

**COMPARISON OF DEPRESSION LEVEL OF SPINAL CORD
INJURY PATIENTS BEFORE AND AFTER PARTICIPATES IN
WHEELCHAIR SPORTS AT CRP**

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

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

**COMPARISON OF DEPRESSION LEVEL OF SPINAL CORD
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WHEELCHAIR SPORTS AT CRP**

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DECLARATION

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

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Abbreviations

ASIA:	American Spinal cord Injury Association
ADL:	Activity of daily living
BHPI:	Bangladesh Health Professions Institute
CRP:	Center for the rehabilitation of the paralyzed
DS:	Depression Scale
NITOR:	National Institute of Traumatology, Orthopedic and Rehabilitation
SCI:	Spinal Cord Injury
WHO:	World Health Organization
BMRC:	Bangladesh Medical and Research Council.

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Abstract

Purpose: To identify the comparison of the depression levels of spinal cord injury patients before and after participate in wheelchair sports at CRP. *Objectives:* To explore the depression levels of spinal cord injury patients before and after participate in wheelchair sports in CRP and to evaluate the effectiveness of wheelchair sports for reducing depression level in SCI patients. *Methodology:* In the methodology a Pre-test and post-test experimental design of quantitative research design is carried out in this study. 11 patients were selected by simple random sampling with spinal cord injury from CRP. Patients were allocated for wheelchair sports and the subject participates in wheelchair sports for 3 weeks. This is a quantitative same subject design study. Outcome was measured by Depression scale developed by Md.Zahir uddin-National Institute of Mental health, Dhaka and Mohammad Mahmudur Rahman-Department of clinical psychology, University of Dhaka. This scale is developed according to cultural context of the Bangladesh. *Result:* This study shows positive change in mental status and reduce depression level of SCI patients after participate in wheelchair sports. The 'p' value (by which we can measure the significance of the result) of the variable is ($P < 0.05$). This means the wheelchair sports program is effective for reducing depression level of SCI patients. *Conclusion:* In conclusion it can be said that for spinal cord injury patients depression is a major common problem and to reduce depression level of SCI patient's wheelchair sports has a significant effects.

1.1 Background of the study

Spinal cord injury is one of the most debilitating and devastating condition in the world. It is a sudden event that often affecting healthy and young individual. It brings sudden profound change in life. It create enormous physical disability with emotionally depress the patient. The cord injury person often an active person in his life, may be participate in various daily activity or earning a living on minute an next minute he is incapable of moving his extremities and find himself paralyzed, dependent and isolated.

Spinal cord injury causes physiological and functional disorder and its severity is more or less depends on the level of the injury. These disorders have an impact on everyday life and often lead to a physiological reconditioning. The limited activity often negatively affects the health of these people and lead to a debilitating cycle (Gang 2002). Life is a state for everyone and for every human being is a matter of adjusting to change but very few people are prepared to all the change after spinal cord injury (Zejdlik 1992). Spinal cord injury can happen to anyone, at any age (Willardson 2007). According to the world health organization about 10% of people is disable in Bangladesh, among them 4.6% are spinal cord injured (Haque et al. 1999). Spinal cord injury belongs to the group of physical disability and some time may be a combination of multiple disabilities. It is one of the major disabilities or problem of the whole world (Disability world 2002). According to Indian statistics India has 4-5% disability out of total population and among them 2% is spinal cord injured patients (Disability world 2002). A spinal cord injury always results in a significant emotional response from the survivor. While emotions vary considerably and no one emotion is to be expected among depression is very common among there (Brain and Spinal Cord.org 2011).

Depression is a condition that causes feeling of sadness and hopelessness (Law and Kelton 2007). It is a common illness that can affect anyone. About 1 in 20 Americans

(over 11 million people) get depressed every year (University of Washington 2011). Depression is found two or three times more often among people who are paralyzed than among the nondisabled (Reeve foundation 2011). Depression is more common in the spinal cord injury (SCI) population-about 1 in 5 people. Estimated rates of depression among people with SCI range from 11% to 37% (University of Washington 2011). Rehabilitation procedure of SCI patient is divided into four stages as acute stage, stabilization stage, rehabilitation stage and reintegration stage. Patient is introducing with sports activity such as wheelchair sports in rehabilitation stage. These sports are elevate their emotion and mood as well as total psychological status. Long time exercise training in spinal cord injury patients are very helpful and results in significant gains in both physical and psychological well-being.

1.2 Justification of the study

Depression is a serious medical disorder that affects your thoughts, feelings, physical health and behaviors (University of Washington 2011). Depression and anxiety disorders and/or symptoms are commonly reported after spinal cord injury (Sakakibara et al.2009). It have been reported as the most common form of psychological distress after spinal cord injury (SCI) and appear to occur more frequently in persons with SCI compared with the non-disabled population.(Saunders, Krause & Focht 2011). In addition to the numerous treatments for depression, exercise has become an appealing new alternative to alter ones mood. Many recent studies have been published supporting the belief that exercise has been proven effective in improving depression and in some cases has been able to prevent it all together (Schlundt n.d). Studies have shown that exercise and physical activity provide health and wellness benefits for paraplegics and tetraplegics including: improved psychological functioning, decreased pain, weight management, and prevention of many secondary conditions (Stillson & Virginia 2007).

Exercise can decrease self reported stress, pain and depression and can enhance physical self concept and overall quality of life in person with SCI (Hick 2003). Individuals with acquired SCI being actively involved in physical exercise and sports differ from physically inactive individuals. (Anneken 2010). In Bangladesh there are two institute-National institute of Traumatology Orthopedic and Rehabilitation(NITOR) and Center for the Rehabilitation of the Paralyzed(CRP) for the management of spinal cord injury (Momin 2003).Different sports activity include wheelchair sports are introduce in rehabilitation phase in CRP. But there is lacking of research to find out the depression level among the spinal cord injury patients before and after participation in wheelchair sports. These study will helps the researcher to find out depression level among them and will also helps to find out the effectiveness of wheelchair sports among SCI patient. This research will also helps in arise awareness about depression and wheelchair sports among the patients that will helps to improve their physical rehabilitation and psychological state.

1.3 Hypothesis

Wheelchair sports may reduce the depression level of spinal cord injury patients.

1.4 Null-Hypothesis

Wheelchair sports cannot reduce the depression level of spinal cord injury patients.

1.5 Objectives

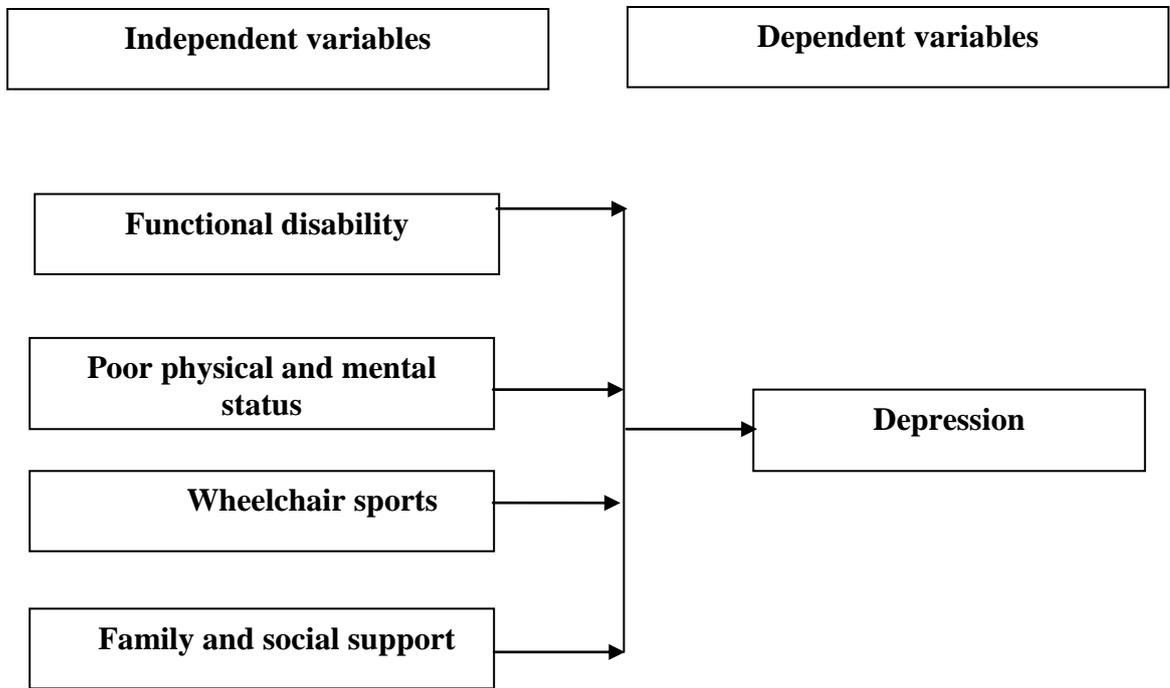
1.5.1 General objectives

To explore the effectiveness of wheelchair sports to reducing depression level in spinal cord injury patients.

