

Effect of Depression on Functional Recovery – A Correlational Study

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Abstract- Study design and purpose: A quantitative and non experimental, correlational study was conducted in order to investigate the relationship between the Beck Depression Inventory (BDI) score and the Functional Independent Measure (FIM) score of the patients with Spinal Cord Injury. Objective: To find out Is there a relationship between BDI and FIM score? How strong is that relationship? What is the direction of the relationship (positive or negative)? Setting: Centre for the Rehabilitation of the paralysed (CRP) Spinal Cord Injury hospital indoor department: Chapain, Savar, Dhaka. Methods: Stratified – systematic random sampling was used to select the participants. Participants were individually interviewed using a semi structured questionnaire, the Functional Independent measure (FIM) and the Beck Depression Inventory (BDI). Results: The data were subjected to statistical analysis. Using a parametric Pearson test, a significant negative correlation ($r = -0.3586$, $p < 0.02$, for two tailed hypothesis) between the FIM score and BDI score was found. The descriptive data calculated as percentages. Among the patients studied 20% had mild mood disturbance, 7% had borderline clinical depression, 33% had moderate depression, 20% had severe depression, and another 20% had extreme depression. Conclusion: Our results have important implications for the treatment of patients with SCI. the findings indicate that the patients BDI score were negatively related with FIM scores. In our opinion these data justify the provision of a psychological service in every hospital where patients with SCI are treated. Further research is required to explore the reason behind this correlation.

Keywords- Spinal Cord Injury (SCI), Depression, Beck Depression Inventory (BDI), Functional Independent Measure (FIM).

INTRODUCTION

Spinal Cord Injury (SCI) is caused by either traumatic or non traumatic events which result in motor, sensory and autonomic dysfunction. For this reason the patients can achieve a fairly low degree of success in daily living tasks and this causes severe adaptations problems. For the reason, life is difficult for people with SCI in Bangladesh. Most of them think that their injury is a curse that has been provided from God. Primarily young adults are affected by Spinal Cord Injury, making adjustment difficult (Yavuz, 1998). It caused various types of life changes.

The person with SCI was often a very active male or female in adolescence or early adulthood. Doing various types of activities such as swimming, playing football, earning money, able to move their limbs according to their needs. But after SCI they can not do these activities anymore. They may be partially or totally dependent upon others.

Prior to the early 1940's, 80% to 90% of people with spinal Cord Injury died within weeks. Treatment of SCI developed gradually and by the late 1940's people with spinal cord injury were able to move back out into the community and they could hope to live for about 10 years.

“The researcher suggests that approximately 30% of individuals with spinal cord injury have clinically significant levels of anxiety and depression” (North, 1999, p.72). Although the physical treatment of spinal cord injury has improved, treatment and assessment has not improved so much in terms of psychological problems. So the patients with spinal cord injury live with many psychological problems, most commonly depression and anxiety. Due to the psychological problems, the treatment of spinal cord injury is not optimal. The therapist or other health care professional rarely understands about psychological effects of spinal cord injury. The fact that these problems go untreated can potentially have a major impact on rehabilitation.

The patients of SCI with psychological problems cannot manage their problems like others. Due to the stress of psychological problem the doctors and medical professionals are going too far from them. The patients can not be free with them due to the poor relationship between them. The patients with SCI cannot share all problems and feelings with health professionals. So their progress is being impeded and their full recovery will be delayed. In this moment the outcome depends partly upon the individual and partly upon the psychological support that he receives.

For proper improvement, SCI rehabilitation should address the patient's psychological needs (Martha, 1992)

1. Purpose of the Study:

The main purpose of this study was to find out the relationship between Functional Independent Measure (FIM) and Beck Depression Inventory (BDI).

2. Significance of the Study:

The WHO defines health as "A positive state of physical, mental and social well being not simply the absence of injury or disease that varies over time along continuum. At one end of continuum, health is the dominant state, and at the other end of continuum is disease or illness, that leads of characteristics signs symptoms or disabilities. In addition to physical health, this definition focuses on the importance of psychological and social factors as being indicative of good health". (Psychological aspect of SCI: 2001. P.144, cited in Farhaduzzaman, 2003).

So, the combination of physical and mental health results normal health. In case of the patient with SCI at first he becomes physically impaired then functionally and at last mentally. Depression is one of the mental health problems. To accelerate patients rehabilitation program and later for his social integration, the patients should not to be depressed. Good mental health also is needed for patients to build a good rapport with the doctor, nurse, physiotherapist, Occupational Therapist and other persons. If they suffer depression then their rehabilitation may not be successful.

