FUNCTIONAL OUTCOME OF SPINAL CORD INJURY PATIENTS ADMITTED IN INPATINET REHABILITATION UNIT OF CRP, SAVAR

By

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DECLARATION

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.
- This dissertation is being submitted in partial fulfilment of the requirements for the degree of MSc in Rehabilitation Science.
- This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A Bibliography is appended.
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ABBREVIATIONS

ADL	Activities of Daily Living
AIS	ASIA Impairment Scale
ASIA	American Spinal Cord Injury Association
BHPI	Bangladesh Health Professions Institute
CRP	Centre for the Rehabilitation of the Paralyzed
FIM	Functional Independence Measure
FML	Functional Mobility Level
HADS	Hospital Anxiety and Depression Scale
IRB	Institutional Review Board
SCI	Spinal Cord Injury
SCIM	Spinal Cord Injury Measure
SPSS	Statistical Package for social science
WC	Wheelchair
WHO	World Health Organization

ABSTRACT

Background: Spinal cord injury (SCI) is a complex life-threating and debilitating condition that not only creates enormous physical disability but also emotional distress among the patient that has highly negative impact on individual's physical and psychological relationship with their environment. Effective rehabilitation has helped SCI patients to achieve significant level of motor as well as functional independence to perform activities of daily living. However, outcome of treatment as well as rehabilitation of SCI patients depends on the type, level and severity of injury, health facility, rehabilitation time, support from family, emotional stability and the active involvement of individual in the treatment.

Objectives: 1. To evaluate the functional outcome of SCI patients admitted in inpatient rehabilitation unit of CRP, Savar. 2.To identify the predicting independent variables of functional motor outcome and functional independence outcome in SCI patients.

Methodology: A one-group pretest posttest study design was conducted among the SCI patients admitted in inpatient rehabilitation unit at CRP. A convenient sampling method was applied for collecting the data from 70 SCI patients from in-patients rehabilitation unit of CRP using the socio-demographic questionnaire, level and severity of SCI using ASIA (American Spinal Injury Association) impairment scale, functional motor outcome using FIM-motor scale (Functional independence measure), functional independence outcome using SCIM III (Spinal cord independence measure), psychological status using HADS scale (Hospital anxiety and depression scale) at admission and discharge time. Some information on time of admission and discharge, time from injury onset and admission in rehabilitation, length of stay at CRP are extracted from the patients' medical records if needed. Paired sample t-test, ANOVA, and Pearson's correlation test were performed using SPSS version 21.

Results: The mean age of the study population was respondents was 31.41 years (Sd=13.7) with 84.3% of male participation. The age of the participants showed negative correlation with FIM outcome score ($r=-0.239$, $p<0.05$) and length of stay at CRP was inversely correlated to post-FIM motor outcome score ($r= -0.369$, $p<0.01$) and Post-SCIM outcome score ($r=0.416$, $p<0.01$) at 95% confidence interval level 2-tailed. The mean difference of FIM outcome scores were 78.186($p=0.000$) and SCIM outcome scores were

37.485(p=0.000) which significantly improved at time of discharge. Post-anxiety score showed negative intermediate correlation with Post-FIM motor score (r=-0.420, p<0.01) and Post-SCIM score (r=-0.393, p<0.01). Furthermore, FIM motor score and post-anxiety score has negative weak correlation (r=-0.393, p<0.05), while post-depression does not show any association with post-SCIM outcome score. Length of stay at CRP for rehabilitation and age of the participants. Functional mobility level, neurological recovery (AIS) and psychological recovery (anxiety/depression) showed better prognosis. However, study did not show any association of cause of injury and time from injury and admission in rehabilitation centre with FIM motor and SCIM outcome at discharge.

Conclusion: Majority of the patients have achieved a good functional mobility level and neurological recovery at the time of discharge from rehabilitation. The significant improvement of functional motor and independence outcomes have also parallelly improved the psychological status of participants assessed by low anxiety and low depression score in HADS. Effective rehabilitation protocols and psychological support can help SCI patients to achieve optimum level of functional outcome in short length of stay at rehabilitation centre.

CHAPTER I
INTRODUCTION

1.1. Introduction

According to World Health Organization, 2013, Spinal cord injury (SCI) is medically complex life-threatening and debilitating condition associated to very high mortality as well as morbidity rate. Globally, the prevalence of spinal cord injury is 200 to 1000 per million and data on annual incidence varied from 15 to 50 per million (Srivastava, Singh, Garg, Agarwal, & Raj, 2015). In 2017, the study done by Kang et al. stated the prevalence of SCI ranges from 490 to 526 per million populations in developed countries (Kang et al., 2017). Prevalence in United states is found to be highest i.e., 906 per million (Fehlings, Singh, Tetreault, Kalsi-Ryan, & Nouri, 2014). Similarly, the prevalence is higher than 681 per million in Australia (O'Connor, 2004). In Canada, 2,525 per million SCI were prevalent including both traumatic and non-traumatic cases (Noonan et al., 2012). According to a worldwide epidemiological study on spinal cord injury by Cripps et al. (2014) incidence in the North America was 39 per million, in the Western Europe 16 per million, and in Australia 15 per million. Annually around 40 million peoples are directly or indirectly affected from spinal cord injury worldwide and approximately 130.7 million peoples with SCI are living in developing countries (Ansari, Kashi, & Naghdi, 2016).

It is estimated that the incidence rate of spinal cord injury in India is 15-20 per million per year population. According to the data of Nepal the prevalence of ASCI (Acute Spinal Cord Injury) is 92.5 cases per million while the estimated incidence rate of SCI in India is 15-20 per million per year population (Srivastava et al., 2015). There is unavailability of population-based data in SCI in Bangladesh, which gives no proper data of incidence and prevalence of the SCI patients. Being an underdeveloped country yet densely populated country, the people of Bangladesh are more vulnerable to spinal cord injury and the magnitude of disease is high (Srivastava et al., 2015).

Spinal cord injury is the leading cause of disability among the patients which is more common in young male between the age 20 to 25 whereas only 1% of children suffer from SCI. The

most common causes of SCI in the world are road traffic accidents, fall from height, gunshot injuries, knife injuries, sport injuries (Nas, Yazmalar, Şah, Aydın, & Öneş, 2015). Most common causes of traumatic SCI in ranges from road traffic accidents (RTA), fall from height, gunshot, stab injury and contact sports/recreational activities are traumatic cause of SCI. On the other hand, non-traumatic causes usually involve underlying pathology such as - tuberculosis of spine, degenerative diseases, malignancy, and congenital problems such as spina bifida, which is a neural tube defect that arises during development of the embryo (Ansari, Kashi & Naghdi,2016). 60-80% of the spinal cord injury occurs in cervical region that is more common in children whereas the thoracic and lumbar spinal cord injury falls in remaining 20%-40%. Cervical injuries as well as injuries due to fall and RTA seems to be increasing (DeVivo, 2012; Nas, Yazmalar, Şah, Aydın, & Öneş, 2015).

A worldwide literature study in 2006 revealed that 50% of the reported SCI had a complete lesion and about 33% were tetraplegic that is impairment of function of all four extremities, trunk and pelvic organ. However, in the scenario of Bangladesh, the incidence of SCI due to fall is higher, followed by the RTA with 52% of the traumatic paraplegia that is loss of motor and sensory function of trunk, lower extremities and pelvic organ, followed by 42% of tetraplegia. Regarding the extent of injury approximately 59% had complete lesion. The incidence of SCI is more common in males than females especially among low socio-economic groups (Rahman et al., 2017).

SCI can lead to either temporary or permanent change in a normal motor, sensory, or autonomic function of the spinal cord that eventually results in physical impairments, long lasting disability and dysfunction in many organ systems. This can affect breathing, heart rate, blood pressure, temperature control, bowel and bladder control, and sexual function. Common secondary long-term complications after SCI, including respiratory complications, cardiovascular complications, urinary and bowel complications, spasticity, pain syndromes, pressure ulcers, osteoporosis and bone fractures. These long-term complications following SCI increase morbidity, decrease community participation and lower the health-related quality of life. (Sezer, 2015). Moreover, these complications post-SCI as well as long period of hospitalization, limitation in daily living activities bring negative changes in patient's

perception that eventually results low self-esteem and psychosocial distress for patients (Nas, Yazmalar, Şah, Aydın, & Öneş, 2015). The type and prevalence of secondary complications after non-traumatic SCI are comparatively less severe than in traumatic SCI. In addition to all the health problems resulting from SCI, the secondary complication often leads to functional disability for SCI patients for accomplishing activities of daily living (New, 2005). The World Health Organization (WHO) statistics reported 10% of disability rate in Bangladesh whereas the total figure of disability is taking a peek with growing population and aging. In addition, it also has an adverse impact on quality of life, life expectancy and economic burden (Ning et al, 2011). Besides all the physical and social consequences, psychological consequences are also the main consideration in SCI patients. In 1983, Zigmond & Snaith in their study stated that stress induced by physical disability is risk factor of emotional disorder which is clinically manifested as anxiety or depression. Emotional distress aggravates in a patient when neurosis coincide with their physical illness that may lead to poor or no response to the treatment.

As compared to normal population, SCI patients tend to have highest risk of emotional distress like anxiety, depression, post-traumatic stress disorder, suicide and substance abuse. 20-40% of the adults with SCI are depressive almost 10 times than normal population where unemployment has been the leading cause of depression and higher suicidal rate among adult SCI patients (Perry, 2014). However, outcome of treatment as well as rehabilitation of SCI patients depends on the type, level and severity of injury, health facility, rehabilitation time, support from family, emotional stability and the active involvement of individual in the treatment (Rahman et al., 2017).

Kang et al., 2017 suggested that advancement of the medical services as well as rehabilitation with the early recognition and treatment of fractures helps to stabilize the mortality and prevent the possible primary and secondary complication among the patients with SCI. Improvement in the health services and rehabilitation facilities helps in rapid mobilization of patients that promotes their functional outcomes. In addition, the supervised and comprehensive rehabilitation has been effective approach in reduction of disability among SCI patients by optimizing the functional outcome of patients, reduction of complications and improving the functional ability among the SCI patients. Effective rehabilitation has helped

SCI patients to achieve significant level of functional independence to perform activities of daily living. It was also evident that the life expectancy of SCI patients has also significantly increased in recent decades, which reflects the importance of medical rehabilitation after SCI (Chowdhury, Barua, Uddin, Khatun, & Biswas, 2015).

In context of Bangladesh, SCI patients are visiting the different hospital for the treatment but due to lack of good medical facilities and treatments, they are not getting effective outcomes. Also, there is no any specialized government hospitals for SCI treatment and rehabilitation in Bangladesh. Centre for the Rehabilitation of the Paralyzed (CRP) is only one non-government organization, which has been especially working for rehabilitation with advanced acute, and intensive care and long-term management of SCI since last 4 decades with the vision of improving their living, functional independency after disability resulting from SCI (Islam, Hafez, & Akter, 2011).

1.2. Justification of the study

SCI has become the sudden and unexpected health care issue, which is also the major leading cause of disability not only in Bangladesh but globally. SCI patients often develops life-threatening complications and most of the studies reveals the higher mortality rate and lower survival rate in developing countries like Bangladesh. However, despite being low-resource country, the life expectancy and survival rate has improved by upgrading the acute care, intensive care and long-term management. (Islam, Hafez, & Akter, 2011). The SCI treatment and rehabilitation process is a lengthy process that is expensive as well as exhausting and also takes long hospital stay which most often brings biophysical, psychosocial and economic burden to patient and the family. Nevertheless, multidisciplinary therapeutic strategies have always been an imperative approach in the maintenance and restoration of function and the prevention of the possible secondary complications in SCI patients (Nas, Yazmalar, Şah, Aydın, & Öneş, 2015). In the study conducted in 2005, Disability and impairments can be minimized by increasing patients' independency level to perform activities for daily living (New, 2005). Therefore, functional performances and disability are the considerable outcomes for effective rehabilitation of the SCI patients. Besides the physical aspects, SCI has also has highly negative influence in psychological aspects where depression and anxiety are highly prevalent after SCI. These disorders have profound impact on functional as well as in independence outcome (Kalpakjian, et al., 2009).

Since, CRP is the largest and specialized rehabilitation center for SCI patients where holistic approaches of the interdisciplinary team provide rehabilitation services to patients. Rehabilitation intervention has an essential role in improving patients' independence and functional outcome. The patients in CRP are highly integrated with functional activities like mobility, self-care, ADL, respiratory care, bowel and bladder care, transfer indoor and outdoor, at the same time they are seeking the psychological counselling as a part of a rehabilitation strategies (Naher, Helal, Saha, Taoheed, & Arafat, 2018).

The main objective of SCI rehabilitation is to optimize the patients' medical, functional, and psychological outcome whereas, the functional outcome and improvement of independence

after SCI is strongly associated to the neurological status or level of injury, psychological state of patients, effective rehabilitation services as well as active participation of the patient. Rehabilitation should begin as soon as possible after the SCI to get the optimum outcome and to reduce the possible risk and secondary complications. Considering these aspects is very important for measurement of prognosis and making management plan of a SCI patient.

However, in Bangladesh there is deficient studies done to find out the effectiveness of the rehabilitation services and the functional outcome of patients suffering from SCI. So far there is no such studies to find out emotional distress before and after receiving the rehabilitation services and the association of the functional outcome and level of emotional distress.

Therefore, I am interested to carry out this study in CRP with the SCI patients with an objective to find out their functional and motor progression, their psychological progression and association of psychological recovery with functional recovery assessed before and after receiving the rehabilitation services from CRP. This study will further help in considering the psychological aspects of the patients along with their functional the rehabilitation services they are getting from the CRP. It will also further help to close the gap in the patients care, treatment protocols and the rehabilitation outcomes. This study also aims to increase our understanding of the relationship between rehabilitation and functional outcome that can be useful tool for future planning of treatment and rehabilitation for acquiring better outcome.

1.2. Research Hypothesis

Research Hypothesis (H_1)

- Patients socio-demographic variables and disease/ disability related factors are strongly associated with functional recovery outcome of SCI patients
- There is association between the ASIA impairment score conversion i.e., neurological recovery and functional recovery of SCI patients in inpatient rehabilitation.
- Patients psychological recovery i.e., anxiety and depression are associated with functional independency and functional outcome of SCI patients.

Null Hypothesis (H_0)

- Patients socio-demographic variables and disease/ disability related factors are not associated with functional recovery outcome of SCI patients
- There is no association between the ASIA conversion i.e., neurological recovery and functional recovery of SCI patients in inpatient rehabilitation.
- Patients' psychological recovery i.e., anxiety and depression are not associated with functional independency and functional outcome of SCI patients.

1.4. Operational definition

Spinal Cord Injury: Spinal cord injury is a medically complex and a crippling condition caused by any sort of injury or damage to spinal cord that generally results in permanent loss in sensory and motor functions that eventually leads to a functional impairment and disability. This extent of motor and sensory loss depends on the neurologic status or level of injury and completeness of injury.

Functional outcome: In context of rehabilitation therapy, functional outcome is a measurable goal that focuses and helps SCI patients to perform specific activities of daily living. Functional outcome is strongly associated with the neurological level of SCI and the rehabilitation services.

Functional Independence: Functional independence is the ability of SCI patients to perform the activities of daily living independently and safely.

Functional independence measures (FIM): FIM is the assessment tool that evaluates the motor and cognitive level of functional independence outcome of SCI patients throughout the rehabilitation process.

Spinal cord independence measures (SCIM): The SCIM is a standardized rating scale used as assessment tool to indicate the level of independence (participation) in activities of SCI patients in daily life such as mobility, self-care, sphincter control and respiratory function.

Anxiety: The patients who have score 11-21 in HADS scale are known to have the severe anxiety and score 8-10 in HADS scale are diagnosed to have mild anxiety.

Depression: The patients with score 11-21 in HADS scale are diagnosed to have severe depression and who have scored 8-10 in HADS scale have mild depression

CHAPTER II

LITERATURE REVIEW

Any sort of damage or injury to any part of spinal cord or spinal nerves extending from the spinal cord causes SCI that leads to the permanent changes in sensory as well as motor functions of body (Dixon & Budd, 2016). The spinal cord conducts afferent and efferent stimuli between the periphery and the brain, injury to this organ causes interruption in connections between the supra-spinal control centers and spinal cord circuits caudal to the lesion site (Franca et al., 2011). This deafferentation of the sub-lesion cord and organic structures results in spinal cord syndrome that eventually leads to paraplegia and tetraplegia. The deafferentation occurs to a variable degree, depending on the extent of the lesion that may be complete and incomplete. Approximately 50% of the cases in incomplete cord syndromes there is partial loss of sensory and motor function below the level of injury with variable neurologic deficit. While in incomplete spinal cord syndromes, the sensory and motor functions are clinically complete, but accompanied by neurophysiological evidence of residual brain influence on spinal cord function below the level of lesion. (Scholtes, Brook, & Martin, 2012). The severity and extent of sensory, motor and autonomic loss of a body vary from the level of injury to cord and the completeness of injury that is incomplete injury and complete SCI (WHO, 2013). Therefore, the physical impairments from SCI vary as a function of the level and completeness of the injury (Dixon & Budd, 2016).

