 2016 – 2017
BHPI, CRP, Savar, Dhaka- 1343, Bangladesh

Subject: Approval of the research project proposal **"Secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users"** by ethics committee.

Dear Md. Yeasin Miah,
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 and S.J.M. Ummul Ambia as thesis supervisor. The Following documents have been reviewed and approved:

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

The purpose of the study is to know about the secondary complications which are arises in Spinal Cord Injury paraplegic wheelchair basketball players and non athletes paraplegic wheelchair users. Since the study involves questionnaire that takes maximum 20-30 minutes and have no likelihood of any harm to the participants, the members of the Ethics committee approved the study to be conducted in the presented form at the meeting held at 09:00 AM on 12th October, 2021 at BHPI (IRB-30 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

Date: 27/03/2022

The Rehabilitation officer

Centre for the Rehabilitation of the Paralysed (CRP),

Chapain, Savar, Dhaka-1343.

Subject: Seeking permission for data collection of 4th year physiotherapy research project.

Respected Sir,

With due respect and humble submission to state that I am Md. Yeasin Miah, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical committee has approved my research project entitled on **"Secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users"**(IRB No:CRP/BHPI/IRB/02/2022/550) under the supervision of S.J.M. Ummul Ambia,Lecturer Department of Rehabilitation Science, BHPI, CRP, Savar. I want to collect data for my research project from the persons with Spinal Cord Injury who are using wheelchair and playing wheelchair basketball. So, I need permission for data collection from thewheelchair basketball players. I would like to assure that anything of my study will not be harmful for the participants.

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

Yours obediently,

Yeasin

.....

Md. Yeasin Miah

4th professional B.Sc. in Physiotherapy

Roll: 38, Session: 2016-17

Bangladesh Health Professions Institute (BHPI)

CRP, Chapain, Savar, Dhaka-1343.

Forwarded to Sports trainer of CRP. He may collect data from sports persons.

11/4/2022

Date: 19/03/2022

The Head of Department

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP),

Chapain, Savar, Dhaka-1343.

Through: Head, Department of Physiotherapy, BHPI

Subject: Seeking permission for data collection of 4th year physiotherapy research project.

Respected Sir,

With due respect and humble submission to state that I am Md. Yeasin Miah, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical committee has approved my research project entitled on **"Secondary complications in spinal cord injury paraplegic wheelchair basketball players and non-athlete paraplegic wheelchair users" (**IRB No : CRP/BHPI/IRB/02/2022/550) under the supervision of S.J.M. Ummul Ambia, Lecturer Department of Rehabilitation Science, BHPI, CRP. I want to collect data for my research project from the persons with Spinal Cord Injury who are using wheelchair and playing wheelchair basketball. Therefore, I need permission for data collection from the Spinal Cord Injury unit, Physiotherapy department of CRP-Savar. I would like to assure that anything of my study will not be harmful for the participants.

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

Yours obediently,

Yeasin

Md. Yeasin Miah

4th professional B.Sc. in Physiotherapy

Roll: 38, Session: 2016-17

Bangladesh Health Professions Institute (BHPI)

CRP, Chapain, Savar, Dhaka-1343.

Forwarded

S.J.M. Ummul Ambia
Lecturer Rehabilitation Science
Department of MRS, BHPI
CRP, Chapain, Savar, Dhaka-1343

Approved

27/03/22

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

Recommended

21.03.2022

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