1.5.2 Specific objectives

- a. To identify the depression level of SCI patients before and after participate in wheelchair sports.
- b. To compare the depression level of SCI patients ,before and after participation on wheelchair sports.
- c. To evaluate the effectiveness of wheelchair sports for reducing depression level in SCI patients.

1.6 Lists of variables



1.7 Operational definition

Depression: Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration.

Spinal cord injury: Spinal cord injury (SCI) is an insult to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function.

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

Sports: Activity that do for pleasure and need physical effort or skill usually done in a special area and according to fixed rules.

Depression scale: It is a scale that is used to measure depressive symptomatology.

Spinal cord and Spinal nerve

Spinal cord extends from the medulla oblongata just above the foramen magnum to the level of L1 or L2 vertebrae. It is located within the vertebral foramen also called vertebral canal. The cord is protected anteriorly by the vertebral bodies and posterior and laterally by the vertebral arch. There are 8 cervical, 12 thoracic, 5 lumbar, 5 sacral and 8 coccygeal pairs of spinal cord. Each spinal nerve has a dorsal and a ventral root that arise from a single spinal cord segment. The c1 through c7 spinal nerve exit vertebral foramen above the corresponding vertebrae, the spinal nerve of T1 and below exit below the corresponding number of vertebrae (Somers 1992).

Spinal cord injury

spinal cord injury is defined as the occurrence of an acute traumatic lesion of neural elements in the spinal canal (spinal cord and cauda equina), resulting in temporary or permanent sensory and/or motor deficit. The clinical definition of spinal cord injury excludes intervertebral disc disease, vertebral injuries in the absence of spinal cord injury, nerve root avulsions and injuries to nerve roots and peripheral nerves outside the spinal canal, cancer, spinal cord vascular disease, and other non-traumatic spinal cord diseases. (National spinal cord injury statistical center 2011)

A lesion of the spinal cord that results in paralysis of certain areas of the body, along with the corresponding loss of sensation. (Disabled world 2007).

Spinal cord injury is damage to the spinal cord. It may result from direct injury to the cord itself or indirectly from damage to surrounding bones, tissues, or blood vessels(Zieve & Hoch 2010).

ASIA impairment scale

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

B = Incomplete: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5.

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

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

E = Normal: motor and sensory function are normal (American spinal cord injury association 2011).

Tetraplegia and Paraplegia

An injury to the upper part of the spinal cord can leave an individual with little or no sensation or movement in their arms and legs, a condition called Tetraplegia (American academy of orthopedic surgery 2001).

According to American spinal cord injury association (2011) 'Paraplegia' is refer to the impairment or loss of motor and sensory function in the thoracic lumber or sacral segment of the spinal cord, secondary ton damage of neural element within the spinal canal. The symptom of paraplegia differs from each other patient and it depend on the severity of the damage of the spine. It may include paralyzed muscle, especially in arm and leg, instability to move or feel anything below the damage area, inability to control bowel and bladder and chest complication.

Depression

Depression may be described as feeling sad, blue, unhappy, miserable, or down in the dumps. Most of us feel this way at one time or another for short periods. True clinical depression is a mood disorder in which feelings of sadness, loss, anger, or frustration interfere with everyday life for weeks or longer (Zieve & Merrill 2011).

Some people describe depression as “living in a black hole” or having a feeling of impending doom. However, some depressed people don't feel sad at all they may feel lifeless, empty, and apathetic, or men in particular may even feel angry, aggressive, and restless (Smith, Saisan & Segal 2011).

There are some factor that may play a role in depression such as, alcohol or drug abuse, certain medical conditions, including underactive thyroid, cancer, or long-term pain, certain medications such as steroids, sleeping problems, stressful life events, such as death or illness of someone close, divorce ,childhood abuse or neglect, Job loss, social isolation (Zieve & Merrill 2011). About one in ten of the population will suffer from depression and women are twice as likely to be affected as men. The prevalence is higher in young women and tends to decrease with age, while the opposite pattern is found in male, where the prevalence is lower in young men and increase with age. Depression occurring as an unusually prolonged or intense reaction to loss is called reactive or exogenous depression is classified as a neurosis, that is often called neurotic depression. Particularly severe depression may also arise without any discernible cause in external events, seems to arise from ‘within’ the patients. this type of depression is called endogenous depression and classified as a psychosis. In endogenous depression genetic and biochemical factors are important ,as opposed to environmental events. Endogenous depression may be part of an overall disorder of mood in which depression alternates with mania (Lyttle 1986).

Types of depression

There are many types of depression. Common types include:

- **Major depression :** Major depression is characterized by a severely depressed mood that persists for at least two weeks. Major depressive disorder is specified as either “ a single episode” or recurrent”, depending on whether period of depression occur as discrete events or recur within an individual’s life span.
- **Minor depression:** It also called “subclinical” or “subsyndromal” depression because it does not meet the full criteria for major depression. For example, the person has some symptoms (4 or 5) of depression. Like major depression,

minor depression is associated with disability and reduced quality of life, and responds well to the same treatments that are used with major depression (Buckwalter & Smith 1993).

Risk factors for depression

There are various risk factors is responsible for occurring depression. Such as –

- Sex: The higher incidence of depression in women has been noted in many studies. Women may complain more readily of depression than men.
- Age: The female risk of depression seems to decrease with age while the male risk increases.
- Social class: Stressful life events experienced by working class women were more numerous and more severe. Many studies shows that four vulnerability factors which increase the risk of depression .These were – lack of close confiding relationship, loss of a mother before the age of 11 years, Having three or more children under the age of 14 years living in the house and lack of employment outside the home.
- Family history: There is much evidence to suggest a genetic component in the affective psychoses insofar as both unipolar and bipolar disorders show familial trends.No relationship between reactive depression and family history has yet been clearly demonstrated and it seems that reactive depression is substantially determined genetically.
- Personality type: Depression seems more likely in persons with the following characteristics: likelihood to breakdown under stress, lack of energy, insecurity, introversion, sensitivity, tendency to worry, social ‘awkwardness’, unassertiveness, dependency and obsessionality.
- ‘Learned helplessness’: Human depression which may also result from situations in which there is helplessness and threat outside the subject’s control (Lyttle 1986).

Clinical feature

Depression varies from person to person, but there are some common signs and symptoms. It's important to remember that these symptoms can be part of life's normal lows. But the more symptoms it has, the stronger they are, and the longer they've lasted (Smith, Saisan & Segal 2011).

Common symptom of depression includes agitation, restlessness, and irritability, dramatic change in appetite, often with weight gain or loss, very difficult to concentrate, fatigue and lack of energy feelings of hopelessness and helplessness, feelings of worthlessness, self-hate, and guilt, becoming withdrawn or isolated, loss of interest or pleasure in activities that were once enjoyed, thoughts of death or suicide, trouble sleeping or excessive sleeping (Zieve & Merrill 2011).

Chemistry of Depression

Heredity often expresses itself biochemically, and the possible importance of biochemical factors in depression. The group of antidepressant drugs known as monoamine oxidase inhibitors act by increasing the concentration of monoamines, and there is some recent evidence that electroconvulsive therapy (which relieves major depressions) does likewise. Tricyclic antidepressants also increase monoamine concentrations, while the drug lithium seems to control mania by reducing the level of monoamines. Research into the chemistry of depression continues though there is some debate as to whether reported fluctuations in cerebral chemistry are the cause or the effect of depression (Lyttle 1986).

Psychological reactions to physical illness

Physically ill people should respond to their illness by feeling anxious or depressed. These emotional reactions are often transient. Some patients' emotional reactions are intense and sometimes psychiatric illnesses appear to be provoked by physical illness. The most common psychiatric illness is depressive disorder. Certain factors increase the risk of serious psychiatric disorder developing in the physically ill. The psychological consequences of physical illness can be divided into three groups. First, psychological symptoms may be directly induced by physical illness or drugs used to

treat them. Second, psychiatric disorders may occur as psychological reaction to physical illness or their treatments. Third, psychological defence mechanism and certain kinds of behavior may be evoked by physical illness. Patients are more vulnerable if they have a history of previous psychological disorder or life long physical disability or inability to deal with adversity. A physical illness is likely to have a greater psychological impact if it has special effect on patient's life. For example spinal cord injury of a patient (Gelder et al. 1983).