Cook et al., (2015) in their study stated SCI as a neurological injury that needs utmost priority in rehabilitation services. Moreover, in the absence of the proper treatment and rehabilitation services SCI patients are more likely to have risk of secondary complications as well as developing depression, which eventually has adverse effect on their quality of life. According to the study done by Coura, França, Enders, Barbosa, & Souza in 2012, the incidence of SCI are also increasing at the same rate with the increasing RTA and urban violence. Quadir et al., in 2017 reported that the incidence of SCI ranges from 15 to 40 per million which is increasing throughout the world with higher prevalence in low socio-economic society. SCI is more prevalent among male population. The study claimed that incidents like RTA, gunshot injury and physical violence are the major cause for traumatic SCI while tuberculosis of spine is

most common cause for non-traumatic SCI. SCI is considered as a crippling condition that adversely affect the life of a patient by increasing the treatment cost and risk of developing the secondary complications. The study done by Ning, et al. in 2012 reported the incidence rates in Asia that ranges from 12 to 61 per million where RTA and falls form height are the leading cause of SCI injury. Most of the SCI victims falls within the age group of 26 to 56 years and men are more likely to suffer from SCI as compared to female (Ning, et al., 2012). According to the world report on spinal cord injury (2013) published by WHO (Geneva) stated that the death rate of spinal cord is 2 to 5 times higher in the developing country in comparison to developed country with ratio of male SCI patient is higher than female i.e., 2:1 ratio. The age group of 20-29 years, and older than 70 years male population are at high risk whereas the female age group of 15-19 years and older than 60 years are at high risk. The study has reported that spinal cord injury is one of the serious medical conditions which may leads to several life-threatening complications including respiratory failure, pulmonary embolism, pressure sores, deep vein thrombosis (DVT), Autonomic dysreflexia, urinary and bowel dysfunction, osteoporosis and bone fractures. Such complications may increase the hospital stay of the patient, hinders the quality of life with no employment and very often it may lead to high mortality as well as morbidity (McKinley, Jackson, Cardenas, & De Vivo, 1999).

SCI also represents a public health problem as it leads to higher incidence of additional health problems, which includes cardio-respiratory disease, obesity, type 2 diabetes, emotional distress among the SCI patients. These emerging health problems along with the secondary complications after SCI often leads functional disability, hinders the activities of daily living and significantly leads to higher dependency rate on family members (Coura, França, Enders, Barbosa, & Souza, 2012). Apart from the physical impairment, sexual dysfunction, incontinence and unpleasant physical symptoms, SCI can bring a greatest trauma to a patients' life that results in socio-economic losses and financial burden to the family. These problems eventually exaggerate the psychological distress in patients (Hancock, Craig, Dickson, Chang, & Martin, 1993). According to the study of Dixon & Budd in 2016, approximately 70% of the SCI patients are reported to suffer from depression post SCI. Suicidal risk is found to be higher in SCI patients whereas patients with complete lesion found to be more depressed that patients having incomplete injury. The opinion of the study done by Dixon & Budd in 2016 also

viewed depression following SCI as challenging and inevitable causes that needs early recognition and treatment. They found depression to be the most common psychological disorders among SCI patients associated with the long duration of hospital stay, re-hospitalization, higher treatment cost and low functional independency. Hancock, Craig, Dickson, Chang, & Martin in 1993 conducted a controlled longitudinal study to investigate the psychological impact of a spinal cord injury. The investigation evaluated 41 people with SCI to assess and contrasted them with 41 physically abled control group utilizing objective psychological measures to assess depression and anxiety over the first year of SCI. Results exhibited noteworthy contrasts between the two gatherings, with SCI patients being progressively anxious and depressed. Approximately 25% of SCI patients presented with the anxiety and depression as compared to the less than 5% of control groups.

Functional outcome and independency are strongly associated with the etiology of SCI as per the study done by Mahmoud, Qannam, Zbogar, & Mortenson (2017). In their study, functional independence is found out to be in higher in traumatic SCI than in non-traumatic injury. However, the functional outcome depends on the different demographic variables such as severity of injury, neurological injury, age, presence of complications and the degrees of disability following SCI at the time of admission. Functional outcome and the neurological outcome following SCI are the compelling issues as SCI patients are more considerate on their ambulation throughout the rehabilitation period. Yet, the improvement in the motor scores and ASIA impairment scale determines the functional and neurological recovery ((Naher, Helal, Saha, Taoheed, & Arafat, 2018).

The level of neurological deficit in SCI patients is assessed by ASIA impairment scale. ASIA impairment scale also classifies the severity of SCI as complete or incomplete SCI. SCI with high severity and the complete loss of all sensory and motor functions below the level of injury is defined as complete injury and is classified as Grade A in ASIA scale. On the other hand, SCI with less severity with some degree of spared sensory and motor function distal to the level of injury and classified as grade B, C, D and E on ASIA scale. There is absence of motor function and some preserved sensory function in Grade B SCI. However, motor functions have grade less than 3 distal to neurological level of injury in Grade C SCI whereas, the motor

grade is at 3 below the neurological level of injury in Grade D SCI. Grade E SCI have normal motor and sensory functions, yet have abnormal neurological reflexes (Roberts, Leonard, & Cepela, 2016). The incomplete SCI shows different extent of neurological and functional recovery while complete SCI has rare possibility of neurological recovery (Marino et al., 2011).

The level of injury in spinal cord can be classified as either tetraplegia or paraplegia (Nas, Yazmalar, Şah, Aydın, & Öneş, 2015). The term quadriplegia is now replaced by tetraplegia in which all the extremities and trunk are affected. The injury at the cervical segment (C1-C8) results in tetraplegia i.e., loss or impaired of the motor and sensory function distal the site of injury. The injury to the thoracic, sacral and lumbar segments (T2-S2) results in paraplegia that represents the loss or impaired motor and sensory function below the level of injury. It also includes cauda equina and conus medullaris injuries (Dixon & Budd, 2016). Therefore, the injury at cervical level C1-C8 is classified under tetraplegia, thoracic level T1-T9 as high paraplegia and injury at level T10-S2 as low paraplegia (Marino et al., 2019).

A literature review done by Nas, Yazmalar, Şah, Aydın, & Öneş in 2015 explained the expected functional progress during rehabilitation process as per the injury level of SCI patients. Patients with C1-C4 level of injury are fully dependent and needs wheelchair for mobility whereas, patients with injury level caudal to C3 needs ventilator support for respiration. SCI patients with injury level C5 needs full assistance during transfer and daily living activities. They need wheelchair for mobility or can use electric wheelchair. Likewise, in C6 injury level they require wheelchair for mobility can acquire transfer with minimal assistance but can independently perform activities done by upper extremities. In case of SCI patients with injury level at C7-C8 segments, they are functionally independent in ADL and transfer, but need some degree of assistance for lower body dressing and are able to use wheelchair manually. Furthermore, patients with injury level at T11-T12 can carry out ADL and transfer independently while they can ambulate using manual wheelchair, walker or orthosis. Similarly, the patients are functionally independent in ADL, transfer, personal care and yet need the assistance of orthosis, walker or crutches in the injury level from L1-L5 level and level below the L5.

The longitudinal study of 1 year conducted by Marino et al., in 2011 determined the significant improvement of motor and neurological recovery in SCI patients. It is evident that 22% of patients with AIS grade A changed over to AIS grade B or better by the time of rehabilitation discharge and 30%, by 1 year, with 8% to AIS grade C and 7.1% to AIS grade D. For AIS grade B, 34% stayed motor complete, 30% became AIS grade C, and 37% became grade D by 1 year. 82.5% of those with AIS grade C improved to AIS grades D and E. In addition, the recent report done by Marino et al., (2019) also examined that the trends of AIS conversion by the level of SCI where they observed the significant improvement in AIS conversion over the 20 years. Literature review done in another study revealed that admission before the onset of the symptoms and less admission score are the essential factors related to improved motor functions among SCI patients. Severity of injury i.e., complete or incomplete SCI and level of injury, and LOS determine the changes in FIM motor scores. The study also explained the association of motor functional outcome of the SCI patients by the time of discharge with functional independence at the time of rehabilitation admission, level and severity of injury, anxiety/depression score, time between injury and admission to rehabilitation, and LOS (Mahmoud, Qannam, Zbogar, & Mortenson, 2017).

Imran et al., (2018) in their study stated SCI as a leading cause of disability that reduces the quality of life of patients due to which SCI patients often experience anxiety, depression and low motivation. This study explained the sports rehabilitation has helped in the psychological recovery of SCI patients where they found there is a significant reduction in anxiety and depression among the patients who participated in sports rehabilitation. Yet, study showed no associations between the level of injury and psychological status. They claimed sports rehabilitation to be an effective outcome in social, functional and psychological improvement. Another study explained that the functional independence measures (FIM) evaluate the functional outcome of patients that describes the efficiency of rehabilitation. In case of functional recovery gained in SCI patients from rehabilitation is strongly associated with nature of injury and patients' characteristics.

The study also describes the strong relationship between the functional outcomes and the rehabilitation services, which explains effective functional recovery is strongly associated

with the long duration of rehabilitation services such as occupational rehabilitative therapy and physical rehabilitative therapy. Nevertheless, the study also shows as the intensity of therapy increases, functional outcome of SCI patient's increases efficiently (Truchon et al., 2017). According to the study conducted by Chowdhury, Barua, Uddin, Khatun, & Biswas (2015), in order to acquire the expected goal in functional outcome of SCI patients, there should be a noteworthy improvement in patients' FIM score, ASIA score, motor score, pain and spasticity. These improvements can be achieved through the effective rehabilitation services such as physical therapy, occupational therapy, mobility trainings, gait retraining and management of complications.

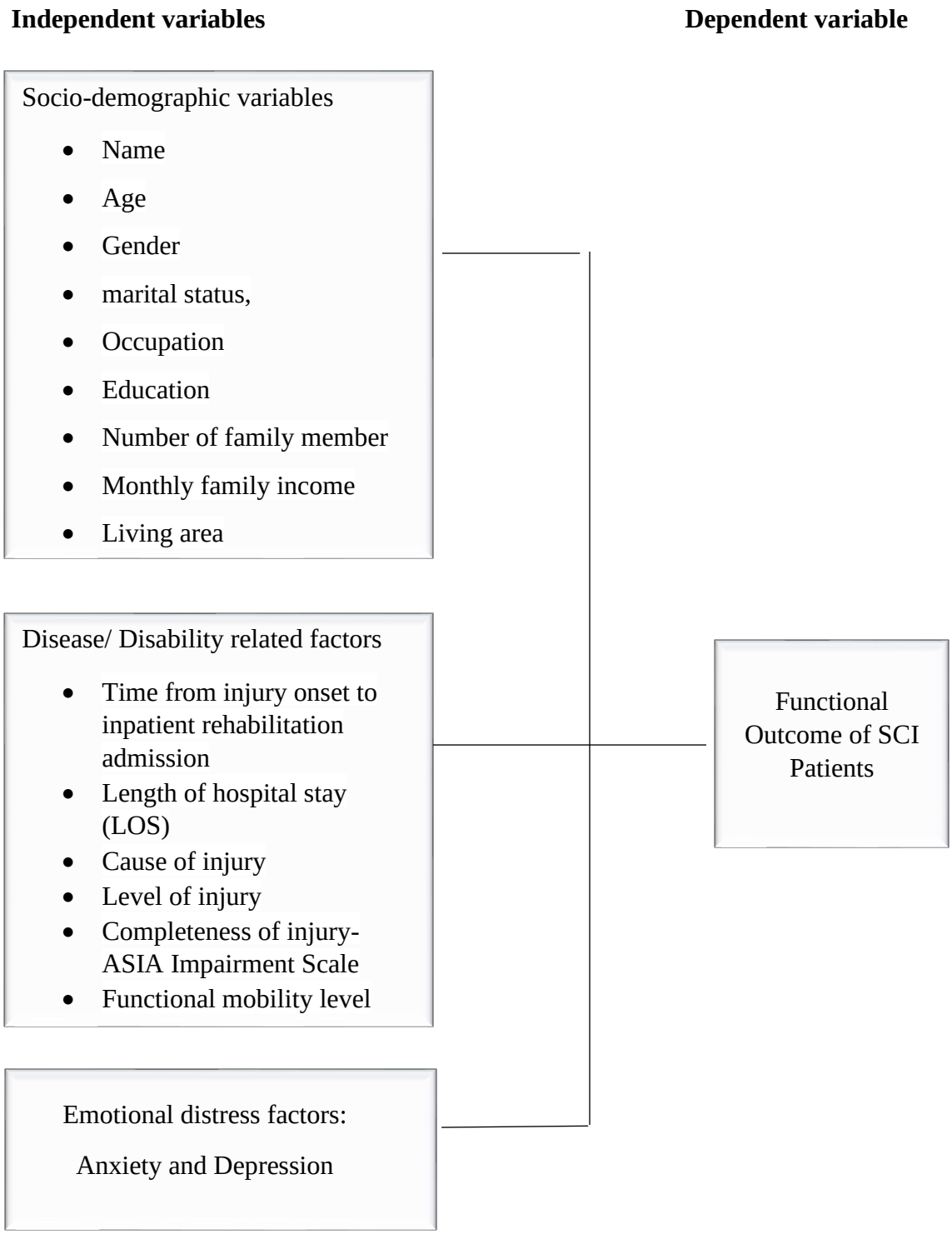
In context of Bangladesh, CRP is one and only largest rehabilitation center with the aim to provide rehabilitation services for SCI patients. CRP provides predefined comprehensive rehabilitation program to SCI patients for 3 months from admission till discharge and this rehabilitation lengthens as per severity and improvement of patients. It is found that the SCI patients in CRP are receiving 40% of physiotherapy services followed by 21% of medical services and 19% of occupational therapy services as main treatment (Naher, Helal, Saha, Taoheed, & Arafat, 2018). The CRP has been providing physical rehabilitation, occupational rehabilitation and counselling services to SCI patients. CRP provides rehabilitation services in for phases, which includes acute, active and rehabilitation phase. Physiotherapy service in acute phase emphasizes on providing cardiopulmonary therapy, pain management, positioning and proceeds through improving strength, balance, coordination, mobility, gait training, lifting, transfer and ambulation with or without support or assistive devices. Whereas, occupational interventions include positioning, splinting, hand therapy which proceeds to functional bed mobility, transfer techniques, wheelchair mobility, introducing functional activities and participations in vocational activities in active phase. Patients are receiving ADL retraining, advanced transfer and wheelchair skills training, vocational trainings, suggesting assistive devices and modification. Throughout these rehabilitation program patients are constantly delivered with counselling services with the aim to assist patients to cope up with their present situation and to reduce psychological problems. Stress management, individual to peer counselling, mental health educations are included in CRP counseling service facilities (CRP - Centre for the rehabilitation of the paralysed | CRP Bangladesh). However, a study by

Whiteneck et al (2011) found that Physiotherapists and Occupational therapists had more intervention sessions for SCI inpatients and outpatients post discharge.

CHAPTER III

RESEARCH METHODOLOGY

3.1. Conceptual framework



3.2. Aims and Objectives of the study

3.2.1 Aim

- To determine the functional outcome of SCI patients from inpatient rehabilitation in CRP, Savar and their predictive factors.

3.2.2 Specific Objectives:

- To study the association between the socio-demographic characteristics of SCI patients and functional outcome at discharge from inpatient rehabilitation.
- To identify the factors impacting motor functional recovery at discharge such as length of stay (LOS) at CRP, time from injury onset to inpatient rehabilitation admission, level of injury, completeness of injury and initial functional independence of patients at the time of admission.
- To analyze the relationship between the functional outcome, ASIA conversion and psychological status and improvement in SCI patients.

3.3 Study Design

The study was a one-group pretest posttest research design, where purposive sample of 70 participants was taken from inpatients rehabilitation of CRP. Individuals with SCI admitted in inpatient rehabilitation of SCI Unit were followed during primary inpatient rehabilitation and at their discharge where the physical and psychological rehabilitation services are provided by the CRP as per their protocols. AIS score, mobility level, functional independence data were collected from the patients' record while socio-demographic data, anxiety and depression score were recorded by face-to-face interaction with patients by physiotherapist.

3.4 Study Population

They are the SCI patients admitted in inpatient rehabilitation of CRP who were admitted less than 1 week and had stayed for at least 3 months as per preplanned rehabilitation program of CRP.

3.5 Study Site/ Area

The study was conducted in inpatient SCI rehabilitation unit of CRP, Savar.

3.6 Study period

First pre data collection period was from June-August 2019 where 70 data were collected omitting the exclusion criteria and those participants were followed up till their discharge periods i.e., up to June 2020 as per the need of the study.

3.7 Inclusion and Exclusion Criteria

Inclusion criteria:

- Both tetraplegic and paraplegic SCI patients
- Both male and female
- Patients whose rehabilitation was planned for at least 3 months from the time of admission

Exclusion criteria

- Patients with multiples comorbidities like leg fracture, stroke, cardiac arrest, brain injury along with the SCI during rehabilitation.
- Patients with age less than 10
- Patients who refused to give consent for participation
- Patients who were psychologically unstable

3.8 Sampling Technique

- The study used the convenient data collection technique as per the convenient and feasibility of the researcher meeting the criteria of inclusion i.e., patients whose rehabilitation was planned for at least 3 months from the time of admission

3.9 Data Collection Tools and procedures

The data were collected using various tools. Socio-demographic questionnaire was assessed by the interview/ standard list. The admission date, discharge date, time interval of injury onset and admission to rehabilitation, FIM motor score pre-post, SCIM score pre-post were obtained from the medical records where HADS score was assessed by face-to-face interview. The time taken by each participant was 15-20 minutes. The questionnaire constituted of 5 parts

1. **Section 1: Socio-demographic questionnaire**

It consisted of 10 items which are age, gender, marital status, level of education, occupation, living area, number of family members, family income and presence of other illness.