By this research, the therapist will be able to know about the relationship of depression with functional independence. They will be able to know the importance of depression measurement. By this research the participant will not be benefited directly. But in future patients may be benefitted, when therapist will try to decrease the symptoms of depression for proper improvement in all aspects.

3. Objectives:

To find out-

- Is there a relationship between BDI and FIM score?
- How strong is that relationship?
- What is the direction of the relationship (positive or negative)?

4. Who will get benefit from this research?

This research will be beneficial in various ways:

- Doctors, physiotherapists, occupational therapists, nurses and other health workers who work at CRP may get benefit because by knowing this correlation they will be able to decrease depression and then their intervention will be appropriate and effective.
- Other organizations, who work with patients with spinal cord injury, may get benefit from the information in management of their patients.

- The patients with spinal cord injury will be more benefited. When the therapist will know this correlation between FIM & BDI then they will use BDI assessment form and will try to manage depression. It will affect their functional improvement.

5. Hypothesis:

The hypothesis will be two tailed-

- Firstly – if the FIM score will be low then BDI score will be high [Negative relationship (H¹)].
- Secondly – if the FIM score will be high then BDI score will be high too [positive relationship (H²)].
- Null hypothesis (H₀) – there is no relationship between BDI score and FIM score.

II. REVIEW OF LITERATURE

1. Background of the study:

In 2001, the population of Bangladesh was 129 million, with this figure expected to double by the year 2035 (BBS, 2001). So the population is growing so fast. As a poor country in the world, with estimates of 45 percent of the total population living below the poverty line (ILO, 2001).

Poverty in this context of Bangladesh is usually defined in terms of the ability to secure adequate calorie intake, health care, educational opportunities, safe drinking water, proper sanitation and shelter (Abedin, 2000). So to overcome this, the people are engaging in various type of job or activity without the awareness of safety issues. As a result various types of disability are occurring by falling from height and motor vehicle accident (Momin, 2003).

2. Centre for the Rehabilitation of the Paralyzed (CRP):

CRP is a national voluntary organization for the development of health care services through treatment and rehabilitation for persons with disabilities. The main aims of CRP are social, physical, mental, economic rehabilitation of individuals with SCI. CRP was established in 1979 as an NGO to provide treatment and rehabilitation for the patients with paralysis, by a British Physiotherapist with the help of two Bangladeshi therapists and a Bangladeshi social worker.

CRP is the only institute of its kind in Bangladesh. The quality of CRP and its importance for people with disability is widely recognized, both in Bangladesh and in abroad. At its head quarter in Savar, CRP currently contains wards for hundred inpatients of spinal cord injury. CRP provides the better services for these patients in 4 phases (see below). CRP has an outpatient services held 3 times a week. The patient can take the help who are predominantly paralyzed by stroke, GBS, Parkinson's, cerebral palsy etc. other facilities includes physiotherapy, occupational therapy, social welfare department, special needs school for children with cerebral palsy, pediatric

children with cerebral palsy unit, operating facilities and a multipurpose hall. CRP also provides social welfare after care, vocational training and follow up visits at home.

CRP has been involved in a Community Based Rehabilitation (CBR) program since 1994. The CBR program is now working in 61 Upazillas of 8 Districts throughout Bangladesh. CRP also provides stage training to the paralyzed people as a production unit for making furniture, wheel chair and tricycle prototypes (Claque and Sym, 2004).

3. Spinal Cord Injury:

According to Werner, (1996, p.203) "spinal cord injury usually results from an accident that breaks or severely damages the central nerve cord in the neck or back. When the cord is damaged, feeling and movement in the body below the level of injury are lost or reduced".

SCI affects all aspects of patient's life including physical, behavioral, psychological and social functioning. When the spinal cord is damaged due to any trauma or disease process it is called SCI. Hughes (1984) defined SCI as, "Severe injury to the vertebral column can occur from any direction and result in dislocation, fracture, or dislocation with or without resultant displacement. As a result, extensive trauma can occur to the spinal cord as it is compressed, crushed or stretched within the spinal canal" (Hughes, 1984, cited in Bromley, 1991).

Spinal Cord Injury causes quadriplegia or paraplegia which can be complete or incomplete (Gatehouse, 1995, pedretti, 1990). The "complete" lesion resulting in absence of motor or sensory function of the spinal cord below the level of the injury or "incomplete" lesion may involve several neurological assignments and some spinal cord function may be partially or completely intact (Adler, 1996).