Effects of depression

Depression has both psychological and social effects. As psychological effects lowering of mood may be profound. The patient feels depressed, miserable and careworn. Concentration is poor and the patient may appear vague and indecisive in conversation. Loss of drive and interest are apparent and the patient may express little interest in discussion of his/her difficulties, or may attempt to minimize or dismiss them. As social effects loss of drive and interest leads to neglect of family and friends. Loss of libido will further contribute to a domestic and marital climate of deterioration and resentment, which will worsen an already deepening depression. Previously valued social interest and hobbies will be neglected and the depressed person shows unwillingness to go out or to mix with friends. The depressed person's family may be driven to extremes of distress and often try to ascribe the depression to some tangible factors thus often confusing cause and effect, though contributory factors may assume these forms.

Treatment of depression

Treatment in depression may be physical or non-physical.

- A. Physical treatment: There are three major groups of drugs used in the treatment of depression. They are tricyclic anti-depressant, monoamine oxidase inhibitors and lithium salts.
- B. Non-physical treatment: A variety of psychotherapeutic approaches have been used effectively in the treatment of depression. They are –
 - Group psychotherapy.
 - Relaxation therapy.
 - Behavior modification.
 - Social skills training.
 - Social, occupational, Industrial, music and therapies.
 - Psychodrama.
 - Various leisure activities training (Lyttle 1986).

Centre for the rehabilitation of the Paralyzed (CRP)

CRP is a national voluntary organization for the development of health care services through treatment and rehabilitation for person with disabilities. The main aims of CRP are social, physical, mental, economic rehabilitation of individual with SCI. CRP was established in 1979 as an NGO to provide treatment and rehabilitation for the patients with paralysis, by a British physiotherapist with the help of two Bangladeshi therapists and a Bangladeshi social worker. CRP is the only institute of its kind in Bangladesh. The quality of CRP and its importance for people with disability is widely recognized, both in Bangladesh and abroad. At its head quarters in Savar, CRP currently contains wards for hundred inpatients for spinal cord injury. CRP provides the better services for these patients in 4 phases. CRP has an outpatients services held 3 times a week. The patients can take the help who are predominantly paralyzed by strokes, GBS, Parkinson's, cerebral palsy etc. Other facilities includes physiotherapy, occupational therapy, social welfare department, special needs school for children with cerebral palsy, pediatric children with cerebral palsy unit, operating theater, radiology and pathology department, training institute, sporting facilities for SCI

patients and a multipurpose hall. CRP also provides social welfare, after care, vocational training and follow-up visits at home. CRP has been involved in a Community Based Rehabilitation (CBR) program since 1994. The CBR program is now working in 61 Upazillas of 8 Districts throughout Bangladesh. CRP also provides the training to the paralyzed people as a production unit for making furniture, wheel chair and tricycle prototypes (Claque & Sym 2004).

Sports

Sports has been defined by UNESCO as “any physical activity which the character of play and which involves a struggle with oneself or with other, or a confrontation with natural elements in sports”(Guttman 1981).

Sports has an immense therapeutic value and plays a great part in physical, psychological and social rehabilitation(Sports activities for disabled people, 2006). There are different aspects of sports- Recreational, Therapeutic, Competitive. Sport can play a key role in the lives and communities of person’s with a disability, the same as their peers without a disability (Houwen 2004).

Sports for the disabled

Sports has an immense therapeutic value and plays a great part in physical improvement for the person with disability. Rehabilitation professionals recognize the importance of sports and recreation in successful rehabilitation of individuals with disabilities. When first faced with the reality of a disability, many experience a loss of confidence depression and believe their lives have ended. Many sporting activities that can be used for rehabilitation have become possible for disable people. Sport is increasingly being used as treatment complementing the conventional methods of physiotherapy (Houwen 2004). It helps to develop strength, coordination, endurance, and respiratory fitness. Some medical conditions may prevent people participating in a particular sport. For example, people with low cardio respiratory endurance, retinal detachment or hernias are preclude from strenuous activities (Sports activities for disable people 2006).

Sports offer the opportunity to achieve success in a very short time of period, to use this success to build self-confidence and focus on possibilities instead of dwelling on what can no longer be done. Rehabilitation is the restoration of the handicapped person to a useful life many sporting activities that can be used for rehabilitation program for the spinal cord injured people (Gwite 1993).

Sports and rehabilitation

This definition for rehabilitation does not account for physical activity for the joy of it as in play, exercise to improve or maintain fitness or activity required in employment (Sherrill & Rimmer 1998).

According to this definition of rehabilitation, activities of daily living including the physical demands which deliberate structured activity to maintain or improve fitness, normal ambulation, play, sport and domestic chores. Today the model of fitness development includes play, sport, physical demands of employment involving large and small muscles and daily chores for people with disabilities and able bodied people alike. By rehabilitation program flexibility, mobility and coordination can be improved (Sherrill & Rimmer 1998). Rehabilitation can enhance the functioning and health of their heart, lungs, muscles and bones in most cases through regular physical activity of people with disabilities. The effects of sport on the rehabilitation of people with paraplegia and tetraplegia are promoting development of their physical and cardio-respiratory status (Additional Sports and Disabilities resources 2004). Since physical activity contributes to the maintenance of health, by exercising, people build stamina that makes the demands of daily living easier thus leaving extra energy at the end of the day for additional social activities. Where people who participate in rehabilitation, it contributes physical fitness (Sherrill & Rimmer 1998). Rehabilitation is the restoration the handicapped person to a useful life.

Wheelchair sports

Sports is a human activity capable of achieving a result requiring physical exertion and/or physical skill, which, by its nature and organization, is competitive and is generally accepted as being a sport (Australian sports commission 2011).

Sports has an immense therapeutic value for the person with disability. Rehabilitation professional recognize the importance of sports and recreation in the successful rehabilitation of individual with disability. When a man first faced with the reality of disability, many experience a loss of confidence, depression, and belief their life has ended. Many sporting activity can be helps to develop strength, coordination, endurance and ultimately can improve their mental status (Outdoor sports and leisure 2010).

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

Wheelchair basketball

Wheelchair basketball is an extreme dynamic game among spinal cord injured patient .it provide a greatest degree of neuromuscular adjustment a promote high degree of integration (Gutmann 1981).It is the most popular competitive game among SCI patient.

Archery

Archery was one of the first sports ever to be competed in. Wheelchair archers compete equally with able-bodied individuals and have minimal rule modifications. Archery is one of the few sports whereby those with various physical disabilities compete against each other..This game helps to reduce weakness of muscle in SCI patient (British wheelchair archery association 2010).

Golf

Wheelchair golf, also called adaptive golf, is growing in popularity as more advocacy, customized equipment, adaptive golf instruction, and resources become available to

help physically challenged players learn and continue to play the game (Mobility advisor 2010).

Wheelchair tennis

Wheelchair Tennis was founded in 1976 when Brad Parks first hit a tennis ball from a wheelchair and realized the potential of this new sport. Still one of the fastest growing wheelchair sports in the world, wheelchair tennis integrates very easily with the able-bodied game since it can be played on any regular tennis court, with no modifications to the size of the court or the size of rackets or balls (International Tennis Federation 2011).

Cycling

The benefits of cycling are the same for a disabled person as they are for an able bodied. Its fun - it promotes physical and mental well being and for the disabled person there is the addition of independent mobility. First time riders describe it as exhilarating, empowering, challenging (Outdoor sports and leisure 2010).

Therapeutic value of sports for spinal cord injured people

Spinal cord injuries can occur at any level of the spinal cord, and the level of the injury will dictate which bodily functions are altered or lost. SCI might be either complete or incomplete. Complete injuries result in total loss of sensation and function below the injury level. Incomplete injuries result in partial loss. "Complete" does not necessarily mean the cord has been severed. Each of the above categories can occur in paraplegia and Tetraplegia (Burnham, May & Nelson 2004).

When a person first faced with the reality of a disability, many experience a loss of confidence, depression and believe their lives have ended (Additional Sports and Disabilities resources 2004). Disabled with SCI alienated from family and friends for this they cannot share positive experience. At that time sports gives self discipline, a competitive spirit, and comradeship, its value in promoting health, physical strength. Sports offer the opportunity to achieve success in a very short period of time; to use success to build self-confidence. While sports have value in everyone's life, it is even

more important in the life of a person with disability. This is because of sport's rehabilitative influence, and the fact that it is a mean to integrate the person into society. Sport is used as treatment complementing the conventional methods of physiotherapy. It helps to develop strength, coordination and endurance. Participation in sports can help physically disabled people to regain self esteem, promotes the development of positive mental attitudes and helps them to come to terms with their disability and achieve social reintegration (Additional Sports and Disability resources 2004). Sport teaches independence. Sport is particularly valuable for persons with a disability as they often remain in the home environment, protected and guarded by their families. Participation in sport creates peer interaction, cooperative relationship and team work. Sports help prepare individuals to face the adversity of a disability in their lives and to learn to bounce back in the face of challenge and change. Sir Ludwig Guttmann introduced sports as an essential part of the management of patients with Spinal cord damage. Sports are more than just a way to recreate or compete; it means sports contribute healthy minds and body. The physical, mental and social values and benefits derived from participation in sport and physical activity are widely accepted (Surgeon 1999). Sport can also play a significant role in reducing the focus on the impairment or disability of the person and place the focus on their abilities. The therapeutic values of the sports program are the patients regained strength, coordination and confidence they began to find regular work and a place in the outside world. Sport is part of the treatment, like taking their medicine, or doing physiotherapy.