2. **Section 2: Participant related information**

In part consist the participant related information such as date of admission, time from injury onset to admission to rehabilitation, date of discharge, cause of spinal cord injury, functional mobility level pre- and post-rehabilitation, ASIA impairment scale pre- and post-rehabilitation which are obtained from respondent medical records and interview.

3. **Section 3: FIM motor scale- Functional independence measure**

The FIM is a functional assessment measure which is widely accepted tool used during inpatient rehabilitation. The FIM is an 18-item scale and each item is rated from 1 to 7 (1=requiring total assistance and 7=completely independence) based on level of independence in that item. Total score ranges from lowest-18 to highest-126 level of independence. FIM is used to assesses function in six areas including self-care, continence, mobility, transfers, communication, and cognition. FIM scores is generated by summing three independent item scores: FIM self-care, FIM motor score and FIM cognitive scores. During rehabilitation, FIM scores can be measured at admission and discharge from inpatient rehabilitation and the difference obtained from pre-FIM and post-FIM scores indicates the FIM change which refers to the rate of FIM gain with time (Ferrucci, Koh, Bandinelli, & Guralnik, 2007). Hsueh (2002), found that the internal consistency of FIM was higher than other tools used during rehabilitation where the FIM total score (α = 0.88-0.97), domains (motor α = 0.86-0.98, cognitive α = 0.68-0.95), and subscales (α = 0.68-0.96) (Hsueh, 2002).

4. **Section 4: SCIM- Spinal Cord Independence Measure**

SCIM III is validated and sensitive tool used optimally to assess functional improvements and ADL independence level in traumatic and nontraumatic SCI during rehabilitation. The SCIM III contains 19 items in 3 major domains: 6 for self-care (score range, 0-20), 4 for respiration and sphincter management (score range, 0-40), and 9 for mobility (score range, 0-40). The total score is obtained by summing the scores of subscales in each item and maximum score has 100 points. Scores range from 0-100, where a score 0 defines total dependence and a score of 100 is indicates complete independence (Unai et al., 2019). Catz et al. found the interrater reliability to be modestly high with Kappa's ranging from 0.696-0.983 across

the tasks listed in each subscale, excellent internal consistency with Cronbach's alpha = 0.9227, and Excellent construct validity where correlation between the SCIM and the FIM (r =.85) (Catz et al., 1997).

5. Section 5: HADS- Hospital Anxiety and Depression Scale

HADS is widely used validated screening questionnaires in clinical setting for assessing depression and anxiety. The HADS consists of 14 items for two scales, 7 items relate for anxiety (HADS–A) and 7 for depression (HADS–D). A sub score of more than 8 indicates clinical case of depression or anxiety and scores of greater than or equal to 11 on either scale indicate a definitive case of depression or anxiety (Edelstein et al., 2010). In Rasch analysis of the HADS in spinal cord injury, Müller et al., (2012) found one-dimensionality of anxiety and depression subscales with reliability (r = .72, 0.82) in SCI.

3.10 Data management and analysis

Data was analyzed using (Statistical Package for social science) SPSS version 25. Descriptive, inferential statistics and comparative statistics were used for data analysis. Results were presented in graphs and tables, descriptive data in numbers and %, appropriate analyses were done (paired sample t-tests for comparison of data/test results at intake and discharge, Chi-square tests, Pearson's correlation with statistical significance levels set at $p<.05$).

3.11 Quality Control and Assurance

To ensure and improve the quality of the study, all questionnaire were translated according to WHO guidelines that is, first in the national language that is Bengali language following the standard procedure of linguistic validation. For forward translation, two individuals were assigned who were fluent in both languages. They prepared two versions of questionnaires then reviewed and discussed together to come up with one first version of translated questionnaire. Then this translated version was provided to another person who was fluent in both languages and who had not seen the original copy of questionnaire for backward translation. Then all three translators worked together and consensus was drawn with final version of translated questionnaires in Bengali language. Before starting data collection procedures, pilot study was conducted for the questionnaire to ensure the face validity of the questionnaire. Filled questionnaire was safely kept; patient records were

anonymously entered in SPSS files. The collected data were be reviewed, recorded and enter into the SPSS program to reduce the human errors that are likely to occur while entering and analysis of the data collected. That is, by at random controlling if records were correctly entered in the SPSS files. The collected data were be reviewed, recorded and enter into the SPSS program to reduce the human errors that are likely to occur while entering and analysis of the data collected.

3.12 Ethical Consideration:

Following the standard procedure for ethical consideration, firstly, approval from course coordinator of Masters in Rehabilitation Science Department and supervisor followed by research proposal submission to concerning authority was made. Then, the ethical approval from Institutional Review Board (IRB) of Bangladesh Health Professions Institute was taken for the study to be conducted. The researcher obtained consent from the Ethical committee of BHPI followed by Head of Spinal cord injury Department at CRP. A voluntary consent form was given to all participants prior to their participation in the study making them aware of aims and implication of the study and full authority was given to participants to withdraw from the study whenever they like. Neither physical nor mental pressure was given on them. On the other hand, no incentives or reward was offered to the patients and assurance about their privacy and confidentiality was made.

CHAPTER IV

RESULTS

4.1. Socio-demographic variables

Table 4.1.1. Distribution of respondents according to age and gender

Characteristics	Minimum-Maximum value	M±SD
Age	11-68	31.41±13.701

Note: M=Mean, SD= Standard deviation; N=70

Age	**Male (n, %)**	**Female (n, %)**	**Total (n, %)**
11-20	14 (20.0)	6 (8.6)	20 (28.6)
21-30	17 (24.3)	1 (1.4)	18 (25.7)
31-40	15 (21.4)	1 (1.4)	16 (22.8)
41-50	7 (10.0)	3 (4.3)	8 (14.3)
51-60	3 (4.3)	0	3 (4.3)
61-70	3 (4.3)	0	3 (4.3)
Total	59 (84.3)	11 (15.7)	70 (100)

The table 4.1.1. above demonstrates the age distribution of both male and female under study. Majority of the respondents (84.3%, n= 59) were male and 15.7% (n=11) were female. The mean age of the study samples was 31.41 years (SD±13.701). The youngest respondent included in the study was 11 years old while the respondent who was oldest was 68 years old. Most of the respondents (28.6%, n=20) were from age group 11-20 where 20%, n=14) were male. 25.7% were within the range of 21 to 30 years of age followed by 22.8% (n=16) and 14.3% (n=8) within the range from 31-40 years and 41 to 50 years of age respectively. 8.6% (n=6) of the respondents had age more than 50. Thus, it can be concluded that most of the participants were young to middle aged with majority of participation of male respondents.

Table 4.1.2. Distributions of socio-demographic variables n=70

Variables	Category	Male (n, %)	Female (n, %)	Total
Marital status	Married	36(51.4)	4(5.7)	40(57.1)
	Unmarried	23(32.9.)	7(10)	30(42.9)
Educational status	Illiterate	13(18.6)	1(1.4)	14(20)
	Primary	29(41.4)	7(10)	36(51.4)
	SSC	10(14.3)	1(1.4)	11(15.7)
	HSC	4(5.7)	2(2.9)	6(8.6)
	Bachelor	3(4.3)	0	3(4.3)
Occupational status	Service holder	8(11.5)	1(1.4)	9(12.9)
	Business	5(7.1)	0	5(7.1)
	Farmer	9(12.9)	0	9(12.9)
	Laborer	24(34.3)	1(1.4)	25(35.7)
	Housewife	0	3(4.3)	3(4.3)
	Student	13(18.6)	6(8.6)	19(27.2)
Residential Area	Rural	42(60.0)	9(12.9)	51(72.9)
	Urban	12(17.1)	2(2.9)	14(20)
	Semi-urban	5(7.1)	0	5(7.1)

The table no. 4.1.2 represents frequency the socio-demographic variables under study. Out of total participants (n=70), 57.1% (n=40) of participants were married while 42.9% (n=30) were single. Almost half of the male respondents were married as compared to the total respondents. Majority of the participants (51.4%; n=34) had primary schooling followed by secondary schooling (15.7%, n=11). Only 8.6% (n=6) had gone to higher secondary school while 3% (n=3) had qualification of graduate and above. Rest 20% (n=14) of the participants were illiterate. The table shows that very few female respondents (1.4%, n=1) were illiterate while no any female respondent in this study has persuaded higher level studies. In case of employment, 35.7% (n=25) of the participants were laborers, 27.1% (n=19) were students, 12.9% (n=9) were farmers and service holder respectively while 7.1% (n=5) were involved in business and 4.3% of the participants were homemaker. Here it shows that majority of male

respondents (34.3%, n=24) were laborer only 1.4% of female respondents were involved in service and labor work. It is evident that 73% of the participants resides in rural area (n=51) and 20% (n=14) resides in urban areas while very few of them were from in semi or sub-urban areas (7%; n=5). There were no any female participants from semi-urban area and only 2.9% (n=2) female respondents were from urban area.

Table 4.1.3. Monthly Family Income n=70

Income	Frequency	Percentage	M±SD
less than 5000	3	4.3%	17307.14±13482.488
5001-15000	42	60.0%	
15001-25000	17	24.3%	
more than 25000	8	11.4%	

Note: M= Mean, SD= standard deviation

Table above 4.1.3. shows the monthly family income of all the participants. In this study 60% of participants have monthly income within the range of 5001 to 15000 taka whereas 24.3% have income range 15001-25000 .11.4% of the participants have monthly family income more than 25000 taka while in the other hand only 4.3% of the participants have income less than 5000 taka. The average family income per month is 17307.14 taka with the standard deviation 13482.488 taka.

4.1.1 Number of family members n=70

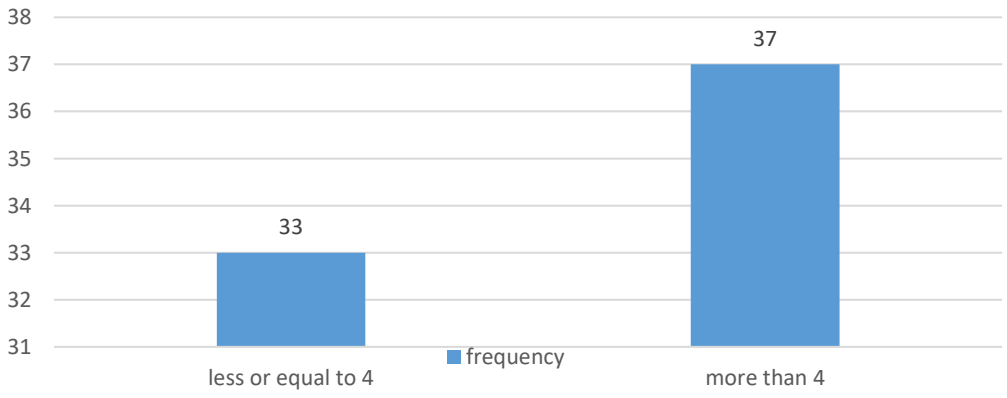


Figure 4.1.1: Number of family members of the respondents

From the figure 4.1.1. it was evident that 37 of the patients had large family of more than4 members and rest of the patients had comparatively less or equals to 4 family members.

4.2. Spinal cord injury related variables

4.2.1 Time from injury onset to admission in Rehabilitation n=70

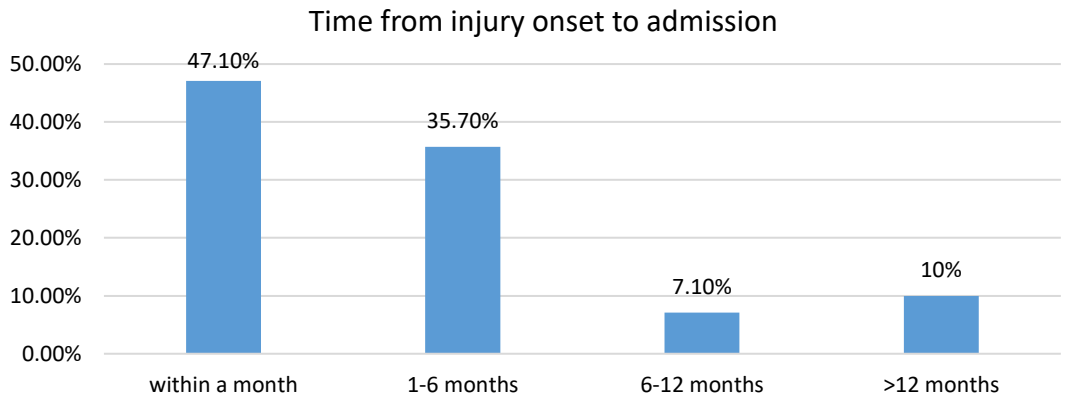
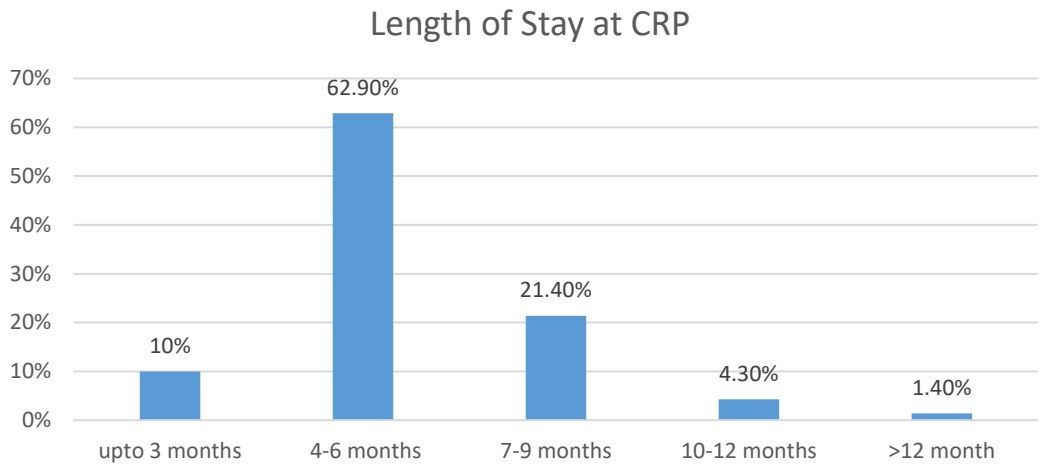


Figure 4.2.1 Time from injury onset to admission in rehabilitation

The bar diagram represents time interval between the time from onset of injury and admission in inpatient unit of CRP for rehabilitation. It demonstrates that most of respondents (47.10%)) respondents were admitted in inpatient rehabilitation within a month after injury followed by 35.70% respondents who were admitted after 1-6 months after injury. Very few of the respondents (17.10%) were admitted for rehabilitation after 7 months and more.

4.2.2 Length of stay at CRP n=70



M±SD = 5.69±2.236

Figure 4.2.2. Length of stay at CRP

The bar graph above demonstrates the length of time patients stay in CRP in months. 62.9% of the participants stayed for 4 to 6 months followed by 21.4% who stayed for 7 to 9 months. There were only 10% of the participants stayed for less than 3 months while very few stayed for 10 to 12 months and longer at CRP. The average months of hospital stay for rehabilitation was 5.69 months with the standard deviation 2.236 months.

4.2.3 Cause of spinal cord injury n=70

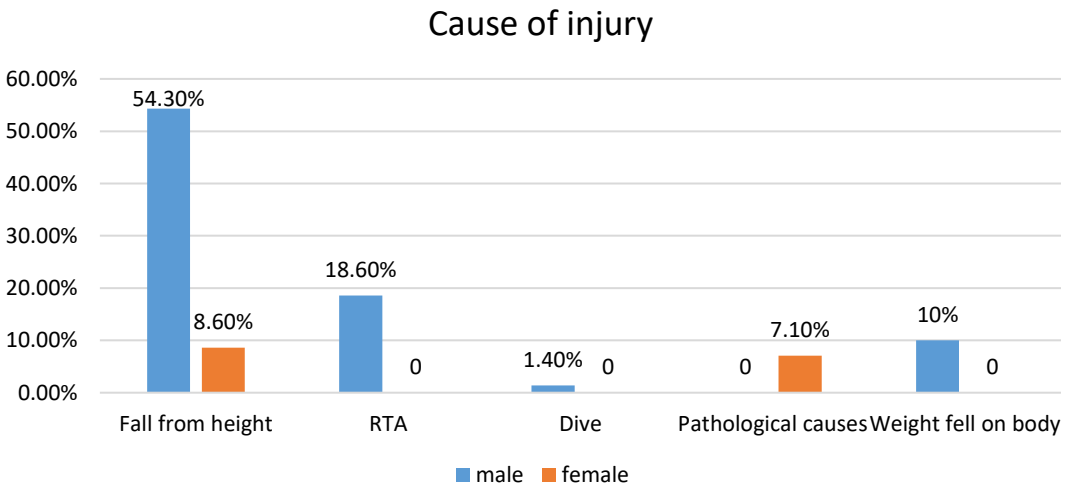


Figure 4.2.3. Cause of spinal cord injury

The bar chart illustrates the proportion of male and female and cause of spinal cord injury. Overall, it can be seen that highest percentage (62.9%) of the respondents were injured falling from height followed by 18.16% due to RTA (road traffic accident) where majority of the victims were male. Similarly, only 10% of the male respondents were injured from the weight falling on body and very few form diving. In term of female respondents from very less percentage of female respondents 8.6% and 7.1% had fallen from height and had pathological causes behind the spinal cord injury. This demonstrates that the 93% of the SCI had traumatic causes and half of male respondents were male having traumatic cause of spinal cord injury.