So we can see that due to SCI the brain cannot pass its messages to the body or receive messages from the body. So the messages in both directions are being disturbed. This will result a paralysis of muscular activity and an absence of sensation below the level of injury.

Most of the SCI are caused by physical injury-road traffic accident; fall from height, driving accident, gunshot or stab wound, and occasionally by a medical accident during surgery. However viruses and viral infections (such as transverse myelitis), cysts and tumors near the spinal cord, can cause permanent damage to the cord leading to progressive paralysis (Gatehouse, 1995).

Spinal Cord Injury can be the result of disease (28%) such as amyotrophic lateral sclerosis or multiple sclerosis, congenital deformities, tumors or trauma. The most common causes of traumatic Spinal Cord Injuries are automobile accidents (18%), gunshot and knife wounds,

driving accidents and falls from height (43%) (Haque, 1990). The vast majority of SCI, approximately 80% are sustained by males, most are between 16 and 30 years of age at the time of injury. Nineteen is the most common age of injury (Kennedy, 1985).

Due to lack of transportation and immediate post injury management many patients with incomplete SCI become complete from the process of being transported to the hospital (Haque, 1998).

4. Depression:

Depression is a group of conditions which are the most common psychiatric problem in people with SCI. depression may come from an understandable reaction to stress (such as death) or from a serious illness. It is also a psychopathologic state which causes total or partial agitation in all activity of daily living, gradual weight loss, feelings of guilt, lack of motivation, insomnia, difficulty performing activity, and inability express pleasure (Reed, 1991).

Depression is not only found in person with SCI but also it may found in different debilitating physical conditions, such as Parkinsonism and schizophrenia (Willson, 1996). Depression is more common in the elderly than it is in the general population. Depression is high for the elderly people who live in low socioeconomic areas, who have lost a spouse, who have a concurrent physical illness and social isolation (Keplan & Sadick, 1994).

Three types of depression primarily may be seen. These are – reactive depression, endogenous depression and manic depression. Reactive depression is more common in SCI. the possible causes are – total or partial functional loss, long time hospitalization, more expressive treatment and recognition of life style changes. Sometimes depression may be mourning due to the loss of motor and sensory function of the body (Trombly, 1989).

Patients with depression not only have low level of motor function but also they have poor verbal activity. They will use very low verbal language and may not be able to give answers to questions. When they will talk to others, then will use very low tone and be expressionless. There may be little eye contact. They may be tired, apathetic, lacking in initiative. They will always sustain poor posture, dislike moving. They will dislike social contact due to poor interest. Always they will think alone and prefer to live alone (Willson, 1996). Sleep disturbance is one of the common features of depression. Awakening too early and then being unable to get back to sleep is the most characteristic pattern. Sometimes depression decreases the person's motivation thus decreases their energy level.

They may feel exhausted all the time to-do anything. When the person feels more depression then he may think about death or suicide (Rose, 1994).

Sometimes patient feels that their limitation is causing disability and the recovery will not be complete for returning to normal life then they become depressed. For this depression their rehabilitation programs is impeded and they cannot integrate the residual disability into a new self concept (Peditti, 1990). The person with depression cannot make decisions or plan for an activity. So, he may take more time to do an activity. Sometimes they will be totally demotivated to do the activity. The person with depression has poor relationship with medical professionals, so they show less involvement in all activity thus affect the whole rehabilitation process.

5. Beck Depression Inventory (BDI):

The Beck Depression Inventory (BDI) is a well documented standardized instrument. By this instrument it is possible to collect nominal data and to process the analysis (see appendix - 4). By this instrument one can measure his or her own depression. It was translated to bangle by Dr. Poritosh. Each educated person can complete this independently but the researcher has to inform about this instrument to the participant. For the non educated person, the researcher can fill up by taking patients opinion. Researcher has to explain easily to the illiterate subject.

The BDI contains 21 questions, each one having four response choices. The subjects should circle the one answer that best described their feelings from last 7 days. Response choices have values as a number from 0-3. The total number will be calculated that the individual given a circle for each question. The people who have score 17 or above should get professional treatment. (See appendix 6).

BDI is an instrument which was designed by Aaron Beck (1967), who utilized this instrument in research, diagnosis and treatment of depression. It has been developed out of the cognitive behavioral model of treatment. Ahava et al. (1998) reported "the BDI is one of the most widely used measures of depression". The instrument is used to differentiate between the normal and depressed patients. The instrument is also used to discriminate the level of depression within the depressed population.