Depression measurement scale

For this study a scale is used for depression measurement which is developed by, Md.Zahir uddin-National Institute of Mental health, Dhaka and Mohammad Mahmudur Rahman-Department of clinical psychology, University of Dhaka. This scale is developed according to cultural context of the Bangladesh. To achieve this aim, the study was done in three phase. In first phase 48 items was constructed and 16 judges were asked to evaluate these items. Based on the data available in the third phase, various reliability validity estimates were obtained for this new scale of depression. A tentative norm was also developed for assessing the severity of

depression and a screening norm for obtaining the cut off point for deciding about the clinical level of depression for a given individual. The obtained results indicate that the newly constructed depression scale has reliability and validity at acceptable level, and with the norms developed on the scale, it is now ready for use in Bangladesh, for both research and clinical purposes. Some researchers showed that depression might have different manifestations in different cultures, for example, in an Indian study, it was found that depression had varied manifestations like depressed mood, anxiety, somatic features, insomnia, lack of interest, paranoid ideas, obsessions etc. In Bangladesh, prevalence of depression was found to be 28.78 per thousands in a field study near Bangladesh. For assessment of depression there are a lot of scales such as, Beck Depression Inventory Second edition-BD-II, Hamilton Rating scale, Hospital Anxiety and Depression Scale-HADS, Beck Hopelessness Scale, Dysfunctional Attitude Scale etc. For the assessment of severity, clinical psychologist are using Beck Depression Inventory (BDI), which is not yet standardized in Bangladesh.

This DS is considered to use it in therapeutic session and in research. The used scale of Depression in this study was developed in three phases. They were as follows-

Phase-1: Construction of item.

Phase-2: Item analysis and selection of items for the final form of depression scale.

Phase-3: Determining Reliability and Validity of the final scale and developing norm for the Target population.

Instruments/Techniques used in this scale are- Newly constructed Depression scale, Depression sub-scale of hospital Anxiety and Depression Scale, Depression Rating by Psychiatrists and Clients self rating of Depression, Psychiatric interview, Basic information about participants. The Depression scale consists of 30 items or statements with printed instruction. The answer options for each item of the scale were according to 5 point rating scale, such as not at all applicable, not applicable, moderately applicable, somewhat applicable, fully applicable. Not at all applicable was scored 1, not applicable was scored 2, moderately applicable was scored 3, somewhat applicable was scored 4, fully applicable was scored 5. The highest possible score was 150 and lowest possible score was 30. Higher score indicated higher depression and lower score indicate low level of depression.

Severity norm of the depression scale:

Severity of depression	Corresponding scores of depression scale
Minimal	30-100
Mild	101-114
Moderate	115-123
Severe	124-150

This Depression scale is easy to administer, as it takes about only ten to fifteen minutes to respond. So, it will be a very good depression assessment tools in routine assessment in psychotherapy session .It will also be a good tool for research purpose (Begum 2005).

3.1 Study design

Pre-post experimental design of quantitative research was selected for this study. The researcher conducted the study with a single group. The design had no control group to compare with the experimental group.

The pre-post experimental design could be shown by:

One group pretest –post test design:

O X O

The pretest-posttest design is valuable in describing what occurs after the introduction of the Independent variable.

3.2 Target Population

A population is the total group or set of event or totality of the observation on which a research is carried out. In this study, sample population were selected from the participant of Spinal cord injury department of Centre for the Rehabilitation of the paralyzed (CRP), Savar. Dhaka.

3.3 Study Site

The research was conducted at the Centre for the Rehabilitation of the paralyzed (CRP), Savar. Dhaka.

3.4 Study Area

The study project is conducted at Spinal Cord Injury (SCI) department of Centre for the Rehabilitation of the paralyzed (CRP), Savar, Dhaka.

3.5 Sample Size

11 Samples were taken for the study purpose in the Centre for the Rehabilitation of the paralyzed (CRP), Savar, Dhaka.

3.6 Subject Inclusion Criteria

- a. Both Paraplegic and tetraplegic patient.
- b. Independent wheelchair users.
- c. Voluntary participant.
- d. Both male and female patient.
- e. Patients who were (15-60) years.

3.7 Subject Exclusion Criteria

- a. Higher Tetraplegia patients.
- b. Acute injured patients
- c. Patients in bed rest.
- d. Patients in traction.
- e. Patient with others mental or physical illness.

3.8 Sampling Techniques

Simple random sampling technique is used for this study. In this technique each number of the population has an equal chance of selection. It is therefore more representative. It is also called unrestricted random sampling.

3.9 Data Collection Procedure

The researcher followed the time schedule of the setting for data collecting data. Researcher has chosen two setting for collecting data. In this study there were 11 samples which were participating in this study and participate in wheelchair sports at least 3 weeks. The researcher used pen, pencil, white page, data collection form with depression measurement scale which is developed by Md. Zahir Uddin and Md. Mahmudur Rahman, Department of Clinical psychology, University of Dhaka. This scale is developed according to cultural context of the Bangladesh.

Data collection was consisted with-

- i. Firstly, the researcher assessed the patients to confirm inclusion and exclusion criteria.

- ii. At the first day of data collection the researcher introduced with the patients. Then given a consent form to the patients and explained the subject of research and objective of the research project to the patients.
- iii. When the participant permitted to collected data then started the interview with the form.

3.10 Informed consent

Written consent was given to all participants prior to completion of the questionnaire. The researcher explained to the participants about his or her role in this study. The researcher received a written consent form every participants including signature. So the participant assured that they could understand about the consent form and their participation was on voluntary basis. The participants were informed clearly that their information would be kept confidential. The researcher assured the participants that the study would not be harmful to them. It was explained that there might not a direct benefit from the study for the participants but in the future cases like them might get benefit from it. The participants had the rights to withdraw consent and discontinue participation at any time without prejudice to present or future treatment 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.

3.11 Ethical consideration

A research proposal was submitted for approval to the administrative bodies of ethical committee. The researcher will take permission from Bangladesh Health Profession Institute and Clinical department of physiotherapy in CRP, Saver. Patient permission will be taken. The participants were explained the purpose and goal of the study. Subjects have participated voluntarily and they were also told that confidentiality would be maintained. Furthermore the researcher would be available to answer any questions in regard to the study. All information kept in secure. Ensure about patient safety. The study followed the World Health Organization

(WHO) and Bangladesh Medical and Research Council (BMRC) guideline and strictly maintains the confidentiality.

3.12 Data analysis

All the subjects' names were coded to maintain confidentiality. Subjects were evaluated by depression measurement scale. Initial assessment was carried out in each participant that provides the pre-test score. After participate in wheelchair sports in the same way as the pre-test data are collected which gives the post-test score. Then calculate the difference of pre-test and post-test score. Then related 't' test is calculated and finds its 'P' value. Subjects details in study:

Table 1

All the subjects' names were coded to maintain confidentiality.

Subjects	Age	Sex	Diagnosis
P1	42yrs	Male	Paraplegia
P2	19yrs	Male	Tetraplegia
P3	40yrs	Female	Paraplegia
P4	18yrs	Female	Paraplegia
P5	35yrs	Male	Tetraplegia
P6	58yrs	Male	Paraplegia
P7	29yrs	Male	Paraplegia
P8	50yrs	Male	Paraplegia
P9	33 yrs	Male	Paraplegia
P10	28yrs	Male	Paraplegia
P11	56yrs	Male	Paraplegia

Subject	Depression score
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Table 2

Pre-test and post-test score of the subject:

Subject	Depression score	
P1	Pre-test score	111
	Post-test score	84
	Difference	27
P2	Pre-test score	91
	Post- test score	65
	Difference	26
P3	Pre-test score	103
	Post-test score	95
	Difference	8
P4	Pre-test score	102
	Post-test score	82
	Difference	20
P5	Pre-test score	105
	Post-test score	87
	Difference	18
P6	Pre-test score	102
	Post-test score	94
	Difference	8
P7	Pre-test score	104
	Post-test score	83
	Difference	21

P8	Pre-test score	98
	Post-test score	86
	Difference	12
P9	Pre-test score	97
	Post-test score	95
	Difference	2
P10	Pre-test score	96
	Post-test score	87
	Difference	9
P11	Pre-test score	99
	Post-test score	88
	Difference	11

Mean score of pre-test and post-test

Mean score of depression level before participate in wheelchairsports-100.72

Mean score of depression level after participate in wheelchair sports- 86

The 't' formula

Formula of related 't' test:

$$t = \frac{\sum d}{\sqrt{\frac{N \sum d^2 - (\sum d)^2}{N-1}}}$$

Where,

$\sum d$ = The total of the difference

$(\sum d)^2$ = The total of the difference squared

$\sum d^2$ = The total of the squared difference

N = Number of subjects.