Table 4.2.1. Level of spinal cord injury n=70

Level of injury		Frequency	Percentage
Tetraplegia	C2-C4	10	14.3
	C5-C8	16	22.9
Paraplegia	T1-T12	26	37.1
	L1-L5	16	22.9
	No-obvious level	2	2.9

The table no. 4.2.1. depicts the level of SCI injury of the respondents. 14.3% (n=10) of the respondents had injury at the cervical level C2-C4 and 22.9% (n=16) had injury at C5-C8 level. Moreover, 37.1% (n=26) of respondents had injury at T1-T12 level whereas, 22.9% (n=16) had injury level at L1-L5. Remaining 2.9% of the respondents had no obvious level of injury. Thus, the given table also shows that 37.2% (n=26) of the respondents had tetraplegia followed by paraplegia in 60% (n=42) of the respondents.

Table 4.2.2. Conversion of ASIA Impairment Score (AIS); Pre- and Post-rehabilitation

		AIS: Post-Rehabilitation					
		AIS-A	AIS-B	AIS-C	AIS-D	AIS-E	Total
AIS: Pre-Rehabilitation	AIS-A	39	3	2	0	0	44
	AIS-B	0	5	3	3	0	11
	AIS-C	0	0	3	4	0	7
	AIS-D	0	0	0	7	1	8
	Total	39	8	8	4	1	70

The given table 4.2.2. demonstrates the prognostic conversion of the AIS i.e., the motor and neurological recovery of patients from the time of pre- and post-rehabilitation**.** At the time of admission in rehabilitation out of 70 respondents, 44 had (ASIA impairment scale) AIS A-complete spinal cord injury (SCI), 11 had AIS B-sensory incomplete SCI, 7 had AIS C-motor incomplete SCI and 8 had AIS D-motor incomplete SCI. After completion of rehabilitation out of 44 of A-complete, 39 remained A-complete while 3 converted to B-sensory incomplete and 2 converted to C-motor incomplete. Similarly, out of 11 respondents with B-sensory incomplete SCI, 5 remained same but similar number of respondents i.e., 3 converted to C and D- motor incomplete respectively. Prognostic conversion from C-motor incomplete to D-motor incomplete was only 4 out of 7 of respondents. Whereas, only 1 the respondents converted to E-normal from 8 respondents with D-motor incomplete while 7 remained the same.

Table 4.2.3. Functional mobility level (FML); Pre- and Post-Rehabilitation

		FML: Post-Rehabilitation				
FML: Pre-Rehabilitation		Independent	Uses walking aids	Uses wheelchair	Bed bound	Total
	Uses wheelchair	1	1	13	0	15
	Bed bound	4	13	35	3	55
	Total	5	14	48	3	70

The given table depicts the initial functional mobility level of respondents and functional level after the rehabilitation. It clearly shows the maximum number of respondents i.e., 55 out of 70 respondents were bed-bound at the time of admission in rehabilitation while only 15 respondents were wheelchair users. After completion of rehabilitation, only 3 of the respondents were bed bounded while most of the respondents 48 were using wheelchair for mobility. 14 respondents were using walking aids for mobility while only 5 respondents had achieved independent mobility level. The table clearly shows the significant progression of the mobility level of SCI patients after rehabilitation.

Table 4.2.4. Anxiety total score; Pre- and Post-Rehabilitation

		Anxiety: Post-Rehabilitation			
		Normal-no anxiety	Mild-anxiety	Severe-anxiety	Total
Anxiety: Pre-Rehabilitation	Normal-no anxiety	8	2	2	12
	Mild anxiety	10	2	2	14
	Severe anxiety	31	10	3	40
	Total	49	14	7	70

The table above describes the anxiety level of the respondents before and after the SCI rehabilitation in CRP. There were 40 respondents with severe-anxiety and 14 respondents with mild-anxiety at the time of admission. Over the time after rehabilitation, only 7 of them had severe anxiety, 14 respondents had mild anxiety and more than the half of the respondents had normal prognosis. Out of 40 respondents with severe anxiety, only 3 remained same while 31 shifted to normal and 10 had mild anxiety over the time from admission to discharge from rehabilitation.

Table 4.2.5. Depression total score; Pre- and Post-rehabilitation

		Depression: Post-Rehabilitation			
		Normal-No Depression	Mild- Depression	Severe- Depression	Total
Depression: Pre-Rehabilitation	Normal-No Depression	15	1	1	17
	Mild- Depression	10	3	4	17
	Severe-Depression	26	9	1	36
	Total	51	13	6	70

The table 4.2.5 give above depicts prognosis of the depression among the SCI patients from admission time to discharge the rehabilitation. It illustrates that similar number of respondents (n=17) were normal and had mild depression at the time of admission in inpatient rehabilitation. 36 respondents had severe depression during admission. The post rehabilitation depression score shows significant changes where only 6 respondents had severe depression while 13 had mild level depression. The maximum respondents, 51 had normal level score after rehabilitation. This shows significant prognosis for the respondents to overcome the depression after rehabilitation services in CRP.

4.3. Functional Independence Measure (FIM)-Motor score; Pre-and Post-rehabilitation

Table 4.3 Paired sample t test of FIM-motor score

Variables	Mean: Pre-rehabilitation	Mean: Post-rehabilitation	Mean difference	t-value	p-value
Bed mobility	6.64	21.18	14.542	13.049	**0.000*** **
Sitting balance	1.51	5.90	4.385	15.042	**0.000*** **
Lifting	6.61	25.90	19.285	12.955	**0.000*** **
Transfer	2.47	10.14	7.671	12.933	**0.000*** **
Wheelchair skills	4.17	21.22	17.057	15.483	**0.000*** **
Standing	4.00	12.85	8.857	8.727	**0.000*** **
Walking gait	4.00	10.38	6.385	5.905	**0.000*** **
Total FIM score	**29.41**	**107.6**	**78.186**	**14.695**	**0.000*** **

Statistical significance *P<0.05, **P<0.01, ***P<0.001

The table no.4.3 above demonstrates the statistically significant paired t-test of the functional independence measure (FIM) motor outcome pre- and post-rehabilitation of SCI patients admitted in CRP for rehabilitation. Total mean score of motor FIM of patients before rehabilitation was 29.41 and post rehabilitation was 107.6 with mean difference of 78.186. It shows highly significant difference between the pre-FIM motor score (t=14.695, P<0.000) and post-FIM motor score (t=14.695, P<0.000). Thus, it can be concluded that the rehabilitation services received by the SCI patients in CRP is successful in providing motor functional independence to SCI patients.

4.4. Spinal Cord Independence Measure (SCIM) Outcome; Pre-and Post-rehabilitation

Table 4.4. Paired sample t-test of SCIM score

Variables	Mean Pre-rehabilitation	Mean Post-rehabilitation	Mean difference	t- value	P value
Self-care	3.47	14.64	11.171	14.063	**0.000*** **
Feeding	1.0	2.52	1.529	12.936	**0.000*** **
Bathing- Upper body	0.43	2.21	1.786	12.954	**0.000*** **
Bathing-Lower body	0.24	1.96	1.714	11.556	**0.000*** **
Dressing-Upper body	0.69	2.83	2.143	11.022	**0.000*** **
Dressing-Lower body	0.30	2.69	2.386	11.886	**0.000*** **
Grooming	0.81	2.43	1.614	13.168	**0.000*** **
Respiration and Sphincter Management	12.04	23.77	11.728	12.623	0.321
Respiration	9.86	9.91	0.057	1.000	**0.000*** **
Sphincter Management-Bladder	1.20	5.71	4.514	7.241	**0.000*** **
Sphincter Management-Bowel	0.66	5.10	4.443	9.980	**0.000*** **
Use of toilet	0.33	3.04	2.714	11.560	**0.000*** **

Mobility (room and toilet)	0.61	6.27	5.657	13.698	**0.000*** **
Mobility in bed	0.49	3.97	3.486	12.672	**0.000**
Transfer: Bed-Wheelchair	0.07	1.17	1.100	12.042	**0.000*** **
Transfer-Wheelchair-toilet-tub	0.06	1.13	1.071	13.003	**0.000*** **
Mobility (indoors and outdoors)	0.71	9.64	8.928	8.928	**0.000*** **
Mobility Indoors	0.14	2.70	2.557	9.150	**0.000*** **
Mobility (10-100 meters)	0.13	2.67	2.543	9.146	**0.000*** **
Mobility Outdoors (more than 100 meters)	0.11	2.61	2.500	9.320	**0.000*** **
Stair Management	0.31	0.76	0.443	3.869	**0.000*** **
Transfer: Wheelchair-car	0.01	0.66	0.643	8.147	**0.000*** **
Transfer: ground-wheelchair	0	0.24	0.243	4.704	**0.000****
Total SCIM score	16.8429	54.3286	37.485	15.256	**0.000*** **

Statistical significance *P<0.05, **P<0.01, ***P<0.001

The table no.4.4above demonstrates the mean and standard deviation of SCIM scale in pre- and post-rehabilitation. The mean value for domain of SCIM scale such as selfcare, respiratory and sphincter management, mobility (room and toilet) and mobility (indoors and outdoors)

were 3.47, 12.04, 0.61 and 0.71 respectively in pre rehabilitation whereas after post rehabilitation the mean values are 14.64, 23.77, 6.27 and 9.64 respectively. The mean difference between pre- and post-rehabilitation are 11.17, 11.73, 5.66 and 8.93 respectively. Paired sample t test is used to find the significance of rehabilitation on domain of SCIM. The values are t=14.06, p value 0.000 for selfcare, t=12.62, p value 0.321 for respiratory and sphincter management, t=13.69, p value 0.000 for mobility (room and toilet) and t-8.93, p value 0.000 for mobility (indoors and outdoors) respectively. We accept alternate hypothesis that there is significant difference in selfcare, mobility (room and toilet) and mobility (indoors and outdoors) in SCI patients after post rehabilitation whereas there is no significant difference in respiratory and sphincter management in SCI patients after post rehabilitation and we accept null hypothesis for this domain of SCIM.

4.5. Association of age and SCI related variables with Functional outcome scales

Table 4.5. Correlations co-efficient of age, length of stay at CRP and time interval from injury onset to admission with FIM motor outcome and SCIM outcome

		Age	Length of stay at CRP	Time interval from injury onset to admission
Post FIM motor score	Pearson correlation	-0.239*	-0.369**	-0.124
Post SCIM score		-0.165	-0.416**	-0.416

**. Correlation is significant at the 0.01 level (2tailed)

The above table no. 4.5 shows correlation between age, length of stay at CRP and the interval of time from injury to admission with post-FIM motor outcome score and post-SCIM outcome score using Pearson' correlation. Here, age of the respondents shows negative weak correlation with Post-FIM motor score ($r=-0.239$, $p<0.05$). It shows that the FIM motor score decreases as the age of the SCI patient increases.

Also, length of hospital stay is negative but intermediately correlated with Post-FIM motor outcome score ($r= -0.369$, $p<0.01$) and Post-SCIM outcome score ($r=0.416$, $p<0.01$) at 95%

confidence interval level 2-tailed. Thus, it can be concluded that less the length in hospital stay higher the outcome of patients scores in both scales.

4.6. Association between functional outcome scales and cause of injury

Table 4.6 Association between Cause of injury with Post-FIM motor And Post-SCIM score

Cause of injury	N	Post-FIM motor score			Post-SCIM Score		
		Mean± SD	F-value	Sig.	Mean± SD	F-value	Sig.
Fall from height	44	105.61±48.723	1.722	0.156	55.659±25.071	1.410	0.241
RTA	3	99.15±50.793			46.769±26.182		
Dive	1	27.00±15.123			11.000±14.577		
Pathological causes	5	137.80±20.188			62.000±16.700		
Weight fell on body	7	125.71±46.758			60.714±24.392		

The table no.4.6 illustrates the association between the cause of injury with post-FIM motor score and post-SCIM outcome score using one way ANOVA. Patients with pathological spinal cord injury (SCI) scored high in post-FIM motor score (137.80±20.188) and post-SCIM outcome score (62.000±16.700) followed by SCI caused by weight fell on body (125.71±46.758) in post-FIM and 60.714±24.392 in post-SCIM. However, there is no observed significance between the cause of injury with post-FIM motor score and post-SCIM outcome score which shows that functional independence outcome does not depend on cause of injury. It also shows that non-traumatic SCI (pathological) injury has highest score on both FIM motor and SCIM outcome as compared to traumatic SCI (fall form height, weight fell on body, RTA, Dive).

4.7 Association between FIM-motor outcome score with level and severity of SCI.

Table 4.7.1 Analysis of level of injury and ASIA score with Post-FIM motor score

	F value	Sig.
Skeletal level of injury	2.154	0.087
ASIA score	6.058	**0.001**
Skeletal Level of injury * ASIA score	0.738	0.657

The table no. 4.7.1 illustrates the association between the level of spinal cord injury and ASIA score with post-FIM motor score using Two-way ANOVA. The table demonstrates that association between the ASIA score and FIM motor outcome is significant ($p<0.05$) i.e., the Severity of spinal cord injury which is measured by ASIA score highly impacts the functional motor recovery outcome. Nevertheless, it can be also concluded that the interaction of skeletal level of injury and ASIA score does not significantly affect the post FIM motor score. Also, the skeletal level of injury does not affect the outcome of motor functional independence

4.7.2 Pairwise comparison of ASIA Impairment Scale (AIS) scores with Post-FIM motor outcome score

Sample 1- Sample 2	Mean difference	Sig.
B sensory incomplete- A complete	8.05	0.939
A complete- C motor incomplete	55.99	**0.007**
A complete- D motor incomplete	60.14	**0.002**
B sensory incomplete- C motor incomplete	47.95	0.085
B sensory incomplete- D motor incomplete	52.09	**0.040**
C motor incomplete- D motor incomplete	4.14	0.997

The table 4.7.2 depicts the information about pairwise comparison of ASIA score examined with post-FIM score using Scheffe's comparison. The highest mean difference of 60.14, 55.99 and 52.09 was observed between in group D motor incomplete and A complete, C motor incomplete and A complete and D motor incomplete and B sensory incomplete at

p=0.002,0.007 and 0.040 respectively. All the population does not have equal mean difference.

4.8. Association between SCIM outcome score with level and severity of SCI.

Table 4.8.1 Analysis of level of injury and ASIA Impairment Scale (AIS) score with Post-SCIM score

	F value	Sig.
Skeletal Level of injury	5.071	**0.002****
ASIA score	11.713	**0.000*****
Skeletal Level of injury * ASIA score	0.920	0.508

The table no. 4.8.1 illustrates the association between the level of spinal cord injury and AIS score with post-SCIM motor score using Two-way ANOVA. The table demonstrates that association between the AIS score and skeletal level of injury with SCIM motor outcome is significant ($p<0.05$) i.e., the Severity of spinal cord injury which is measured by ASIA Impairment Score highly influence the independence measure outcome. Furthermore, it can be also concluded that the interaction of skeletal level of injury and ASIA score does not significantly affect the post SCIM outcome score.

Table 4.8.2 Pairwise comparison of ASIA Impairment Scores (AIS) with Post-SCIM score

Sample1- Sample2	Mean difference	Sig
A complete- B sensory incomplete	-4.5682	0.869
A complete- C motor incomplete	-33.2955	**0.000*****
A complete- D motor incomplete	-40.0455	**0.000*****
B sensory incomplete- C motor incomplete	-28.7273	**0.006****
B sensory incomplete- D motor incomplete	-35.4773	**0.000*****
C motor incomplete- D motor incomplete	-6.7500	0.881

The pairwise comparison between ASIA impairment score (AIS) i.e., severity of SCI by post-hoc test where result explains that mean difference between AIS A-AIS C (md=33.2955,

p=0.000), AIS-A- AIS D (md=40.0455, P=0.000), AIS B- AIS C (md=28.7273, p<0.05) and AIS B – AIS D (md=35.4773, p=0.000) are highly significant with post-SCIM outcome score.

Table 4.8.3. Pairwise comparison of skeletal level of injury with Post-SCIM score

Sample1- Sample2	Mean difference	Sig.
(C2-C4) – (C5-C8)	28.4375*	**0.002****
(C2-C4) – (T1-T12)	1.1923	1.000
(C2-C4) – (L1-L5)	-14.9375	0.268
(C2-C4) - No obvious level	5.0000	0.997
(C5-C8)- (T1-T12)	-27.2452*	**0.000*****
(C5-C8) – (L1-L5)	-43.3750*	**0.000*****
(C5-C8) - No obvious level	-23.4375	0.442
(T1-T12) – (L1-L5)	-16.1298	0.052
(T1-T12) - No obvious level	3.8077	0.999
(L1-L5) - No obvious level	19.9375	0.052

The pairwise comparison between skeletal level of injury by post-hoc test where result explains that mean difference between cervical level of injury C2-C4 and C5-C8(md=28.4375, p<0.05), C5-C8 level of injury and thoracic level of injury T1-T12(md=27.2452, p<0.05), cervical level C5-C8 and lumbar L1-L5 level of injury (md=43.3750, p<0.05) are highly significant with post-SCIM outcome score.