The Beck Depression Inventory is used extensively in research, screening and treatment of depression. Winter et al. (1999, p389) found the BDI to be a "Useful instrument for screening for clinical depression in adolescents receiving routine medical examinations". Steer et al. (1999, p106) found the BDI to be "an effective case – finding instrument for screening primary care patients with MDD" (major depression disorders). Gutkovitch et al. (1999, p117) found the BDI to be "Significantly correlated with the number of psychosomatic complaints, hopelessness, lack of optimism and anhedonia".

According to National Institute of Mental Health (NIMH, 1999) reports, "Nearly two-thirds of depressed people do

not get appropriate treatment because their symptoms were not recognized. These elevated numbers of people affected by depression being about a great need for instruments that assess and measure depression, thus paving the way for the treatment of the illness".

In a study by Barkham et al., (1999) The BDI was instrumental in both differentiating depressed from non-depressed, and also in measuring degree of depression. D'Antonio et al., (1998) concluded "An inverse relationship between patient reported quality of life and depression", as measured by the BDI.

So, BDI has been used in various types of research as a standardized tool. According to Bangladeshi culture it is very sensitive to use for people with depression. As yet it has not been used in research of patients with SCI. but there was not found any negative issue to use BDI for patient with SCI. BDI is a highly reliable and valuable instrument for measuring depression. By this instrument the researcher will be able to maintain of reliability and validity. For the filling of BDI form the participants will not need to be prepared before because it is not a hard thing. The participants will not be nervous or anxious.

6. Functional Independence Measure (FIM):

FIM is a standard instrument for the measurement of function independence and has been accepted internationally. It is not only used for measurement of level of physical independence but also cognitive independence. By this measurement it quantifies the extent of disability. For a proper rehabilitation measurement, the medical professions need accurate methods. FIM is one of the latest methods to measure disability. By the FIM scale the therapist is able to identify the patient's functional independence level. It is assessed with a seven point scale describing varying degrees of the amount of assistance or supervision that is needed from other saws the result of impairment. Sub scores for each of the six life areas, as well as a total score are obtained. It can fully describe the impact of SCI on the individual and also can monitor or evaluate progress associated with treatment by standard measure of daily life activities.

So, FIM is becoming widely used for all aspects of disability including SCI but it is recommended that the FIM will be measured by trained clinicians who are familiar with the patients. (Karamehmetoglu, et al. 1997)

Reliability has been shown to be high in the FIM instrument, especially in the use of Rasch analysis (Heinemann et al., 1993). High internal consistency with a Cronbach's value of $\alpha=0.93$ for overall admissions and $=0.95$ for discharges. Inter- rater reliability has been shown to range from .89 to 1.0. A meta-analysis of 11 studies showed a median inter-rater reliability for the total FIM score of 0.95, a median test-retest reliability of 0.95, and an equivalence reliability of 0.92 (Dodds et al., 1993).

Studies have shown that the FIM is able to discriminate between patients on the basis of age, co morbidity, and discharge destination. Through Rasch analysis, FIM scores decreased with ascending injury level (Dodds et al., 1993).

Also, differences were seen in difficulty of specific items for certain impairment groups (Heinemann, 1993). Construct validity was demonstrated by Heinemann and associates (1997) through strong correlations between burden of care and a measure of disability (r values ranging from 0.40 to 0.60).

III. METHODOLOGY

The study was non – experimental, quantitative research following a correlational approach. The aim of correlational studies in the health sciences is to identify inters relationships among clinically significant variables.

Most non – experimental research of health science falls in the correlational category. Correlational research is similar to experimental research. In correlational research one hypothesis is tested, but there is no manipulation of independent variables. Correlational research can find out cause – effect relationship and it is not being simulated. (Bailey, 1997)

1. Study Design:

In this research the correlational study has expressed numerically the strength of association that might exist between these two variables. These two variables are Beck Depression Inventory (BDI) score and Functional Independent Measure (FIM) score. This research has identified the relationship between Beck Depression Inventory (BDI) score and Functional Independent Measure (FIM) score and also identified direction of this relationship (positive or negative) and the strength of this relationship.

In CRP indoor department the patients are treated in 4 phases. These are acute phase, active phase, rehabilitation phase and integration phase. Acute phase is the phase where the patients with spinal cord injury must be in an immobilized position. Here they may wear any stabilization device. So, this phase is also called traction phase. In this phase flexion, extension and rotary movements of spine and neck are contraindicated. So, patient's stay in this phase with various pain and dangerous feelings.