Statistical Analysis

Statistical analysis is done to find out pair 't' test. To find out 'p' value for the significance of the result, the examiner used a related 't' test. Dependent variable of the treatment group were statistically tested by related 't' test and eventually gave a 'p' value.

Significant levels

The hypothesis of the experimental study is one- tailed hypothesis because it was predicting a specific direction to the result. If the 'p' value is <0.05 was accepted by the researcher to show the significant the study.

Table 3

Difference between pre-test and post-test score of depression level:

Subject	Pre-test score X1	Post-test score X2	Differences between pre-test and post test	
			d=X1-X2	d ²
P1	111	84	27	729
P2	91	65	26	676
P3	103	95	8	64
P4	102	82	20	400
P5	105	87	18	324
P6	102	94	8	64
P7	104	83	21	441
P8	98	86	12	144
P9	97	95	2	4
P10	96	87	9	81
P11	99	88	11	121
	$\sum X1 = 1108$ $X1 = 100.72$	$\sum X2 = 946$ $= 86$	$\sum d = 162$	$\sum d^2 = 3048$

The 't' formula-

$$t = \frac{\sum d}{\sqrt{\frac{N \sum d^2 - (\sum d)^2}{N - 1}}}$$

$$= \frac{162}{\sqrt{\frac{11 \times 3048 - (162)^2}{11 - 1}}}$$

$$= 1.898$$

Calculating the degree of freedom (df) from the formula,

$$df = N-1$$

$$= 11-1$$

$$= 10$$

Now 't' value for significance,
The 't' value = 1.898, df=10

Table 4- The level of significance for one tailed hypothesis

P value	0.10	0.05	0.25	0.01	0.005	0.0005
Critical t value	1.372	1.812	2.228	2.764	3.169	4.587

Observed 't' value 1.898 is larger than 1.812 but smaller than 2.228. The probability associated with this 't' value comes between 0.05(5%) and 0.025(2.5%). The 't' value is less than 0.025 and greater than 0.05. According to convention P is always less than the given level.

Now the **P** value of the study

P value : < 0.05

Variable	't' value	'P' value	Remark
Improvement of depression level	1.898	0.05	Significant

3.13 Limitation

There were some limitation and barrier during conducting the research project. These are as follows:

- This study was used 11 patients to evaluate the effectiveness of wheelchair sports to reduce of depression of SCI patients. This was small number of sample that is why it is not possible to generalize the study result in SCI patients.
- It was possible that this may be had an effect the accuracy of the study. Because there might be lack of harmony about distributing of confounding variable, like medication, sex, other physiotherapy treatment program etc. These unmasked variable were not controlled in the analysis might have affect the outcome of the study.
- As depression is a psychological problem some time it can be changed according to situation.
- There were no available researches done in this area in Bangladesh. As a result relevant, information about depression and effective of wheelchair sports to reduce depression of SCI patients is very limited.
- Time was limited and this had a great deal of for impact for the study. So it not possible to identify long term effects of wheelchair sports to reduce depression for that type of patients.

After spinal cord injury patients face a lot of complications. Psychological complications are one of them. Depression is the major problem among them. A marked reduction of mental status such as sadness, sense of failure, dissatisfaction, guilt, self-dislike, crying, irritability, withdrawal, indecisiveness, body image change, work retardation, insomnia, fatigability, anorexia, weight loss, loss of libido are seen. Physical disabilities are the major cause for those symptoms of SCI patients. Various types of therapeutic wheelchair sports can reduce those effects of disability and also the effects of depression of SCI patients.

The purpose of this study to find out the depression level of SCI patients and find out the effectiveness of wheelchair sports to reduce depression and objectives are to evaluate the wheelchair sports as a part of the treatment program to reduce depression of SCI patients and see the improvement rate.

In this Pre experimental study 11 subjects with SCI were conveniently allocated to treatment group. This group participates in wheelchair sports and also takes other treatments. Each subject of the group had participated three weeks of wheelchair sports session at spinal cord injury department in CRP. The outcome was measured by depression scale developed by Md. Zahir Uddin and Mohammad Mahmudur Rahman.

In the study researcher wanted to prove the experimental hypothesis by manipulating the SCI patient with depression by wheelchair sports, and by statistical analysis it has been proved that the wheelchair sports reduce depression of SCI patient.

The experimental hypothesis was that wheelchair sports can reduce depression of spinal cord injury patients. It is a one-tail hypothesis.

From this hypothesis two variables were found, one was wheelchair sports that was independent variable and other was changes in depression level which is dependent variable. The dependent variable that means, the outcomes of wheelchair sports for reducing depression of SCI were measured by depression scale (DS) which is realistic and measurable. It can be said that experimental hypothesis was realistic and testable.

The study represent that, the depression level score of the subjects before participate in wheelchair sports mean score was 100.72 and after participating in three weeks wheelchair sports mean score was 86. Therefore the mean score of depression level is reduced that means participate in wheelchair sports patients mental status is improved.

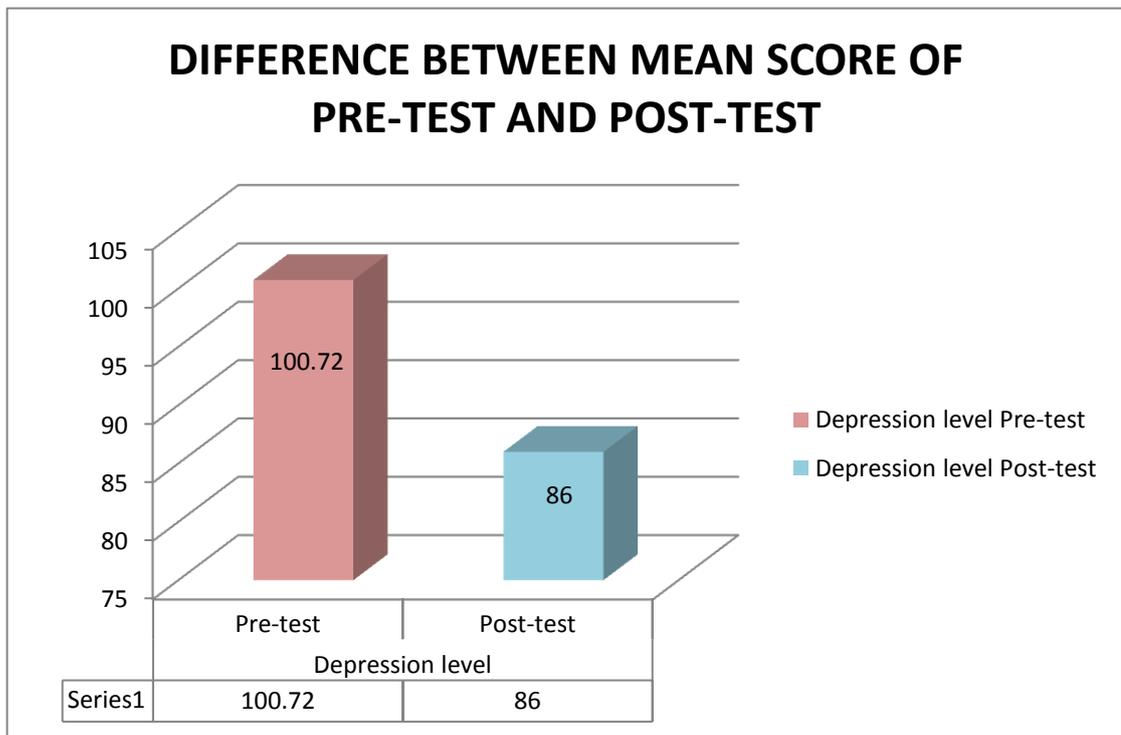


Figure 1: Difference between mean score pre-test and post-test

In this study, using a same- subject group, where subjects were conveniently allocated to the treatment program group. The same subjects are used for each level of the independent variable. Since the subjects are the same for all levels of the independent variables, they are their own controls (that is, subject variables are controlled). Outcomes were measured by collecting the scores of different variables and the scores are considers of interval/ratio data. The pretest-posttest comparison group design is one of the most extensively used methods to evaluate clinical research. Common method of analyzing data from a pretest-posttest research design are related ‘t’ test on the difference score between pretest and posttest .This study used parametric related ‘t’ test to calculate the significance level of the study. The ‘t’ test is used to find out

whether the 't' value represented a significance difference between the results from before received treatment and after received treatment of the same group of subjects.