4.9. Association between HADS score and functional outcome score

Table 4.9. Correlation between post-rehabilitation outcome score of HADS, FIM motor and SCIM

		Post-anxiety score	Post-depression score
Post-FIM motor score	Pearson correlation	-0.420**	-0.285*
Post-SCIM score		-0.393**	-0.232

**. Correlation is significant at the 0.01 level (2tailed).

*. Correlation is significant at the 0.05 level (2tailed).

The above table no. 4.9 shows correlation between HADS (Hospital anxiety and depression scale) total score, FIM motor outcome score and SCIM outcome score analysed using Pearson' correlation coefficient significant at $p<0.001$. HADS, FIM-motor outcome score and SCIM outcome score were assessed at the time of discharge i.e., post rehabilitation. Post-anxiety score has negative intermediate correlation with Post-FIM motor score ($r=-0.420$, $p<0.01$) and Post-SCIM score ($r=-0.393$, $p<0.01$). Furthermore, FIM motor score and post-anxiety score has negative weak correlation ($r=-0.393$, $p<0.05$), while post-depression does not show any association with post-SCIM outcome score. The result concluded that motor and functional independence measures have higher outcome with low anxiety and depression scores in HADS.

CHAPTER V

DISCUSSION

Spinal cord injury is considered as highly destructive and disabling neurological condition. The level and severity of SCI determines the functional self-care, motor and cognition compromise in individual's life as well as their dependency on a care giver. Most of the person with SCI show clinically significant signs of anxiety and depression, which in turn has a negative impact on improvements in functioning and overall health. As per author's knowledge this study was conducted first time in Bangladesh to analyze the improvement of patients' motor functioning, ADL independency, their psychological status and association of the triad before and after the rehabilitation from the inpatient rehabilitation unit of CRP. Due to very limited published data for SCI patients in Bangladesh, or countries from the region, the findings were compared with the reports and findings of studies from affluent countries. Seventy patients from the inpatient rehabilitation unit of CRP, Savar who were admitted during the time July 2019 and had at least 3 months of rehabilitation plan been enrolled in this study fulfilling all the inclusion and exclusion criteria.

Out of total 70 respondents, 84.3%(n=59) were male respondents with list participation of female respondents (15.7%, n=11). The mean age of the study population was respondents was 31.41 years with standard deviation of 13.701. The majority of the respondents (28.6%, n=20) were from age range 11-20 and very few (8.6%, n=6) followed by 25.7% respondents within the range of 21 to 30. Most of the respondents in this study was found to be young to middle aged with higher male proportion. These findings support the study conducted in Bangladesh at Chittagong Medical College Hospital in 2015 by Chowdhury et al., and study of 2017 in conducted by Rahman et al., and Quadir et al., in which most of the patients at high risk of SCI were in their 3rd decades with high male predominance. Similarly, a hospital-based prospective study in Bangladesh conducted by Razzak et al., in 2017 found male/female ratio 4.5:1which explained the male predominance and mean age of SCI injury was 34.5 years. Rahimi-Movaghar et al., (2013) in their epidemiology study of spinal cord injury in the developing world found 82.8% of male at risk with a mean age of 32.4 years. Most of the people vulnerable to SCI are day labourer and farmers as most of the SCI patients (48.6%) in

this study were day labourers and farmers at the time of injury which is consistent with the data obtained from Chowdhury et al., 2015 and Razzak et al., 2017).

In context of educational status, this study found 80% of literacy level with half of them (51.4%) having primary level followed by 15.7%, 8.6% with secondary education level, higher secondary education level while only 3% had graduation and above educational level. These findings do not go in line with the data from Hu, Mak, Wong, Leong, & Luk, 2008 where participants with education below primary level was 12.1% and 43% of participant had secondary education. Besides the educational status, the mean monthly family income i.e., 17307.14 BDT (USD 200) of studied SCI patients contradict the data obtained by Islam et al., 2011 (USD 60), Razzak et al., 2017(USD 100) and Quadir et al., 2017 (USD 59). It is evident that the people residing in rural area (73%) are most likely to be at high risk of SCI which is similar to the other studies conducted in Bangladesh by Rahman et al., in 2017, Rahman et al., in 2018, Islam et al., in 2011 and Razzak et al., in 2017.

SCI is classified as traumatic and non-traumatic based on mode of injury. This study found 93% of the SCI patients had traumatic causes and most of 84.3% of patients were male. Only 7% had non-traumatic SCI which was similar to the findings by Agarwal et al.,2006. Falling from height found to be most common cause of SCI in Bangladesh (62.9%), followed by RTA (18.6%) and 10% of SCI was due to weight falling on a body which matches the trends of cause of SCI with local studies (Islam et al., 2011, Chowdhury et al., 2015, Rahman et al., 2018, Razzak et al., 2017). Other studies from Asian countries also exhibit the same trend on mode of SCI injury such as 53% falling from height and 28% from road traffic accident in India (Mathur et al., 2014), almost 60% from fall injury in Nepal and 16% from RTA (Parajuli et al., 2020) and 63% in Pakistan (Cripps et al, 2014).

Most of the participants of this study had paraplegia (60%) followed by 37.2% tetraplegia. These findings are similar to other studies on Bangladesh, Razzak et al., (2017) found 70.49% paraplegia vs 29.51% tetraplegia, Quadir et al., (2017) found 66% paraplegia vs 29.2% tetraplegia and Rahman et al., (2018) found 52.3% paraplegia vs 43.5% tetraplegia. The cervical and thoracic spine accounted equal number of injuries (37.2%), followed by 22.9%

of injury at thoracic level which is comparable to the report of Agarwal et al., (2006) and Rahman et al., (2018) and Mathur et al., (2014).

Based on American Spinal Injury Association (ASIA) Impairment Scale (AIS) the current study found that at the time of admission 63% (n=44) had complete lesion (AIS-A) and rest of 37%(n=26) had incomplete lesion (AIS-B to D) and this trend of highest number of complete spinal cord lesion was found common with various studies of Bangladesh (Islam et al., 2011, Rahman, et al., 2018, Rahman et al., 2017 and Razzak et al., 2017). In the contrary more incomplete injury than complete injury (42% vs 36.3%) was observed in Nepal (Parajuli et al., 2020), 68% vs 32% in Italy (Scivoletto et al, 2011) and 74.8% vs 25.2% in China (Ning et al, 2011). The rate of conversion from complete spinal cord injury to motor incomplete has been prognostically increased over the year as reported by Waters et al., (1994), Naher et al., (2018), Marino et al., (2011), Chowdhury et al., (2015) and as per the current finding of this study on admission 63%(n=44) of participants had complete lesion AIS-A whereas on discharge 55%(n=31) remained unchanged and 7.1%(n=5) were shifted to incomplete AIS-B and C from AIS-A. AIS-B, AIS-C and AIS-D had distribution of 15.7%(n=11), 10%(n=7) and 11.4%(n=8) on admission and 11.4%(n=8), 11.4%(n=8), 20%(n=14%) and AIS-E 1.42%(n=1) on discharge respectively. On admission 55 participants were bed bound and 15 were wheelchair for mobility and the prognosis after rehabilitation was effective to improve the functional mobility during discharge as only 3 remained bed bound, 48 shifted to wheelchair, 15 started walking aids for mobility and 5 were walking at time of discharge. This functional mobility prognosis was found similar to the report by Naher et al., (2018).

Regarding anxiety and depression in SCI patients, result demonstrated that there was good prognosis on anxiety and depression score after rehabilitation. While admission 40 respondents had severe anxiety and 14 had mild anxiety on HADS scale but during discharge only 7 showed severe anxiety and 14 with mild anxiety whereas rest of them had normal prognosis on HADS scale. While admission 36 respondents had severe depression and 17 had mild depression on HADS scale but during discharge only 6 respondents showed severe depression and 13 with mild depression on HADS scale. The higher number of respondents were depressed and anxious during admission on CRP, the possible reason behind this could

be the new clinical setup to cope up for them, their type and level of injury and their difficulties during initial hospitalization. During rehabilitation, they cope up with the environment in CRP, peer support and familiarity with clinician and other helped them to overcome their depression and anxiety. After completion of rehabilitation, they were more aware regarding their life and selfcare. Treatment approach, Peer support and encouragement played major role to overcome their anxiety and depression. The study conducted by Hancock et al., 1993 to find out Anxiety and depression in SCI patients in initial first year also supported our study regarding prognosis of anxiety and depression in SCI patients.

Regarding functional activity of SCI patients, total mean score of motor FIM before rehabilitation was 29.41 while after rehabilitation was 107.6. The result demonstrates that there was statistically significant improvement in total FIM motor outcome scale after rehabilitation with p value=0.000 and t=14.695 in paired sample t test. The component of motor FIM scale such as bed mobility, sitting balance, lifting, transfer, wheelchair skills, standing and walking gait was also statistically significant after rehabilitation with p value 0.000, t=13.049, p value 0.000, t=15.042, p value 0.000, t=12.955, p value 0.000, t=12.933, p value 0.000, t=15.483, p value 0.000, t=8.727 and p value 0.000, t=5.905 respectively. FIM was used as outcome measure because the total FIM score during admission is a significant positive factor of functional activity in persons with disability which includes SCI too (Ng et al., 2007). Wirth et al., (2007) reported that spinal cord independence measures (SCIM) has improved significantly during 1 year follow up and after discharge from rehabilitation which is similar to the current findings on SCI patients pre- and post-rehabilitation (t=12.042, p=0.000). All the domains of SCIM such as selfcare, respiration and sphincter management and mobility-indoor and outdoor has improved significantly (p=0.000) at the time of discharge.

The possible reason for significant improvement in motor FIM is due to treatment approach that CRP is following, active participation of caregiver during rehabilitation, peer support and encouragement, onset of admission for rehabilitation, least number of secondary complications while admission and coping strategies that individual participants have during

stay in CRP. There is an association between improvement in FIM score and neurological level of injury (Middleton et al., 1998).

Our data of motor FIM was not supported by study done by Ditunno and Formal, 1994 who studied on traumatic SCI patients and found that the traumatic SCI patients generally have a total motor FIM score of 59.5 during admission on hospital and after rehabilitation the post total motor FIM score is around 95.3 regardless of our pre motor FIM score of 29.5 on admission and 107.6 on discharge after rehabilitation.

Our study showed that there is significant improvement on motor FIM score in SCI patients after rehabilitation which is supported by study done by (Abdul-Satter, 2014) to find the prognosis of traumatic SCI in terms of functional outcome measures in Saudi Arabia. There is other study also who support our study such as (Muslumanoghu et al, 1997) and (Mingaila & Krisciunas, 1997).

There was negative weak correlation between motor post FIM score with age of respondent in our study ($r=-0.239$, $p<0.05$) and no such association is seen between age and SCIM outcome score. We can conclude that the prognosis of SCI in terms of motor FIM at older age is least as compare to injury at younger age. Our study also found that there was negative intermediate correlation between duration of hospital stay with post mean motor FIM score ($r= -0.369$, $p<0.01$) and Post-SCIM outcome score ($r=0.416$, $p<0.01$) at 95% confidence interval level 2-tailed. It can also conclude that longer the hospitalization for rehabilitation does not associated with higher level of improvement in functional activities in SCI patients. Our study was supported by study conducted by Marcel et al, 2005 to measure the functional outcome measure in SCI patients in relation to duration of injury in Netherland. He found that there was strong negative correlation between functional outcome and length of stay in hospital with Rs (rSpearman) (-0.61; $p<0.001$). The possible reason could be the complication associated with long hospital stay, bed rest and type of injury which impact the functional outcome in SCI patients. Our study is also supported by (Jang et al., 2011) and (Post et al., 2004) in contrast to study done by (Ng et al., 2007) which emphasis on longer hospitalization

and rehabilitation have significant improvement on functional outcome as long duration help in natural recovery and provision of different treatment approaches.

There was no such correlation is obtained between improvement in terms of motor FIM and SCIM score with time interval from injury onset to admission. The possible reason behind this could be the possibility of treatment of SCI patient without developing secondary complication and further deterioration of condition. Our study was supported by study conducted by (Abdul-Satter, 2014) to find the prognosis of traumatic SCI in terms of functional outcome measures in Saudi Arabia.

There was no observed significance correlation between post motor FIM and SCIM outcome and cause of injury. We can conclude that prognosis of SCI in terms of functional recovery which is measured by motor FIM score was not associated with cause of SCI. The motor recovery in terms of FIM is associated with neurological level of injury and severity of injury irrespective of cause of injury (Middleton et al, 1998).

Two-way ANOVA was used to study the association between level of injury and ASIA score with post FIM-motor score. It was found that the skeletal level of injury and interaction between skeletal levels of injury and ASIA score was not associated with post FIM motor score and it has no impact on the functional outcome of SCI patients in terms of motor FIM scale. There was a significant association between ASIA score and post motor FIM score with sig. value 0.001, f =6.058. we concluded that the functional outcome of SCI patients in terms of FIM scale is highly depend on the severity of SCI which is measured by ASIA scale. Our study is supported by study done by (Abdul-Satter, 2014) to find the prognosis of traumatic SCI in terms of functional outcome measures in Saudi Arabia. He found that functional outcome of SCI patients was largely depend on level of injury and severity of injury on ASIA (ASIA=A and B). He also concluded that the functional improvement in tetraplegia and other severe injury were least when compare to improvement on paraplegia and mild to moderate

injury. Our study was also supported by (Post et al., 2004), (Middleton et al, 1998), (Mingaila & Krisciunas, 1997) and (Scivoletto et al, 2004).

On Scheffe's comparison between ASIA score and post motor FIM score, it was found that the higher mean difference was observed in group D motor incomplete and A complete, group C motor incomplete and A complete and group D motor incomplete and B sensory incomplete with mean difference value 60.14, 55.99 and 52.09 respectively.

Association between the AIS score and skeletal level of injury with SCIM outcome is found significant ($p<0.05$) i.e., the Severity of spinal cord injury which is measured by ASIA Impairment Score, highly influence the independence measure outcome.

According to Ackerman, P., Morrison, S. A., McDowell, S., & Vazquez, L. (2009) ,SCIM outcome score on pre-and post-assessment showed statistically significant positive changes for the level of injury except C1-C4 level of injury which fits with the current findings of this study where the pairwise comparison between skeletal level of injury by post-hoc test determined that mean difference between cervical level of injury C2-C4 and C5-C8(md=28.4375, $p<0.05$), C5-C8 level of injury and thoracic level of injury T1-T12(md=27.2452, $p<0.05$), cervical level C5-C8 and lumbar L1-L5 level of injury (md=43.3750, $p<0.05$) are highly significant with post-SCIM outcome score. Nevertheless, the association of ASIA impairment score and SCIM at discharge was significantly reported where patient with ASIA impairment B and C significantly has increased SCIM during discharge (Naher et al., 2018). This prognosis was found more significant in current study where mean difference between AIS A- AIS C (md=33.2955, $p=0.000$), AIS A- AIS D (md=40.0455, $P=0.000$), AIS B- AIS C (md=28.7273, $p<0.05$) and AIS B – AIS D (md=35.4773, $p=0.000$) are also highly significant with post-SCIM outcome score which is analysed using pairwise comparison between ASIA impairment score (AIS) i.e., severity of SCI by post-hoc test.

On studying association between post rehabilitation outcomes score such as post motor FIM score and HADS score, it was found that post anxiety score showed negative intermediate

correlation with post FIM motor score ($r=-0.420$, $p<0.01$) whereas post-depression score showed negative weak correlation with post motor FIM score ($r=-0.285$, $p<0.05$). The result concluded that the anxiety and depression score predict the functional improvement of SCI patients and plays an important influential factor for rehabilitation. This finding is supported by (Ng et al., 2007) and (Abdul-Satter, 2014) in contrast to (Fuhrer et al., 1993) and (Shin et al., 2012). Furthermore, this study found that post-anxiety score in HADS has negative intermediate correlation Post-SCIM score ($r=-0.393$, $p<0.01$) while post-depression does not show any association with post-SCIM outcome score. The result concluded that motor and functional independence measures have higher outcome with low anxiety and depression scores in HADS.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

Overall, it can be concluded that improving psychological well-being is an eqThe study found male were predominantly involved in SCI where day laborers and farmers from the rural areas are more vulnerable to SCI. Majority of the patients have achieved a good functional mobility level and neurological recovery at the time of discharge from rehabilitation. The functional motor outcome and independence outcome suggest that older patients have lesser functional recovery as compared to young patients, the longer stay at rehabilitation center does not predict the optimum functional recovery. The result also concluded that the functional motor outcome and independence outcome is significantly higher in patients with low score of anxiety and depression in HADS scale which suggest the better psychological prognosis with functional recovery. Furthermore, neurological recovery highly influences the functional motor and independence outcome in SCI patients. Overall, it can be concluded that improving psychological well-being is an equally important aspect of rehabilitation and treatment of SCI patients.