Active phase is a phase where patients can move his unaffected limbs and body. So another name is mobilization phase. In this phase the patients can sit on wheelchair or bed, and gradually increase sitting tolerance. Here patient's functional capability starts to increase. So, the researcher will be able to understand the relation of depression with functional independency. For this reason the researcher has taken this phase as a one phase.

Rehabilitation and integration are the last two phases of spinal cord injury management. Here all kinds of activities such as – self care, productivity and leisure are introduced according to patient's capability and interest. Here patient are made ready to go to their own family and society. Here patient's functional capability is increased more. So, their depression may be changed.

Due to the similarities between these two phases they were combined into one phase that is rehab-integration phase. As the sample size was 45, 15 patients were taken from each phase.

From these three phases their BDI score was compared with FIM score to find out the relationship between them. The hypothesis was two tailed because there was no specific direction to in the hypothesis. The researcher was not able to found any specific literature about the relationship between them. Most of the literature was suggested that functional limitation not only responsible for depression, there are many other factors are responsible for depression.

The data was in rational, measured by using an accepted standardized scale BDI and FIM and it followed a specific test to find out its significant value. BDI is a high standard measurement tool because it is used extensively in research, screening and treatment of depression. Ahava et al. (1998) reported "The BDI is one of them most widely used measures depression". Craig et al. (1994) used the BDI "As a measure of depression" in their study attempting to isolate pre- indicators of depression in persons who had suffered a SCI.

While filling in the questionnaire the researcher carried out an observational study and noted the relevant expressions which were associated with depression to support the result. 'FIM is one approach to functional assessment that has become widely utilized in the USA and is gaining acceptance internationally and it focuses on six areas of functioning such as self-care, sphincter control, mobility, locomotion, communication and social cognition' (Ditunno, et al., 1994).

2. Sample:

Sample means the population who were included in research by the fulfilling of inclusion criteria. For a quantitative research it is better to get as many participants as possible. A sample of 45 participants was selected from the population of indoor patients at CRP. Although this was too small to enable full generalization it was considered to be sufficient to meet the objectives of this research.

3. Types of Sampling:

The researcher has used stratified systematic random sampling for sample collection. Because all persons with spinal cord injury, who are taking the treatment for

occupational therapy indoor department they have the right to be sample. To get more accurate representation, the researcher has divided the population into smaller homogeneous groups. Random sampling is the most population and common method for choosing the sample in research. When researcher talk about sampling, the word random means that every single person in the defined population has the same chance to be included in the study.

The defined population in this study was all patients with spinal cord injury who are being treated under occupational therapy indoor department. Stratified random sampling is "A type of sample in which the researcher wishes to ensure that important sub groups and their representation are preserved in the sample" (Polgar & Thomas 1991, p331). Systematic random sample consists of the selection of each nth term from a list.

4. Procedure of sample selection:

The total sample numbers were 45. From three strata (acute phase, active phase and rehab-integration phase), the researcher was selected these sample by systematic random sampling. All kinds of patients were selected, according to inclusion criteria. Subjects' were selected randomly (at CRP indoor unit for the study) from patient's medical records. Patients who are spinal cord injured, after visited by the outdoor duty doctor, they are admitted to the wards.

To select the subjects, the researcher went to the nursing station at CRP and saw the patient's files. If the patient's condition fulfilled the research topic, preliminary took out those patient's personal details and gave them number for each strata. The researcher founded 17 acute phase patients, 40 active phase patients and 32 rehab- integration phase patients. Researcher deducted 2 patients from acute phase by lottery to fulfill 15 patients. By systematic random sampling the researcher selected another 30 patients from active and rehab-integration phase. For first number selection, the researcher has done a lottery from 1-10 numbers. By the lottery, the first number was 7. The researcher started to take the patients 7, 9, 11 in this way and fulfilled 15 patients from each stratum.

5. Patient's Inclusion Criteria:

The researcher has selected his sample from CRP spinal cord injury hospital indoor department, who are taking treatment from occupational therapy indoor department. Researcher was taken all economical status (poor, medium and rich) patients, all occupational level patients, complete and incomplete, traumatic and non traumatic, male and female, educated and illiterate, and all age group patients.

6. Patient's Exclusion Criteria:

There were no exclusion criteria in this research. None of the patients had a history of major psychiatric or cognitive disorder (head injury, mental retardation, or organic

mental disorder) that could affect the validity of test responses. So, all patients were included.