Statistical analysis of the data represented the 't' value of depression level score of the subjects which was significant ($t = 1.898$, $df = 10$, $p = 0.05$). This mean that the probability associated with this 't' value comes between 0.05(5%) and 0.025(2.5%). The 't' value is less than 0.025 and greater than 0.05. According to convention P is always less than the given level. Therefore it can be said that the findings of the study is significant. The bar chart is representing the mean improvement of the depression level with SCI patients.

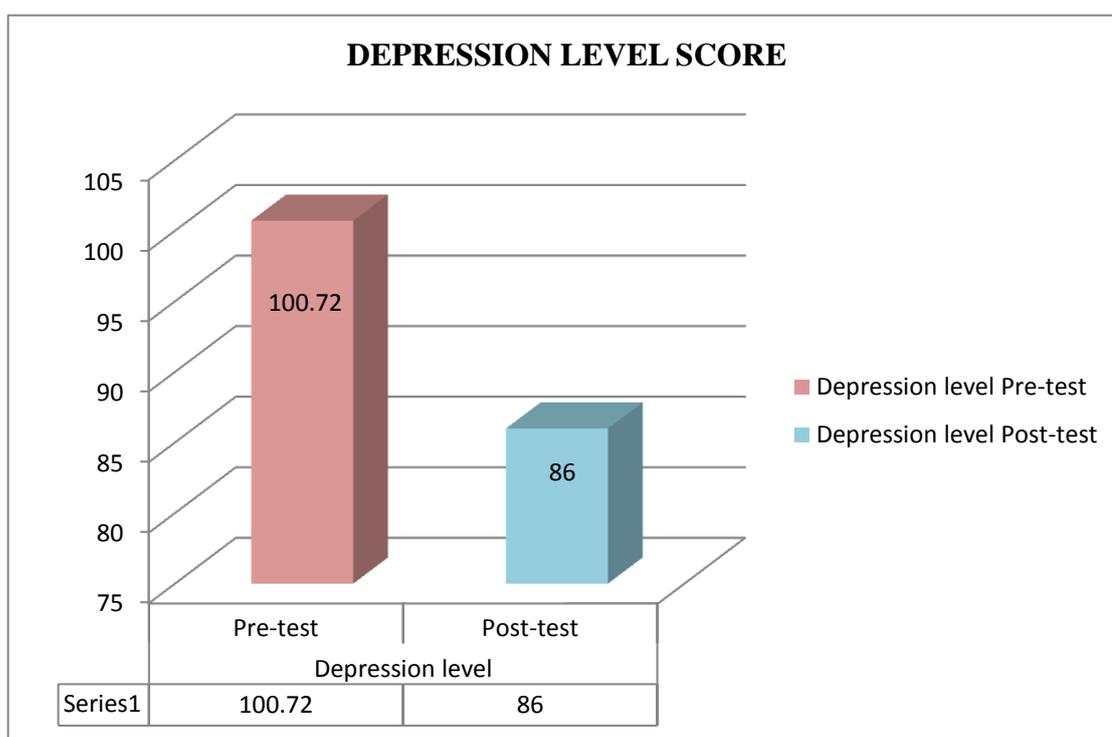


Figure 2: Depression level score

So, using related 't' test it was found that significant positive changes in the variable after participate in wheelchair sports. The result is depression level ($p < 0.05$) this

means the wheelchair sports program is effective for reducing depression level of patients with spinal cord injury.

CHAPTER-V:

DISCUSSION

SCI involves severe physical, social, but also psychological consequences. The risk for major depression, anxiety disorder, post-traumatic stress disorder, substance abuse and suicide is elevated for people with SCI compared with the general population (Peter et al. 2011). Physical activity like sports has the potential to promote health and to enhance quality of life. However, despite the known benefits of physical activity, large proportions of the population are physically inactive to the point that it impacts negatively on health. This is true to an even greater extent for people with spinal-cord injury (SCI). The wheelchair sports can improve physical status as strength, coordination power, cardiovascular status, pulmonary function and that all can improve their psychological status and reduce depression. Wheel chair sports are part of their exercise program.

Hicks et al. (2003) also state that a 9-month program twice-weekly exercise can decrease self-reported stress, pain, and depression, and can enhance physical concept and overall QOL in persons with SCI.

Life expectancy for individuals after spinal cord injury (SCI) is approaching that of the able-bodied population the ultimate goal of rehabilitation for this group has shifted from extension of life expectancy to enhancement of independence and quality of life. The importance of regular physical activity on the course and success of rehabilitation after SCI has been increasingly recognized, especially with respect to the physical benefits of exercise for promoting functional independence. Major cause of morbidity and mortality in the SCI population modifiable risk factors, such as physical inactivity, are attracting increased attention from health care professionals.

According to (Post & Leeuwen 2012) a significant decrease of depressive symptoms during the intervention, although this effect was not always maintained at follow-up. The results showed that at group level, life satisfaction improves from a low level early after SCI, and that there is no substantial decrease of life satisfaction at long-term follow-up. Intervention decrease of anxiety and depression but no change of coping strategies was found after SCI.

Greater heavy-intensity activity was related to lower levels of pain and fatigue and higher levels of self efficacy, whereas higher amounts of mild-intensity activity and total activity were related to less depressive symptoms (Tawashy et al. 2009).

In this study showed that wheelchair sports significantly reduce depression level of spinal cord injury patients. But for small sample size and short time duration it can not be possible to generalize the study result in wheelchair sports to reduce depression level of SCI patients.

From over all discussion researcher can be said that to reduce depression level wheelchair sports has a great impact and play an effective role. Null hypothesis of this study is wheelchair sports cannot reduce the depression level of spinal cord injury patients. But in this study proved that wheelchair sports significantly reduce the depression level of Spinal cord injury patients. So null hypothesis is rejected in this study.

CHAPTER-VI:	CONCLUSION AND RECOMENDATION
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6.1 Conclusion

A significant decrease in mental status and depression was present after spinal cord injury. When spinal cord injury patients first faced with reality of disability, many experience depression, loss of confidence as a result reduced quality of life. Depression is a prominent terminal psychiatric disorder and so should be considered with priority. So early detection and proper management of this condition is essential.

In this study, there were found big difference between pre-treatment and post-treatment group. These were indicating that wheelchair sports are effective on reducing depression level for spinal cord injury patients. Aim and objective of this study is fulfilled at the end of the study. In this study null hypothesis were rejected. So that hypothesis of the study was proved. After completing the study, researcher says that wheel chair sport is effective on reducing depression level of the SCI patients.

6.2 Recommendation

Significant result for comparison of depression level of SCI patients and efficacy of wheelchair sports to reducing depression level of SCI patients. In term of future, a much larger study needs to be under taken of a longer duration.

This study is a pre-experimental design for this reason the result could not be generalized so need to true experimental study in this area which will help to improve the field work. Include a large number of sample size also generalized the study so need a large number of sample in further research. Future research that includes other environmental, social and or personal factors would be useful in examining factors that may be associated with the mental health outcomes of depression and clinically significant stress in these patients.

For SCI patient's depression is major and common problem. This will hamper their daily life. There are many research in various aspects of SCI. But there a few research in this aspect. But it is a very important part for spinal cord injury patients to reduce depression and depression is a major complication of spinal cord injury patients. So, Here need a lots of study.

REFERENCES

- Additional Sports and Disabilities Resources 2004, viewed at 12th August 2011, <<http://www.healthtouch.com>>.
- American academy of orthopedic surgery 2001, *Restoring Hand Function After Spinal Cord Injury*, Viewed 2 August 2011, <<http://orthoinfo.aaos.org/topic.cfm?topic=A00371>>.
- American spinal cord injury association 2011, *Education*, viewed 25 November 2011, <http://www.asia-spinalinjury.org/education/n_index.php>.
- Anneken, V, Doose, AH, Hirschfelds. S, Scheuer, T & Thietzer, R 2010, 'Influence of physical exercise on quality of life in individuals with spinal cord injury', *Spinal cord*, vol.48, pp.393-399.
- Australian sports commission 2011, *Definition of sports*, viewed 2 August 2011, <http://www.asf.org.au/who/definition_of_sport>.
- Brain & Spinal cord Organisation 2011, *Depression & spinal cord injury*, Viewed 12 August 2011, <<http://www.brainandspinalcord.org/coping-spinal-cord-injury/depression-spinal-cord-injury/index.htm>>.
- British wheelchair archery association 2010, *Wheelchair archery*, viewed 2 August 2011, <<http://www.british-wheelchair-archery.org.uk>>.
- Buckwalter, K & Smith, M 1993, *Geriatric Mental health training series*, viewed at 15th April 2011, <[www.nursing.uiowa.edu/hartford/nurse/common support -Mat.doc](http://www.nursing.uiowa.edu/hartford/nurse/common_support_Mat.doc)>.
- Begum, HA 2005, 'Development of a scale of depression for use in Bangladesh,' *Bangladesh psychological studies*, vol.15, pp. 26-32.
- Burnham, RS, May, L, Nelson, E 2004, *Spinal Cord Injury*, viewed at 15th August 2011, <<http://www.paraplegic-online.com/einjurycomplic01.htm>>.
- Clauque, A & Sym, A 2004, *Annual report 2003-2004*, Centre for the rehabilitation of the paralysed (CRP), Dhaka.
- Disability world 2002, *World report on disability*, viewed 15 July 2011, <<http://www.disabilityworld.org/index.html>>.
- Disable world 2009, *Disability Sports*, viewed 2 August 2011, <<http://www.disabledworld.com/sports/>>.