The functional recovery of SCI patients and also their recovery in psychological status can be optimized in short duration of stay at rehabilitation center if the therapeutic interventions and adequate counselling and peer group support is efficiently implied during rehabilitation period. Furthermore, the study would be better to be conducted in large sample size with longer follow-up time and follow-up even after discharge to explore the effectiveness of rehabilitation on functional outcome of patients, their psychological strength to cope up with the environmental aspects as well as their quality of life after their discharge from rehabilitation. It is recommended to conducted the prospective study in large population with longer follow-up period in the same setting as well as other setting to explore the association between functional and neurological outcome of SCI patients with their contributing factors and variables and contributing factors. It might also help to explore the association between the neurological and functional outcome with the time interval if injury onset and admission in rehabilitation which was expected but not significantly associated in this study.

STRENGTHS AND LIMITATIONS OF THE STUDY

Strength:

This study is the first study conducted to exposure the functional motor and independence outcome based on the socio-demographic characteristics and injury related variables (level and severity of SCI, cause of injury, length of stay at CRP, time from injury onset and admission to rehabilitation, anxiety and depression score of SCI patients during the rehabilitation period.

Limitations:

The main limitation of this study was the small sample size and limited short follow-up period for patients. In this study, only those patients who were present at the time of data collection period were recruited and limited data collection set were used where treatment protocols, vocational rehabilitation data, caregivers' burden and stress questionnaire, secondary complications that could have greater impact in functional outcome of SCI are not included. In this study there was an inadequate proportion of the number of female participants to the males. Moreover, data was collected from only one hospital setting which makes make judgments difficult for generalizability of the results. Due to limited published data and limited study regarding the functional recovery, independence gain and psychological recovery research faced difficulties in reviewing literature.

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APPENDIX I: INFORMATION SHEET

I am Susmita Khatri, student of the Bangladesh Health Professions Institute (BHPI) which is the academic institute of the Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka. I am studying M.Sc. in Rehabilitation. In regards to the fulfillment of M.Sc. Degree, it is mandatory to conduct a research in final year of study. I request you to participate in this research study **"Title: Functional Outcome of Spinal Cord Injury Rehabilitation in CRP".** It will be very helpful if you accept my invitation and take part in my study.

If you agree to participate in this study, you will be asked a certain question regarding the socio-demographic data including enquiries related to your injury such as cause of injury, duration of injury, duration of hospital stay. For other part of the study, you will be asked few questions about your psychological changes before and after the rehabilitation. And asked to perform some activities regarding your functional gain in mobility, selfcare during the rehabilitation as mentioned in the form. This will take approximately 25-30 minutes and you can voluntarily participate in this study.

This study will surely help you to determine the effectiveness of the rehabilitation service you are receiving form CRP as well as to determine the functional as well as psychological outcome and independence level after SCI rehabilitation. All the information provided by you will be kept very confidential. The identity of your will not be disclosed in any presentation or publication without your agreement. 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, researcher and/or, Associate Professor, Sk.Moniruzzaman, Head of Department of Occupational Therapy, BHPI, CRP, Savar Dhaka.

Susmita Khatri
M Sc. in Rehabilitation Science
BHPI, CRP-Chapain, Savar, Dhaka-1343
Cell Phone: 088-01572140637

APPENDIX II: INSTITUTIONAL REVIEW BOARD FORM

BANGLADESH HEALTH PROFESSIONS INSTITUTE

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

Ref:

Date: 22/08/2019

CRP-BHPI/IRB/08/19/1319

To,
Susmita Khatri
5th Batch M.Sc. in Rehabilitation Science
Session: 2018-2019, Student ID 181180115
BHPI, CRP-Savar, Dhaka-1343, Bangladesh

Subject: Approval of thesis proposal **"Functional Outcome of Spinal Cord Injury Patients Admitted in Inpatient Rehabilitation Unit of CRP, Savar"** by ethics committee.

Dear Susmita Khatri,

Congratulations,

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned thesis, with yourself, as the Principal Investigator. The Following documents have been reviewed and approved:

S.N.	Name of Documents
1.	Thesis Proposal
2.	Questionnaire (English and Bengali version)
3.	Information sheet & consent form.

Since the study involves use of a Functional Independence Measure (FIM), Spinal Cord Independence Measure (SCIM) and Hospital Anxiety and Depression Scale (HADS), questionnaire to determine the functional and psychological progress in SCI patients after rehabilitation that may take 20 to 25 minutes to answer and fill in the questionnaire for collection of data. There is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 10.00 AM, 17th February, 2019 at BHPI.

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

Best regards,

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

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

APPENDIX III: PERMISSION LETTER

Date: 21/08/2019

To,

The Head of the Department

CRP, Bangladesh

Subject: Application for permission to collect data in Spinal Cord Injury Unit at CRP

Dear Sir,

After per my thesis study, titled, "Functional Outcome of Spinal Cord Injury Rehabilitation in CRP, Savar", under the honorable supervisor, Firoz Ahmed Mamin, Associate professor Department of Physiotherapy, BHPI, Dhaka, Bangladesh. The purpose of the study is to determine the functional outcomes of inpatients receiving Spinal cord injury rehabilitation at CRP in Bangladesh.

The study involves use of a FIM scale to measure the SCI patient's functional outcomes, SCIM scale that measures the level of independence of SCI patients and HADS that measures the psychological gain of patients before and after the rehabilitation during hospital stay at CRP in Bangladesh that may take 25 to 30 minutes to fill in the questionnaire. There is no likelihood of any harm to the participants and / or participation in the study may benefit the participants or other stakeholders as service quality gap can be determined to identify patient satisfaction on services delivered and accordingly necessary measures can be taken to provide quality care to the Spinal cord injury patients. Related information will be collected from the patient's guide books. Data collectors will receive informed consent from all participants. Any data collected will be kept confidential.

Sincerely,

Susmita Khatri

MRS 5th Batch

BHPI, Bangladesh

Allow for data collection at SCI unit
Permission 22/8/19
MUZAFFOR HOSSAIN
Junior Consultant & Incharge SCI Unit
Physiotherapy Department
CRP, Savar, Dhaka

Forwarded & Recommended
22/08/2019
Tunamin Mithat Hossain
Assistant Professor
Project & Course Coordinator
Dept. of Rehabilitation Science
BHPI CRP, Savar, Dhaka-1343, Bangladesh

Supervisor

Firoz Ahmed Mamin

Associate Professor, Department of Rehabilitation Science, BHPI, Dhaka, Bangladesh

Firoz Ahmed Mamin
Associate Professor
Dept. of Rehabilitation Science
Coordinator
M.Sc. in Physiotherapy Program
BHPI, CRP, Savar, Dhaka-1343

update Topic : Functional outcome of Spinal cord Injury Patients admitted in Inpatient Rehabilitation unit of CRP, savar.

APPENDIX III: PERMISSION LETTER

Date: 12/03/2020

To,

The Head, Medical Service Wing

CRP, Savar, Bangladesh

Subject: Application for permission to collect data in Spinal Cord Injury Unit at CRP

Dear Sir,

With due respect, I would like to mention that my thesis title is "Functional Outcome of Spinal Cord Injury Rehabilitation in CRP, Savar", under the honorable supervisor Sk. Moniruzzaman, Associate professor and Head ofDepartment of Occupational Therapy, BHPI, Dhaka, Bangladesh. The purpose of the study is to determine the functional outcomes of inpatients receiving Spinal cord injury rehabilitation at CRP in Bangladesh.
The study involves use of a FIM scale to measure the SCI patient's functional outcomes, SCIM scale that measures the level of independence of SCI patients and HADS that measuresthe psychological gain of patients before and after the rehabilitation during hospital stay at CRP in Bangladesh that may take 25 to 30 minutes to fill in the questionnaire.Data collectors will receive informed consent from all participants. Any data collected will be kept confidential Related information will be collected from the patients' medical records. For this purpose I need to access to patients' medical records.

Therefore I request you to grant me the permission to access patients' medical records for data collection from your department.

Sincerely,
Susmita
Susmita Khatri
MRS 5th Batch
BHPI, Bangladesh

Updated Topic: Functional outcome of Spinal cord Injury Patients' Addmitted in Inpatient Rehabilitation unit of CRP, Savar
Susmita

Recommended & Forwarded
1136
12/03/2020
Muhammad Millat Hossain
Assistant Professor
Project & Course Coordinator
Dept. of Rehabilitation Science
BHPI, CRP Savar, Dhaka-1343, Bangladesh

Supervisor
12.03.2020
Sk. Moniruzzaman
Associate Professor, Head of Department of Occupational Therapy
BHPI, Dhaka, Bangladesh

Forwarded to Registrar, for N/A.
12/3/2020
Dr. Sayeed Uddin Helal, MS
Neuro-Spine Surgeon
Sr. Consultant & Head
Medical Services Wing, CRP
BMDC Reg. 50223

APPENDIX IV: CONSENT FORM

হ্যালো,

আমি সুস্মিতা ক্ষত্রি, বাংলাদেশ হেল্থ প্রফেশন্স ইন্সটিটিউটের ছাত্রী যেটি সেন্টার ফর রিহ্যাবিলিটেশন অব দ্য প্যারালাইজড (সিআরপি), সাভার,ঢাকা এর একটি একাডেমিক প্রতিষ্ঠান। আমি এম.এস-সি ইন রিহ্যাবিলিটেশন অধ্যয়নরত আছি। এম.এস-সি ডিগ্রী সম্পূর্ন করার জন্যে চূড়ান্ত বর্ষে একটি গবেষণা করা আবশ্যক আমি আপনাকে এই গবেষণায় অংশগ্রহনের জন্যে অনুরোধ করছি **"শিরোনামঃ সিআরপিতে মেরুদন্ডের আঘাত পুনর্বাসনের কার্যকরী ফলাফল"**। আপনি যদি আমার অনুরোধ গ্রহণ করে আমার গবেষণায় অংশগ্রহণ করেন তাহলে আমি অনেক উপকৃত হবো।

আপনি যদি এই গবেষণায় অংশগ্রহণ করতে সম্মত হন, আপনাকে আপনার আঘাত সম্পর্কিত কিছু জিজ্ঞাসা যেমন আঘাত প্রাপ্তির কারন, আঘাতের স্থায়িত্বকাল, হাসপাতালে থাকার সময়কাল সহ আর্থ-জনসংখ্যা সংক্রান্ত একটি নির্দিষ্ট প্রশ্ন করা হবে। গবেষণার অন্য একটি অংশের জন্যে, আপনাকে পুনর্বাসনের আগে ও পরে আপনার মানসিক পরিবর্তন বিষয়ক কিছু প্রশ্ন করা হবে। এবং ফর্মে উল্লেখিতভাবে পুনর্বাসন চলাকালীন নিজের যত্ন নেয়া, আপনার কার্যকরী গতিশীলতা প্রাপ্তি বিষয়ক কিছু ক্রিয়াকলাপ করে দেখাতে বলা হবে। এতে ২৫-৩০ মিনিট সময় লাগবে এবং আপনি স্বেচ্ছায় এই গবেষণায় অংশগ্রহণ করতে পারেন।

এই গবেষণা সিআরপি থেকে আপনি যে পুনর্বাসন সেবা পাচ্ছেন তার প্রভাব সেইসাথে এসসিআই পুনর্বাসনের পর কার্যকরী ও মানসিক ফলাফল এবং স্বাধীনতার মাত্রা আপনাকে বুঝতে সাহায্য করবে আপনার দ্বারা সরবরাহকৃত সকল তথ্য গোপন রাখা হবে। আপনার অনুমতি ব্যতীত আপনার পরিচয় কোন উপস্থাপনা বা প্রকাশনায় প্রকাশ করা হবে না। এই গবেষণায় আপনার অংশগ্রহণ স্বেচ্ছাকৃত এবং আপনি গবেষণা চলাকালীন যেকোনো সময় কোনরকম নেতিবাচক পরিণতি ছাড়াই নিজেকে প্রত্যাহার করে নিতে পারবেন। সাক্ষাৎকার চলাকালীন আপনার অপছন্দের প্রশ্নের অথবা আপনি উত্তর দিতে চান না এমন কোন প্রশ্নের উত্তর না দেয়ার অধিকারও আপনার রয়েছে।

আমি শুরু করার পূর্বে আপনার কি কোন প্রশ্ন আছে?

তাহলে, সাক্ষাৎকার অথবা কাজটি এগিয়ে নিয়ে যেতে আমি কি আপনার সম্মতি পেতে পারি?

☐ হ্যাঁ ☐ না

অংশগ্রাহকের স্বাক্ষর.....

তদন্ত কারক

আমি উপরে উল্লিখিত অংশগ্রাহকের কাছে এই গবেষণা ও এর উদ্দেশ্য সঠিকভাবে ব্যাখ্যা করেছি এবং তিনি অংশগ্রহন করতে সম্মত হয়েছেন।

তদন্ত কারকের স্বাক্ষর..... তারিখ.....

APPENDIX V: QUESTIONNAIRE (ENGLISH)

PART 1: SOCIO-DEMOGRAPHIC INFORMATION

Reg.No:

Name:

Age: **Contact no:**

Present address: **Permanent address:**

Date of admission: **Discharge date:**

Gender:

1. Male 2. Female 3. Others

Marital status

1. Married 2. Unmarried 3. Widow/Widower 4. Separated

Level of education

1. Illiterate 2. Primary 3. SSC 4. HSC 5. Bachelor
   6. Masters or Above

Occupation:

1. Service holder 2. Bussiness 3. Farmer 4.Laborer 5. housewife
   6. Student 7. Others (specify)

Living area:

1. Rural 2.Urban 3. Semi-urban

Number of family member:

Family income:

PART 2: PARTICIPANT RELATED INFORMATION

Date of injury: **Date of admission:**

Cause of injury:

1. Fall from height 2.RTA 3. Gunshot 4. Dive 5. Pathological causes 6. Weight fell on body

Skeletal Level of injury:

1. C2-C4
2. C5-T1
3. T2-T12
4. L1-L5
5. S1-S5

	On admission	On discharge
ASISA Impairment Scale:	A- complete B- sensory incomplete C- motor incomplete D- motor incomplete E- normal	A- complete B-sensory incomplete C- motor incomplete D- motor incomplete E- normal
Functional mobility level:	1. Independent 2. Uses cane 3. Uses crutches 4. Uses walker or frames 5. Uses wheelchair 6. Bed bound	1. Independent 2. Uses cane 3. Uses crutches 4. Uses walker or frames 5. Uses wheelchair 6.Bed bound

PART 3: FUNCTIONAL OUTCOME MEASUREMENT (FIM)

7= Independent 6= Independent with assisted device 5= Supervision 4= Minimal assistance 3= Moderate assistance 2= Maximal assistance 1= Total assistance needed

Self-care	On admission	On discharge
Bed Mobility		
Rolling (Right ↔left)		
Lying to sitting		
Sitting to lying		
Prone lying		
Sitting balance		
Lifting		
Lifting in wheelchair		
Lifting on bed		
Lifting to forward		
Lifting sideways		
Lifting backwards		
Transfers		
Wheelchair↔bed		
High and low transfer		
Wheelchair skills		
Wheelie		
Up and down slop		
Rough ground		
Small steps		
Standing		
Sit to stand		
Standing balance		
Standing table		
Tilt table		
Walking Gait		
Flat surface		
Rough surface		
Steps/slopes		
Fitting brace		
Total		

PART 4: SPINAL CORD INDEPENDENCE MEASURE (SCIM)

Self-Care	**Item**
Score	

	A	RA	D
1. **Feeding** (cutting, opening containers, pouring, bringing food to mouth, holding cup with fluid)			

0. Needs parenteral, gastrostomy or fully assisted oral feeding

1. Needs partial assistance for eating and/or drinking, or for wearing adaptive devices

2. Eats independently; needs adaptive devices or assistance only for cutting food and/or pouring and/or opening containers

3. Eats and drinks independently; does not require assistance or adaptive devices

2. Bathing (soaping, washing, drying body and head, manipulating water tap)

A. Upper body			

0. Requires total assistance

1. Requires partial assistance

2. Washes independently with adaptive devices or in a specific setting (e.g., bars, chair)

3. Washes independently; does not require adaptive devices or specific setting (not customary for healthy people) (adss)

B. Lower Body			

0. Requires total assistance

1. Requires partial assistance

2. Washes independently with adaptive devices or in a specific setting (adss)

3. Washes independently; does not require adaptive devices (adss) or specific setting

3. Dressing (clothes, shoes, permanent orthoses; dressing, wearing, undressing)

A. Upper body			

0. Requires total assistance

1. Requires partial assistance with clothes without buttons, zippers or laces (cwobzl)

2. Independent with cwobzl; requires adaptive devices and/or specific settings (adss

3. Independent with cwobzl; does not require adss; needs assistance or adss only for bzl.

4. Dresses (any clothes) independently; does not require adaptive devices or specific setting

B. Lower Body

0. Requires total assistance

1. Requires partial assistance with clothes without buttons, zippers or laces (cwobzl)

2. Independent with (cwobzl); requires adaptive devices and/or specific settings (adss)

3. Independent with (cwobzl) without adss; needs assistance or adss only for bzl.

4. Dresses (any clothes) independently; does not require adaptive devices or specific setting

4**. Grooming** (washing hands and face, brushing teeth, combing hair, shaving, applying makeup)

0. Requires total assistance

1. Requires partial assistance

2. Grooms independently with adaptive devices

3. Grooms independently without adaptive devices

Self-Care Subtotal (0-20)			