- Disabled world 2007, *What is Quadriplegia and Paraplegia*, Viewed 2 August 2011, <http://www.disabled-world.com/artman/publish/article_0082.shtml>.
- Geldern, M, Gath, D & Mayon, R 1983, *Oxford Textbook of Psychiatry*, Oxford university press, New York.
- Grang, CC 2002, 'Spinal cord stimulation for chronic pain of neuropathic or ischaemic origin: systematic review and economic' *Evaluation Spinal cord*, vol. 40, pp. 513-518.
- Gutmann, I 1981, *Textbook of sports for the disabilities*, 1st edn, HM publisher Ltd, England.
- Hicks, AE, Martin, KA, Latimer, AE, Carven, C, Bugaresti, J & Cartney, NM 2003, 'Long-term exercise training in persons with spinal cord injury: effects on strength, arm ergometry performance and psychological well-being', *Spinal cord*, vol.41, pp.34-43.
- Hoque, MF, Gangone, C and Reed, KN 1999, 'Spinal cord lesion in Bangladesh: an epidemiological study 1994-1995', *Spinal cord*, vol.37, pp. 858-861.
- Houwen, P 2004, *United Nation Standard Rules on the Equalisation of Persons with Disabilities*, viewed at 16th August 2011, <<http://www.toolkitsportdevelopment.org/html>>.
- International Tennis Federation 2011, *Wheel chair tennis*, viewed 2 August 2011, <<http://www.itftennis.com/wheelchair/generalinfo/index.asp>>
- Law, AM and Kelton, D 2007, *Stimulation modeling and analysis*, 4th edn, McGraw-Hill, New York.
- Lyttle, J 1986, *Mental disorder*, Bailliere tindall, London.
- Mobility advisor 2010, *Wheelchair Golf - Adaptive Golf*, viewed 2 August 2011, <<http://www.mobility-advisor.com/wheelchair-golf.html>>.
- Momin, MKA 2003, *The level of integration of people of Spinal cord lesion in Bangladesh*, 1st ed, The university of leads, Canada.
- National spinal cord injury statistical center 2011, *Definition and Eligibility Criteria 2006-2011*, Viewed 2 august 2011, <https://www.nscisc.uab.edu/public_content/nscisc_database/definition_eligibility.aspx>.

- Outdoor sports and leisure 2010, *Outdoor sport for disabled people*, Viewed 2 august 2011, <<http://www.outdoor-sport-leisure.net/disabled.htm>>.
- Post, M & Leeuwen, CV 2012, 'Psychosocial issues in spinal cord injury: a review,' *Spinal Cord*, pp. 1-8.
- Peter, C, Muller, R, Cieza, A & Geyh, S 2011, ' Psychological resources in spinal cord injury: a systematic literature review,' *Spinal Cord*, pp. 1-14.
- Reeve foundation 2011, *Paralysis resource center*, Viewed 12 August 2011, <<http://www.christopherreeve.org/site/c.mtKZKgMWKwG/b.5016279/k.1FD9/Depression.htm>>.
- Sakakibara, BM, Miller, WP, Orenczuk, SG, & Wolf, DL 2009, 'A systematic review of depression and anxiety measures used with individuals with spinal cord injury', *Spinal cord*, vol.47, pp. 841-851.
- Saunders, LL, Krause, JS & Foch, KL 2011, 'A longitudinal study of depression in survivors of spinal cord injury', *Spinal cord*, vol.49, pp.1-6.
- Schlund, D n.d., *Exercise And Depression*, Vanderbilt University, Viewed 12 August 2011, <http://www.vanderbilt.edu/ans/psychology/health_psychology/exercise_and_depression.htm>.
- Sherill, C and Rimmer, JH 1998, *Adapted Physical Activity and Sports*, 5th edn, McGraw-Hill, Boston.
- Smith, M, Saisan, J & Segal, J 2011, *Understanding Depression*, Help guide organisation, Viewed 2 august 2011, <http://www.helpguide.org/mental/depression_signs_types_diagnosis_treatment.htm>.
- Somers, MF 1992, *Spinal cord injury functional rehabilitation*, Appleton & Lange, Norwalk.
- Stillson, M, Virginia, G 2007, ' Case study of participation and perceptions of wheelchair athletes in wheelchair sports', *The state university of Newjersey*, vol.8, no.7, pp.123-125.
- Surgeon, G 1999, *Blaze Sports and Active lifestyle*, viewed at 23th January 2012, <<Http://www.blazesports.com/desktopDefault.aspx?tabindex=1&tabid=23&tablevel=2>>.

- Tawashy, AE, Eng, JJ, Lin, KH, Tang, PF & Hung, C 2009, 'Physical activity is related to lower levels of pain, fatigue and depression in individuals with spinal-cord injury: a correlational study,' *Spinal Cord*, vol. 47, pp. 301-305.
- University of Washington 2011, *Northwest regional spinal cord injury system*, Viewed 12 August 2011, <
http://sci.washington.edu/info/pamphlets/depression_sci.asp>.
- Wheelchair sports federation 2010, *Adaptive Sports*, viewed 2 August 2011, <<http://www.wheelchairsportsfederation.org/adaptive-sports>>.
- Willardson, JM 2007, 'Core stability training: Application to sports conditioning programme', *Journal of Strength and Conditioning Research*, vol.21, no.3, pp.979-985.
- Zejdlik, CP 1992, *Management of spinal cord injury*, 2nd edn, Jones and Bartlett Publishers, Boston.
- Zieve, D & Hoch, DB 2010, *Spinal cord trauma*, Pubmed health, viewed 2 August 2011, <<http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002061/>>.
- Zieve, D & Merrill, DB 2011, *Major depression*, Pubmed health, Viewed 10 august 2011, <<http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH00019>>.

Appendix

সম্মতি পত্র / অনুমতি পত্র

চিকিৎসাকেন্দ্র : পক্ষাঘাতগ্রস্থদের পুনর্বাসন কেন্দ্র (সি.আর.পি) সাতার শাখা ।

এ অধ্যয়ন ‘পক্ষাঘাতগ্রস্থ’ রোগীদের হুইল চেয়ার ক্রীড়ায় অংশ গ্রহণের আগে এবং পরে বিষন্নতা পরিমাপক তুলনা সম্পর্কিত গবেষণা। গবেষক তাসমিয়া জামিল, বি,এইচ,পি,আই এর চতুর্থ বর্ষ বি,এস,সি ইন ফিজিওথেরাপী কোর্সের একজন ছাত্রী এবং এই গবেষণা তার অধ্যয়নের অংশ। (নিম্নোক্ত তথ্যাদি পাঠ করার পর অধ্যয়নে অংশগ্রহণকারীগণ অংশগ্রহণ করার জন্য আমন্ত্রিত।)

এই অধ্যায়ের লক্ষ্য হল ‘পক্ষাঘাতগ্রস্থ’ রোগীদের হুইল ক্রীড়ায় অংশগ্রহণের আগে এবং পরে বিষন্নতা পরিমাপ করা এবং তাদের বিষন্নতার তুলনা করা যা পরবর্তী সময়ে বিষন্নতা চিকিৎসার ক্ষেত্রে সহায়ক হবে। গবেষণাটিতে বিষন্নতা কমাতে হুইল চেয়ারের ভূমিকা বের করতে সাহায্য করবে। এই গবেষণায় অংশগ্রহণের কারণে আপনার চিকিৎসার কোন রকমের অসুবিধা/ক্ষতি হবে না এবং আপনার ব্যক্তিগত সকল তথ্য গোপন রাখা হবে/ গবেষক গোপনীয়তা রক্ষা করবেন।

প্রশ্নোত্তর পর্বের যে কোন মুহুর্তে আপনি সম্মতি প্রত্যাহার এবং কোন প্রশ্নের উত্তর প্রদানের অপারগতা প্রকাশের ব্যাপারে আপনার সম্পূর্ণ অধিকার রয়েছে। এই গবেষণায় প্রাপ্ত তথ্য সম্পূর্ণভাবে গোপনীয় থাকবে এবং অংশগ্রহণকারীকে ব্যক্তিগতভাবে গবেষণার ফল প্রকাশের সময় চিহ্নিত করা হবে না।

.....
রোগীর স্বাক্ষর

.....
তারিখ :

.....
গবেষকের স্বাক্ষর

.....
তারিখ :

Consent form

Clinical setting-Centre for the Rehabilitation of the paralyzed (CRP)—Savar.