Respiration and Sphincter Management

5. Respiration

0. Requires tracheal tube (TT) and permanent or intermittent assisted ventilation (IAV)

2. Breathes independently with TT; requires oxygen, much assistance in coughing or TT management

4. Breathes independently with TT; requires little assistance in coughing or TT management

6. Breathes independently without TT; requires oxygen, much assistance in coughing, a mask (e.g., peep) or IA (bipap)

8. Breathes independently without TT; requires little assistance or stimulation for coughing

10. Breathes independently without assistance or device

6. Sphincter Management - Bladder

0. Indwelling catheter

3. Residual urine volume (RUV) > 100cc; no regular catheterization or assisted intermittent catheterization

6. RUV < 100cc or intermittent self-catheterization; needs assistance for applying drainage instrument

9. Intermittent self-catheterization; uses external drainage instrument; does not need assistance for applying

11. Intermittent self-catheterization; continent between catheterizations; does not use external drainage instrument 13. RUV <100cc; needs only external urine drainage; no assistance is required for drainage

15. RUV <100cc; continent; does not use external drainage instrument

7. Sphincter Management - Bowel

0. Irregular timing or very low frequency (less than once in 3 days) of bowel movements

5. Regular timing, but requires assistance (e.g., for applying suppository); rare accidents (less than twice a month)

8. Regular bowel movements, without assistance; rare accidents (less than twice a month)

10. Regular bowel movements, without assistance; no accidents

8. Use of Toilet (perineal hygiene, adjustment of clothes before/after, use of napkins or diapers)

0. Requires total assistance

1. Requires partial assistance; does not clean self

2. Requires partial assistance; cleans self independently

4. Uses toilet independently in all tasks but needs adaptive devices or special setting (e.g., bars)

5. Uses toilet independently; does not require adaptive devices or special setting

Respiration and Sphincter Management Subtotal (0-40)			

Mobility (room and toilet)

9. Mobility in Bed and Action to Prevent Pressure Sores

0. Needs assistance in all activities: turning upper body in bed, turning lower body in bed, sitting up in bed, doing push-ups in wheelchair, with or without adaptive devices, but not with electric aids

2. Performs one of the activities without assistance

4. Performs two or three of the activities without assistance

6. Performs all the bed mobility and pressure release activities independently

10. Transfers: bed-wheelchair (locking wheelchair, lifting footrests, removing and adjusting arm rests, transferring, lifting feet)

0. Requires total assistance

1. Needs partial assistance and/or supervision, and/or adaptive devices (e.g., sliding board)

2. Independent (or does not require wheelchair)

11. Transfers: wheelchair-toilet-tub (if uses toilet wheelchair: transfers to and from; if uses regular wheelchair:

Locking wheelchair, lifting footrests, removing and adjusting armrests, transferring, lifting feet)

0. Requires total assistance

1. Needs partial assistance and/or supervision, and/or adaptive devices (e.g., grab-bars)

2. Independent (or does not require wheelchair)

Mobility (indoors and outdoors, on even surface)

12. Mobility Indoors

0. Requires total assistance

1. Needs electric wheelchair or partial assistance to operate manual wheelchair

2. Moves independently in manual wheelchair

3. Requires supervision while walking (with or without devices)

4. Walks with a walking frame or crutches (swing)

5. Walks with crutches or two canes (reciprocal walking)

6. Walks with one cane

7. Needs leg orthosis only

8. Walks without walking aids

13. Mobility for Moderate Distances (10-100 meters)

0. Requires total assistance

1. Needs electric wheelchair or partial assistance to operate manual wheelchair

2. Moves independently in manual wheelchair

3. Requires supervision while walking (with or without devices)

4. Walks with a walking frame or crutches (swing)

5. Walks with crutches or two canes (reciprocal walking)

6. Walks with one cane

7. Needs leg orthosis only

8. Walks without walking aids

14. Mobility Outdoors (more than 100 meters)

0. Requires total assistance

1. Needs electric wheelchair or partial assistance to operate manual wheelchair

2. Moves independently in manual wheelchair

3. Requires supervision while walking (with or without devices)

4. Walks with a walking frame or crutches (swing)

5. Walks with crutches or two canes (reciprocal waking)

6. Walks with one cane

7. Needs leg orthosis only

8. Walks without walking aids

15. Stair Management

0. Unable to ascend or descend stairs

1. Ascends and descends at least 3 steps with support or supervision of another person

2. Ascends and descends at least 3 steps with support of handrail and/or crutch or cane

3. Ascends and descends at least 3 steps without any support or supervision

16. Transfers: wheelchair-car (approaching car, locking wheelchair, removing arm and footrests, transferring to and from car, bringing wheelchair into and out of car)

0. Requires total assistance

1. Needs partial assistance and/or supervision and/or adaptive devices

2. Transfers independent; does not require adaptive devices (or does not require wheelchair)

17. Transfers: ground-wheelchair

0. Requires assistance

1. Transfers independent with or without adaptive devices (or does not require wheelchair)

Mobility Subtotal (0-40)			
TOTAL SCIM SCORE (0-100) Admission: _____ Re-Assessment: _____ Discharge: _____			

Part 3: Hospital Anxiety and Depression Scale (HADS)

A. 3 2 1 0	**I feel tense or 'wound up':**		**I feel as if I am slowed down:**	D 0 1 2 3
	Most of the time A lot of the time From time to time, occasionally Not at all	Most of the time A lot of the time From time to time, occasionally Not at all	Nearly all the time Very often Sometimes Not at all	Nearly all the time Very often Sometimes Not at all
D 0 1 2 3	**I still enjoy the things I used to enjoy**		**I get a sort of frightened feeling like 'butterflies' in the stomach:**	A 3 2 1 0
	Definitely as much Not quite so much Only a little Hardly at all	Definitely as much Not quite so much Only a little Hardly at all	Not at all Occasionally Quite Often Very Often	Not at all Occasionally Quite Often Very Often
A. 3 2 1 0	**I get a sort of frightened feeling as if something awful is about to happen:**		**I have lost interest in my appearance:**	D 0 1 2 3
	Very definitely and quite badly Yes, but not too badly A little, but it doesn't worry me Not at all	Very definitely and quite badly Yes, but not too badly A little, but it doesn't worry me Not at all	Definitely I don't take as much care as I should I may not take quite as much care I take just as much care as ever	Definitely I don't take as much care as I should I may not take quite as much care I take just as much care as ever
D. 0 1 2 3	**I can laugh and see the funny side of things:**		**I feel restless as I have to be on the move:**	A 3 2 1 0
	As much as I always could Not quite so much now Definitely not so much now Not at all	As much as I always could Not quite so much now Definitely not so much now Not at all	Very much indeed Quite a lot Not very much Not at all	Very much indeed Quite a lot Not very much Not at all
A 3 2 1 0	**Worrying thoughts go through my mind:**		**I look forward with enjoyment to things:**	D 0 1 2 3
	A great deal of the time A lot of the time From time to time, but not too often Only occasionally	A great deal of the time A lot of the time From time to time, but not too often Only occasionally	As much as I ever did Rather less than I used to Definitely less than I used to Hardly at all	As much as I ever did Rather less than I used to Definitely less than I used to Hardly at all
D 0 1 2 3	**I feel cheerful:**		**I get sudden feelings of panic:**	A 3 2 1 0
	Not at all Not often Sometimes Most of the time	Not at all Not often Sometimes Most of the time	Very often indeed Quite often Not very often Not at all	Very often indeed Quite often Not very often Not at all
A. 3 2 1 0	**I can sit at ease and feel relaxed:**		**I can enjoy a good book or radio or TV program:**	D 0 1 2 3
	Definitely Usually Not Often Not at all	Definitely Usually Not Often Not at all	Often Sometimes Not often Not often	Often Sometimes Not often Not often

APPENDIX VI: QUESTIONNAIRE (BENGALI)

প্রথম অংশঃ আর্থ-জনসাংখ্যিক তথ্য

রেজি নংঃ

নামঃ **মোবাইল নংঃ**

বর্তমান ঠিকানাঃ **স্থায়ী ঠিকানাঃ**

ভর্তির তরিখঃ **ছাড় পাওয়ার তারিখঃ**

লিঙ্গঃ

১. পুরুষ ২. মহিলা ৩. অন্যান্য

বৈবাহিক অবস্থাঃ

১. বিবাহিত ২. অবিবাহিত ৩. বিপত্নীক/বিধবা ৪. তালাকপ্রাপ্ত

শিক্ষাগত যোগ্যতাঃ

১. নিরক্ষর ২. প্রাথমকি ৩. এস এস সি ৪. এইচ এস সি

৫. স্নাতক

৬. স্নাতকোত্তর বা উপরে

পেশাঃ

১. চাকুরী ২. ব্যাবসা ৩. কৃষক ৪. শ্রমিক

৫. গৃহিণী

৬. অন্যান্য(উল্লেখ করুন) ----------

বসবাসের এলাকাঃ

১. গ্রাম ২. শহর ৩. মফস্বল

দ্বিতীয় অংশঃ অংশগ্রাহক সম্পর্কিত তথ্য

আঘাতের তারিখঃ **ভর্তির তারিখঃ**

আঘাতের কারণঃ

১.পতন ২. আরটিএ ৩.বন্দুকের গুলি ৪.ঝাঁপ

৫.অন্যান্য(উল্লেখকরুন) ----------

আঘাতের কঙ্কালিক মাত্রাঃ

১. সি২-সি৪
২. সি৫-টি১
৩. টি২-টি১২
৪. এল১-এল৫
৫. এস১-এস৫

আঘাতের স্নায়ুবিক মাত্রাঃ

	ভর্তির সময়	ছাড় পাবার সময়
এএসআইএসএ প্রতিবন্ধকতা স্কেলঃ	১. এ-কমপ্লিট ২. বি- সেন্সরি ইনকমপ্লিট ৩. সি-মোটর ইনকমপ্লিট ৪. ডি-মোটর ইনকমপ্লিট ৫. ই-স্বাভাবিক	১. এ- কমপ্লিট ২. বি- সেন্সরি ইনকমপ্লিট ৩. সি-মোটর ইনকমপ্লিট ৪. ডি- মোটর ইনকমপ্লিট ৫. ই-স্বাভাবিক
ক্রিয়ামূলক গতিশীলতা মাত্রাঃ	১. স্বাধীন ২. ছড়ি ব্যাবহার করে ৩. ক্রাচ ব্যাবহার করে ৪. ওয়াকার বা ফ্রেম ব্যাবহার করে ৫. হুইলচেয়ার ব্যাবহার করে	১. স্বাধীন ২. ছড়ি ব্যাবহার করে ৩. ক্রাচ ব্যাবহার করে ৪.ওয়াকার বা ফ্রেম ব্যাবহার করে ৫. হুইলচেয়ার ব্যাবহার করে

ফাংশন্যাল ইমপ্রুভমেন্ট/উন্নতি

কর্মশীলতা (অ্যকটিভিটিজ)	প্রাথমিক স্কোর	ডিসচার্জের স্কোর
বিছানায় গতিশীলতা		
গড়াগড়ি		
শোয়া থেকে বসা		
বসা থেকে শোয়া		
উপুর হয়ে শোয়া		
বসে থাকার ভারসাম্য		
উত্তোলন		
হুইলচেয়ারের মধ্যে উত্তোলন		
বিছানার উপর উত্তোলন		
সামনের দিকে উত্তোলন		
দুইপাশে উত্তোলন		
পিছনের দিকে উত্তোলন		
স্থানান্তর		
হুইলচেয়ার ↔ বিছানা		
উপরে এবং নিচে স্থানান্তর		
হুইলচেয়ারের দক্ষতা		
হুইলচেয়ার চালানোর ক্ষমতা		
উঁচু এবং নিচু ঢাল		
অমসৃণ ভূমি/তল		
স্কেট ধাপ		
দাঁড়ানো		
বসা থেকে দাঁড়ানো		
দাঁড়ানোর ভারসাম্য		
দাঁড়ানোর টেবিল		
টিল্ট টেবিল		
হাঁটা		
মসৃণ তল		
অমসৃণ তল/ অসমতল		
ধাপ/ঢাল		
উপযুক্ত ব্রেস/ ফিটিং ব্রেস		
মোট		

ব্যাক্তিগত পরিচর্চা	আইটেম স্কোর

১ খাওয়া (কাটাকুটি, কৌটা খোলা,পানি ঢালা,খাবার মুখের কাছে আনা,পানিসহ কাপ ধরা)

০ অন্য কারো সাহায্য প্রয়োজন,গ্যাস্ট্রস্টমি টিউব অথবা খাওয়ার জন্য সম্পূর্ণ সাহায্য প্রয়োজন হয়।

১ সামান্য সাহায্য অথবা সহায়ক উপকরণের সাহায্যে খাবার খেতে এবং পানি পান করতে পারে।

২ সহায়ক উপকরণের সাহায্যে নিজে নিজে খেতে পারে অথবা শুধুমাত্র কাটাকুটি, পানি ঢালা, কৌটা খোলার জন্য সাহায্যের প্রয়োজন হয়।

৩ সাহায্য এবং সহায়ক উপকরণ ছাড়াই, পানি ও খাবার নিজে নিজে খেতে পারে।

২ গোসল করাঃ (সাবান লাগানো, ধোয়া,মাথায় ও শরীর মোছা, পানির কল ব্যবহার করা)

ক.শরীরের উপরের অংশ ধোয়া

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ সামান্য সাহায্যের প্রয়োজন হয়।

২ গোসল করার জন্য সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার (যেমনঃ চেয়ার) প্রোয়োজন হয়।

৩ গোসল করার জন্য সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জাওয়গার (যেমনঃ চেয়ার) প্রয়োজন নেই।

খ. শরীরের নিচের অংশ ধোয়া

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ সামান্য সাহায্যর প্রয়োজন হয়।

২ গোসল করার জন্য সহায়ক উপকরণ অথাবা রূপান্তরিত কোনো জায়গার (যেমনঃ চেয়ার) প্রয়োজন হয়।

৩ গোসল করার জন্য সহায়ক উপকরণ অথাবা রূপান্তরিত কোনো জায়গার (যেমনঃ চেয়ার) প্রয়োজন হয় নেই।

৩ জামাকাপড় পড়া : (জামা, জুতা, পরিবর্তন করা যায়না এমন আর্থোসিস – পরা এবং খোলা)

ক. শরীরের উপরের অংশ

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ বোতাম, চেইন অথবা ফিতা ছাড়া জামাকাপড় পড়তে সামান্য সাহায্যের প্রয়োজন হয়।

২ বোতাম, চেইন অথবা ফিতা ছাড়া জামাকাপড় পড়তে সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার প্রয়োজন হয় ।

৩ সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার ছাড়াই – বোতাম, চেইন অথবা ফিতা ছাড়া জামাকাপড় নিজে নিজে পড়তে পারে কিন্তু – বোতাম,চেইন অথবা ফিতা লাগাতে সাহায্যে ও সহায়ক উপকরণের অথবা বিশেষ কোনো জায়াগার প্রয়োজন হয়।

৪ সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার ছাড়াই নিজে নিজে যেকোনো জামাকাপড় পড়তে পারে।

খ.শরীরের নিচের অংশ

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়

১ সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার ছাড়াই নিজে নিজে যেকোনো জামাকাপড় পরতে পারে।

২ বোতাম, চেইন অথবা ফিতা ছাড়া জামাকাপড় পরতে সামান্য সাহায্যের প্রয়োজন হয়।

৩ বোতাম, চেইন অথবা ফিতা ছাড়া জামাকাপড় পরতে সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার প্রয়োজন হয়।

৪ সহায়ক উপকরণ অথবা রূপান্তরিত কোনো জায়গার ছাড়াই – বোতাম, চেইন অথবা ফিতা ছাড়া জামাকাপড় নিজে নিজে পড়তে পারে কিন্তু – বোতাম,চেইন অথবা ফিতা লাগাতে সাহায্যে ও সহায়ক উপকরণের অথবা বিশেষ কোনো জায়াগার প্রয়োজন হয়।

৪. পরিষ্কার পরিচ্ছন্নতাঃ (হাত মুখ ধোয়া, দাঁত ব্রাশ করা, চুল আঁচড়ানো, শেভ করা, মেকআপ লাগানো)

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ সামান্য সাহায্যের প্রয়োজন হয়।

২ সহায়ক উপকরণের সাহায্যে নিজে নিজে পরিষ্কার হতে পারে।

৩ সহায়ক উপকরণ ছাড়া নিজে নিজে পরিষ্কার হতে পারে।

ব্যাক্তিগত পরিচর্চার সাবটোটাল –(০-২০)		

শ্বাস – প্রশ্বাস ও মাংশপেশী পরিচালনাঃ

৫.শ্বাস-প্রশ্বাসঃ

০ সব সময় অথবা মাঝেমাঝে শ্বাস-প্রশ্বাস গ্রহণের জন্য কৃত্রিম শ্বাননলী (ট্রাকিয়াল টিউব প্রয়োজন হয়।

২ শ্বাসনালীতে লাগানো টিউবের মাধ্যমে সঠিকভাবে নিজে নিজে শ্বাস নিতে পারে, অক্সিজেন প্রয়োজন হয়, কাশি এবং শ্বানালীতে লাগানো টিউবের ব্যবহারের জন্য পর্যাপ্ত সাহায্যের প্রয়োজন হয়।

৪ শ্বাসনালীতে লাগানো টিউবের মাধ্যমে সঠিকভাবে নিজে নিজে শ্বাস নিতে পারে, অক্সিজেন প্রয়োজন হয়, কাশি এবং শ্বানালীতে লাগানো টিউবের ব্যবহারের জন্য সামান্য সাহায্যের প্রয়োজন হয়।

৬ শ্বাসনালীতে লাগানো টিউব ছাড়া সঠিকভাবে নিজে নিজে শ্বাস নিতে পারে, অক্সিজেন প্রয়োজন হয়, কাশি এবং শ্বানালীতে লাগানো টিউবের ব্যবহারের জন্য পর্যাপ্ত সাহায্যের প্রয়োজন হয়।

৮ শ্বাসনালীতে লাগানো টিউবের ছাড়া সঠিকভাবে শ্বাস নিতে পারে, অক্সিজেন প্রয়োজন হয়, কাশি এবং শ্বানালীতে লাগানো টিউবের ব্যবহারের জন্য সামান্য সাহায্যের প্রয়োজন হয়।

১০ কোনো প্রকার সাহায্য ছাড়া সঠিকভাবে শ্বাস নিতে পারে।

৬.মাংশপেশীর পরিচালনাঃ মূত্রাশয়/ মূত্রথলি

০ অন্তর্বর্তী ক্যাথিটার প্রয়োজন হয় (প্রস্রাবের জন্য আলাদা যন্ত্রের প্রয়োজন)

৩ রিসিডিউয়াল ইউরিন ভলিউম (মূত্রাশয় থেকে যাওয়া প্রস্রাবের পরিমাণ) - ১০০ সিসির চেয়ে বেশি নিয়মিত ক্যাথিটারাইজেসন প্রয়োজন হয় না বা অথবা মাঝে মঝে প্রয়োজন।

৬ রিসিডিউরাল ইউরিন ভলিয়ম (মূত্রাশয় থেকে যাওয়া প্রস্রাবের পরিমাণ) ১০০ সিসির চেয়ে কম মাঝে মাঝে নিজে ক্যাথিটার করে ,মুত্র নিষ্কাশনের জন্য সহায়ক কৃত্রিম নলের ব্যাবরের জন্য সাহায্য প্রয়োজন।

৯ মাঝে মাঝে নিজে ক্যাথিটার করতে পারে, মূত্র নিষ্কাশনের জন্য সহায়ক কৃত্রিম নলের ব্যাবহারে জন্য সাহায্যের প্রয়োজন হয় না।

১১ মাঝে মাঝে নিজে নিজে ক্যাথিটার করতে পারে ক্যাথিটাইরাইজেশনের মাঝের বিরতিতে মল মুত্রের বেগ ধারনে সক্ষম , মূত্র নিষ্কাশনের জন্য সহায়ক কৃত্রিম নলের ব্যাবহারে জন্য সাহায্যের প্রয়োজন হয় না।

১৩ মূত্র নিষ্কাশনের জন্য সহায়ক কৃত্রিম নলের ব্যাবহারে জন্য সাহায্যের প্রয়োজন হয় না, নিষ্কাশনের জন্য সহায়ক কৃতিম নলের ব্যাবহারে জন্য সাহায্যের প্রয়োজন হয় না কিন্তু বাইরে নিষ্কাশনের প্রয়োজন হয়।

১৫ রিসিডিউরাল ইউরিন ভলিয়ম (মূত্রাশয় থেকে যাওয়া প্রস্রাবের পরিমাণ) ১০০ সিসির চেয়ে কম, মল মূত্র ধারনে সক্ষম , মূত্র নিষ্কাশনের জন্য সহায়ক কৃত্রিম নলের ব্যাবহারে জন্য সাহায্যের প্রয়োজন হয় না।

৭ .মাংশপেশীর পরিচালনাঃ মলদ্বারঃ

০ অনিয়মিতভাবে বা হটাত (তিন দিনে এবার)মল করতে পারে। | | |

৫ নিয়মিতভাবে হয়ে থাকে ,কিন্তু কিছু সাহায্যের প্রয়োজন হয় (সাপোজিটরি লাগানো) ,খুব কম দুর্ঘটনা ঘটে থাকে (একমাসে দুই বারের কম) ।

৮ কোন সাহায্য ছাড়াই মল ত্যাগ হয় ,খুব কম দুর্ঘটনা ঘটে থাকে (একমাসে দুই বারের কম) ।

১০ দুর্ঘটনা ও সাহায্য ছাড়াই মল ত্যাগ করতে পারে।

৮ টয়লেটের ব্যাবহারেরঃ (মলদ্বার পরিষ্কার করা,মল ত্যাগের আগে ও পরে জামাকাপড় ঠিকভাবে খোলা এবং পরিধান করা ,ন্যাপকিন অথবা ড্যায়াপার এর ব্যাবহার)

০ সম্পুর্ণ সাহায্যের প্রয়োজন হয়। | | |

১ সামান্য সাহায্যের প্রয়োজন হয় ; নিজে নিজে পরিষ্কার হতে পারে না ।

২ সামান্য সাহায্যের প্রয়োজন হয় ; নিজে নিজে পরিষ্কার হতে পারে।

৪ নিজে নিজে টয়লেট ব্যাবহার করতে পারে কিন্তু সহায়ক উপকরণ অথবা রুপান্তরিত কোনো জায়গার প্রয়োজন হয়।

৫ নিজে নিজে টয়লেট ব্যাবহার করতে পারে কিন্তু সহায়ক উপকরণ অথবা রুপান্তরিত কোনো জায়গার প্রয়োজন হয় না ।

শ্বাসপ্রশ্বাস ও মাংসপেশি পরিচালনা সাবটোটাল: (০-৪০)		

৯ চলাচল/নড়াচড়া (ঘরে এবং টয়লেটে) বিছানার মধ্যে চলাচল/নড়াচড়া চাপজনিত ঘা প্রতিরোধের জন্য করনীয় কাজ-

০ সব কাজের সাহায্য প্রয়োজন হয় (শরীরের উপরের ও নিচের অংশ নড়াচড়া করার জন্য , বিছানার বসার জন্য,হুইল চেয়ারে বসে থাক্কা দিয়ে শরীরেুলে উপরে তোলার জন্য,সহায়ক উপকরনসমূহ অথবা ছাড়া কিন্তু কোনো বৈদ্যুতিক উপকরণ নয়) ।

২ যে কোন একটা কাজ সাহায্য ছাড়া করতে পারে।

৪ যে কোন দুইটা/তিনটা কাজ সাহায্য ছাড়া করতে পারে।

৬ বিছানার সব রকমের পাশ পরিবর্তন অথবা ঘা প্রতিরোধে সব কাজ সাহায্য ছাড়া নিজে করতে পারে।

১০ জায়গা পরিবর্তন/ স্থানান্তর বিছানা –হুইলচেয়ার (হুইলচেয়ার লক করা, ফুটরেস্ট সরানো, হাতল **সরা**নো ও **ঠিক জায়গায় রাখা, স্থানান্তর, পা উপরে তোলা)**

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ সামান্য সাহায্যের প্রয়োজন অথবা তত্তাবধান অথবা সহায়ক উপকরণ (যেমন-মসৃন কাঠের টুকরা) প্রয়োজন হয়।

২ নিজে নিজে নড়াচড়া করতে পারে (হুইলচেয়ার প্রয়োজন হয় না)।

১১ জায়গা পরিবরতন/ স্থানান্তর –হুইলচেয়ার থেকে, টয়লেট থেকে টব (যদি টয়লেট থেকে হুইলচেয়ার ব্যবহার করে তাহলে–স্থানান্তর হওয়া —হুইলচেয়ারে অথবা হুইলচেয়ার থেকে, নিয়মিত –হুইলচেয়ার ব্যবহার কারীর জন্য **হুইলচেয়ার লক করা, ফুটরেস্ট সরা**নো, হাতল **সরা**নো ও **ঠিক জায়গায় রাখা, স্থানান্তর, পা উপরে তোলা)**

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ সামান্য সাহায্যের প্রয়োজন অথবা তত্তাবধান অথবা সহায়ক উপকরণ (যেমন-ধরার জন্য উপকরণ) প্রয়োজন হয়।

২ নিজে নিজে নড়াচড়া করতে পারে (হুইলচেয়ার প্রয়োজন হয় না)

১৪ বাইরে চলাচল (১০০মিটারেরবেশি)

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়।

১ বৈদ্যুতিক হুইল চেয়ার লাগে অথবা হাত দিয়ে চালানো হুইল চেয়ার চালাতে সামান্য সাহায্য প্রয়োজন হয়।

২ হাত দিয়ে চালানো হুইল চেয়ারের মাধ্যমে নিজে চলাচল করতে পারে।

৩ কোনো উপকরণ সহ অথবা ছাড়া হাটার সময় দেখাশোনা / তদারকির দরকার হয়।

৪ হাটার জন্য ব্যবহৃত ফ্রেম / ক্রাচ দিয়ে হাটতে পারে।

৫ ক্রাচ অথবা হাটার জন্য ব্যবহৃত দুইটি লাঠি এর সাহায্যে হাঁটতে পারে।

৬ হাটার জন্য ব্যবহৃত একটিলাঠি এর সাহায্যে হাঁটতে পারে।

৭ শুধু পায়ের জন্য অর্থোসিস প্রয়োজন হয়।

৮ কোনো প্রকার হাঁটার উপকরণ ছাড়া হাঁটতে পারে।

১৫ সিড়িতে চলাচল

১ সিড়িতে উঠতে এবং সিড়ি থেকে নামতে পারে না

২ অন্য কারো সাহায্যে অথবা তত্ত্বাবধানের মাধ্যম সিড়ির কমপক্ষে তিনটি ধাপ উঠানামা করতে পারে।

৩ সিড়ির হাতল / ক্রাচ / হাটার জন্য ব্যবহৃত লাঠির মাধ্যমে কমপক্ষে তিনটি ধাপ উঠানামা করতে পারে।

৪ অন্যকারো সাহায্যে অথবা তত্ত্বাবধানের ছাড়াই কমপক্ষে তিনটি ধাপ উঠানামা করতে পারে।

১৬ জায়গা পরিবর্তন / স্হানান্তর , – হুইলচেয়ার গাড়ি (গাড়ির কাছাকাছি যেতে পারে, হুইলচেয়ার লক করা, ফুটরেষ্ট সরানো ও ঠিক জায়গায় রাখা, গাড়ী এবং গাড়ী থেকে স্হানান্তর, হুইলচেয়ার গাড়ীর ভিতরে ও বাইরে নওয়া,)

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়

১ সামান্য সাহায্যের প্রয়োজন হয় (তত্ত্বাবধান অথবা সহায়ক উপকরণ প্রয়োজন হয়)

২ নিজে নিজে স্হানান্তর হতে পারে (তত্ত্বাবধান অথবা সহায়ক উপকরণ প্রয়োজন হয় না, অথবা হুইলচেয়ার এর প্রয়োজন হয় না।

১৭ জায়গা পরিবর্তন / স্হানান্তরঃ মাটির মেঝে অথবা হুইলচেয়ার

০ সম্পূর্ণ সাহায্যের প্রয়োজন হয়

১ নিজে নিজে স্হানান্তর হতে পারে (তত্ত্বাবধান অথবা সহায়ক উপকরণ প্রয়োজন হয় না, অথবা হুইলচেয়ার এর প্রয়োজন হয় না।

চলাচল সাবটোটাল (০-৪০)		
টোটাল স্কীম স্কোর (০-১০০)		

HADS

মনোবিজ্ঞানীরা বিশ্বাস করেন যে,বেশিরভাগ মানসিক অসুস্থতার ক্ষেত্রে আবেগের একটি গুরুত্বপূর্ন ভূমিকা আছে। যদি মনোবিজ্ঞানী আপনার | জাতীয় আবেগীয় অনুভূতিগুলোর কথা আনতে পারেন তিনি আপনাকে আরো ভালোভাবে সাহায্য করতে পারেন। আপনি কেমন অনুভব করেছেন এই প্রশ্নমালার সাহায্য একজন মনোবিজ্ঞানী সে সম্পর্কে জানতে পারবেন।

A	আমি এত নার্ভাস বা উদ্বিগ্ন বোধ করি যে মনে হয় আমার সবকিছু গোলমাল পাকিয়ে যাচ্ছে।		আমার মনে হয় আমি যেন পিছিয়ে যাচ্ছি।		D
3	বেশির ভাগ সময়	বেশির ভাগ সময়	সব সময়ই	সব সময়ই	3
2	অনেক সময়ই	অনেক সময়ই	প্রায়ই	প্রায়ই	2
1	সময়ে সময়ে,মাঝে মাঝে	সময়ে সময়ে,মাঝে মাঝে	মাঝে মাঝে	মাঝে মাঝে	1
0	একদম না	একদম না	একদম না	একদম না	0
D	আগে যে ভালো লাগতো এখনও তা অনুভব করতে পারি।		আমি এমন এক ধরনের ভয় পাই যে আমার মনে হয় পেটের মাঝে সবকিছু ওলট পালট খাচ্ছে।		A
0	সম্পূর্ণ আগের মত	সম্পূর্ণ আগের মত	একদম না	একদম না	0
1	ঠিক আগের মত নয়	ঠিক আগের মত নয়	মাঝে মাঝে	মাঝে মাঝে	1
2	খুব সামান্যই	খুব সামান্যই	অনেক সময়ই	অনেক সময়ই	2
3	একদম না	একদম না	বেশিরভাগ সময়	বেশিরভাগ সময়	3
A	আমার এক ধরনের ভীতিজনক অনুভূতি হয় যে মনে হয় খুব খারাপ কিছু ঘটতে যাচ্ছে।		আমি আমার সৌন্দর্য ও পোশাক পরিচ্ছেদ সম্পর্কে উদাসীন হয়ে পড়ি।		D
3	নিশ্চিতভাবেই এবং খুবই খারাপভাবে হ্যাঁ,কিন্তু ততটা	নিশ্চিতভাবেই এবং খুবই খারাপভাবে হ্যাঁ,কিন্তু ততটা খারাপভাবে নয়	নিশ্চিত ভাবেই ঠিক যতটা যত্ন আমার নেওয়া উচিত তা নেই না	নিশ্চিত ভাবেই ঠিক যতটা যত্ন আমার নেওয়া উচিত তা নেই না	3
2	খারাপভাবে নয় সামান্য,তবে	সামান্য,তবে এতে তত চিন্তিত হই না	আমি হয়ত তেমন যত্ন নেই না	আমি হয়ত তেমন যত্ন নেই না	2
1	এতে তত চিন্তিত হই না	একেবারেই না	আমি আগের মতই নিজের যত্ন নেই	আমি আগের মতই নিজের যত্ন নেই	1
0	একেবারেই না				0
D	ঘটনার কৌতুকপূর্ণ দিকগুলো দেখে আমি এখনও হাসতে পারি।		সারাক্ষণ আমি অস্থির বোধ করি,মনে হয় আমাকে সবসময়ই সচল থাকতে হবে।		A
0	ঠিক আগের মতই	ঠিক আগের মতই	খুবই সঠিক	খুবই সঠিক	0
1	আগের মত না	আগের মত না	সঠিক	সঠিক	1
2	খুব সামান্যই	খুব সামান্যই	ঠিক ততটা নয়	ঠিক ততটা নয়	2
3	একেবারেই না	একেবারেই না	একেবারেই না	একেবারেই না	3
A	দুশ্চিন্তাপূর্ণ চিন্তা আমার মনের মাঝে আনাগোনা করে		আমি আনন্দ লাভের জন্য আগ্রহের সাথে অপেক্ষা করি।		D
3	সব সময়ই	সব সময়ই	এখনও ঠিক আগের মত	এখনও ঠিক আগের মত	0
2	বেশিরভাগ সময়	বেশিরভাগ সময়	আগের থেকে কিছু কম	আগের থেকে কিছু কম	1
1	মাঝে মাঝে	মাঝে মাঝে	আগের থেকে অনেক কম	আগের থেকে অনেক কম	2
0	খুবই কম	খুবই কম	একেবারেই না	একেবারেই না	3
D	আমি আনন্দিত বোধ করি।		আমার হঠাৎ ভুব ভয়ংকর আতংকের অনুভূতি হয়		A
0	কখনোই না	কখনোই না	বেশিরভাগ সময়ই হয়	বশিরভাগ সময়ই হয়	0
1	তেমন না	তেমন না	প্রায় সময় হয়	প্রায় সময় হয়	1
2	মাঝে মাঝে	মাঝে মাঝে	তেমন একটা হয় না	তেমন একটা হয় না	2
3	বেশিরভাগ সময়ই	বেশিরভাগ সময়ই	একেবারেই না	একেবারেই না	3
A	নিশ্চিন্তে বসে থেকে আরাম বোধ করতে পারি।		ভাল বই,রেডিও বা টেলিভিশনের অনুষ্ঠান উপভোগ করতে পারি।		D
3	অবশ্যই	অবশ্যই	প্রায়ই	প্রায়ই	0
2	সাধারণত	সাধারণত	মাঝে মাঝে	মাঝে মাঝে	1
1	তেমন না	তেমন না	তেমন একটা না	তেমন একটা না	2
0	একেবারেই	একেবারেই	খুবই কম	খুবই কম	3

0-7 = Normal 8-10 = mild/borderline 11-21= abnormal/severe