The title entitled "The comparison of depression level of spinal cord injury patients before and after participate in wheelchair sports in CRP". The researcher Tasmia Jamil is a student of B.H.P.I in 4th year B.Sc. in Physiotherapy and it is a part of her study. The participant in invited to participate in the study after reading the following information.

The study being conducted, To find out the depression level of spinal cord injury patients before and after participate in wheelchair sports an compare their depression level. This will help to find out role of wheelchair sports to reduce the depression level of spinal cord injury patients. For this research the participant would need to answer some questions. This will take 20 minute. The study does not cause any risk or harm for your treatment. All in formation provided by you will be treated as confidential.

Your participation in this study is voluntary you may withdraw 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.

In the event of any report or publication it will be ensured that the source of information remains anonymous.

.....
Signature of the patient

.....
Date:

.....
Signature of Interviewer

.....
Date:

তথ্য সংগ্রহের ফরম

রোগীর নাম :
 বয়স :
 লিঙ্গ :
 ঠিকানা :
 রোগ নির্ণয় :

হুইল চেয়ার ক্রীড়ায় অংশগ্রহণ : হ্যাঁ: না:

বিষন্নতা পরিমাপক

নিচের বিবৃতিগুলো পড়ে গত মাসের মধ্যে এই বিবৃতিগুলো আপনার ক্ষেত্রে কতটা প্রযোজ্য বিবৃতির পার্শ্বে সম্ভাব্য পাঁচটি উত্তরের যেটি প্রযোজ্য সেটির ঘরে (√) বিহু দিয়ে নির্দেশ করুন। আপনাকে সম্ভাব্য এই পাঁচটি উত্তর থেকে যে কোন একটিকে বেছে নিতে হবে এবং সবগুলো প্রশ্নের উত্তর দিতে হবে। অনুগ্রহ করে লক্ষ্য করুন সবগুলো বিবৃতির উত্তর দিয়েছেন কি না।

বিবৃতিসমূহ	একেবারেই প্রযোজ্য নয়	প্রযোজ্য নয়	মঝামঝি	কিছুটা প্রযোজ্য	পুরোপুরি প্রযোজ্য
১. আমার অশালিড় লাগে।					
২. ইদানিং আমি মনমরা থাকি।					
৩. আমার ভবিষ্যৎ অন্ধকার।					
৪. ভবিষ্যতে আমার অবস্থা দিন দিন আরো খারাপ হবে।					
৫. আমার সব শেষ হয়ে গেছে।					
৬. আমি মনে করি যে জীবনটা বর্তমানে খুব বেশি কষ্টকর।					
৭. বর্তমানে আমি অনুভব করি যে মানুষ হিসাবে আমি সম্পূর্ণ ব্যর্থ।					
৮. আমি কোথাও আনন্দ-ফুর্তি পাই না।					
৯. নিজেকে খুব ছোট মনে হয়।					
১০. সবকিছুতে আমার আত্মবিশ্বাস কমে গেছে।					
১১. আমার মনে হয় মানুষ আমাকে করুণা করে।					
১২. জীবনটা অর্থহীন।					
১৩. প্রায়ই আমার কান্না পায়।					
১৪. আমি প্রায়ই বিরক্তবোধ করি।					
১৫. আমি কোনকিছুতেই আত্মহ পাই না।					
১৬. আমি ইদানিং চিন্ত্র করতে ও সিদ্ধান্ত্র নিতে পারি না।					
১৭. আমি আজকাল অনেক কিছুতেই মনোযোগ দিতে পারি না।					
১৮. আমি আগের মতো মনে রাখতে পারি না।					

১৯.	আমি দুর্বলবোধ করি এবং অল্পতেই ক্লান্ত হয়ে পড়ি।				
২০.	আমি এখন কম ঘুমাই				
২১.	আমি এখন বেশি খুমাই।				
২২.	আমার মিজাজ খিটখিটে হয়ে গেছে।				
২৩.	আমার ক্ষুধা কমে গেছে।				
২৪.	আমার ক্ষুধা বেড়ে গেছে।				
২৫.	আমার ওজন কমে গেছে (ইচ্ছাকৃতভাবে ওজন নিয়ন্ত্রণের চেষ্টা করার ফলে নয়)।				
২৬.	আমার মনে হয় যে আমার কাজকর্মের গতি কমে গেছে।				
২৭.	হাসির কোন ঘটনা ঘটলেও আমি আর হাসতে পারি না।				
২৮.	যৌন বিষয়ে আমার আগ্রহ কমে গেছে।				
২৯.	সামাজিক কাজকর্মে আগের মতো অংশগ্রহণ করতে পারি না।				
৩০.	শিক্ষা বা পেশাগত কাজকর্ম আগের মতো করতে পারি না।				

মোট :

Data Collection Form

Partients Name :

Age :

Sex :

Address :

Diagnosis :

Participation on wheel chair sports :- Yes No

Depression Measurement Scale

Dear Sir/Madam, Please read the following statements and indicate how much each or those statements are applicable for you in the last month. Please indicate your answer by putting tick (√) mark to one of the possible five answers given in right side of each statement. You should not give more than one answer for each item. Please check that you answer all the statements. Thank you for your co-operation. Let us start now.

SL No	Statement	Not At all Applicable	Not Applicable	Moderately Applicable	Somewhat Application	Fully Applicable
1.	I feel lack of peace in my mind.					
2.	Now a days I experience low mood.					
3.	My future is dark.					
4.	My condition will be worse in future.					
5.	I am finished.					
6.	Currently I think that my life is very painful.					
7.	Currently I feel that I am a complete failure.					
8.	I find no pleasure any where.					
9.	I feel myself very inferior.					
10.	Myself-esteem has reduced in every respect.					
11.	I think that I am an object of pity to the people.					
12.	Life is meaningless.					
13.	I often feel like crying.					
14.	Often I feel irritated.					
15.	I feel no interest in anything.					
16.	Now a days I cannot think and cannot take decisions.					
17.	Now a days cannot concentrate in many things.					
18.	I cannot remember as before.					

19.	I feel become weak and become exhausted easily.					
20.	Currently I sleep less.					
21.	Currently I sleep more.					
22.	My temper has turned irritable.					
23.	My appentive has reduced					
24.	My appentive has increased					
25.	My weight has reduced (No intentional attempt to control weight).					
26.	I think speed of my work has reduced					
27.	I cannot laugh even when there is a funny event					
28.	My desire in 6 has reduced					
29.	I cannot participate in social activities as I used to					
30.	I can not do academic or professional activities as I used to.					
Total =						

94+ = Depressed; 31–100 = Minimal; 101–114 = Mild; 115–123 = Moderate; 124–150 = Severe.

Developed by : Zahir Uddin and Dr. Mahmudul Rahman, Department of clinical psychologist.

Permission Letter

To
The Head of the Department
Department of the Physiotherapy
Center for the Rehabilitation of the Paralyzed.
Savar, Dhaka-1343
Subject: Application for getting permission for conducting research project.

Sir,

I beg most respectfully to state that, I am a student of 4th year, B.sc in Physiotherapy in Bangladesh Health Professions Institute (BHPI). As a part of my study I need to conduct a research project. Because of this, I need your kind permission to conduct the research. My research Topic is "Comparison of depression level of spinal cord injury patients who participate in wheelchair sports and non participants spinal cord injury patients in CRP".

Here I want to assure you that my research program will not be harmful for the patient. From this research, we will be able to know the depression level of both participating and non-participating SCI patient in wheelchair sports. For this reason, I need to collect data for my research project. And my selected place is Spinal Cord Injury Unit of CRP.

I therefore, pray and hope that, you would be kind enough to give me permission to do this Research successfully in your Department and oblige thereby.

I remain

sir

Your most obedient pupil
Tasmia Jamil
Tasmia Jamil

B. sc in Physiotherapy

BHPI, Savar, Dhaka.

Date:

Given permission
on Date
Please consult with
SET include, etc.
Allowed
29.07.11