7. Rational for selection of participants:

In this study the target population was indoor patients with spinal cord injury who was taking treatment under occupational therapy indoor department. Researcher included them because CRP is the only institute who has SCI Hospital for 100 patients, which provides a complete rehabilitation program.

8. Setting:

This study was conducted in the indoor unit of CRP spinal cord injury hospital.

9. Duration of the study:

This study was conducted from 29th January to 17th February (3weeks) at the year of 2005.

10. Variables:

BDI scores and FIM scores were the two dependent variables. There were some confounding variables such as patient's educational level, motivation to participate in the study session, financial problem, family related problem, age and gender.

11. Ethical issues:

Researcher protocol was submitted for approval to administrative bodies of indoor occupational therapy department of CRP. At that time researcher submitted a written application to the administration of the occupational therapy department for the clients, therapist and others facilities to participate in this correlational study. When researcher received permission from the head of department of occupational therapy then started works and completed within accurate time. The researcher has taken consent from every single subject by informed consent form (appendix-2) to participate in study.

Participants were informed that they were free to decline answering any questions during the study and were free to withdraw their consent and terminate participation at any time, which would not affect their occupational therapy treatment and facilities from the department. Subjects had power to discuss their problem with senior administration of CRP. Before measuring BDI form, the researcher always checked the patient's health condition, fitness for function, mood and mental status.

12. Methods of data collection:

After the selection of the sample the researcher started to collect data. For data collection the researcher was started from acute phase, according to patient's serial numbers. When the researcher went to the relevant ward for data collection then the responsible therapist of that ward introduced the researcher to the patients. Researcher was given his own introducing to the patients and explained about the research and its benefit. Then researcher was

shown the information sheet and consent form. The patients, who were educated, read the both form and signed in consent form. The patients who were illiterate, then the witness was explained both form and was taken the patients agreement. Then the witness was signed in each patient's consent form that was taken from his other own ward. After the full agreement of patients, the researcher was taken the signed from patients and was started the interview.

The interview was started with rapport building with each patient because rapport often increases a participant willingness to share (Bell, 1997), closed questions were asked to the patients to check their knowledge about the issues (such as what is depression? What are the symptoms? Etc), and empathy was given to the patients when they become emotional during the interview. After the build up the relationship with patients, the researcher was given the explanation to the patients about BDI.

BDI is a commonly used self-report measure for depression. If patient think, more than one comment is right for his or her then he or she have to give round shape on all of his number of comments. Patient must have to sure before giving the round shape that he or she has been read all comments and have understood properly. The total amount of number will be indicated the depression level.

The educated person filled up the questionnaire own self. The researcher at first given the briefing about BDI form, how they will fill up this form? But for the non educated person the researcher filled up the BDI form his self by taking patients opinion. The researcher explained each question of BDI form to the patient. Most of the uneducated person took more time to understand every statement. Sometimes they were undecided, which statement will be correct for his or herself in this time the researcher explained more easily this statement.

The researcher collected data from male participants; however, due to the personal nature of some of the questions, a female intern occupational therapist that was familiar with the BDI collected data from female participants. These interviews were observed from a distance by the researcher.

Occupational therapist at CRP routinely assesses patient's using the FIM. The most recent FIM score for each participant was recorded from his or her file. Interview (approximately 40 to 50 minutes) for each subject were carried out purpose of filling up questionnaire. Giving feedback about their feelings from the researcher ended each session.

13. Measurement tools

For the completion of this study the researcher was used BDI and FIM assessment form. Which both have been described in appendix-4.

14. Pilot Study:

A pilot study was conducted by interviewing two inpatients of CRP. This gave the researcher an opportunity to discover which parts of the assessment, patients had difficulty understanding and devise strategies for clearly explaining these. The purpose of the study was explained to the participants. Any questions they had regarding the research were answered.

They were informed that no indentifying information would be used in any publication resulting from the research. They were also informed they could withdraw their consent at any time without it affecting current or future treatment from CRP.

15. Informed Consent:

Prior to inclusion in this study, participants gave written consent. Information about the sample and consent form has given in the appendix-2.

16. Data Analysis:

For the rational of data analysis the researcher applied various ways. At first descriptive data analysis was used, such a patient's social and demographic characteristics, individual response item value was cumulated for total BDI score, mean score of the FIM and BDI in different phases.

The researcher used correlational coefficient statistical method for data analysis, which is expressed as Pearson 'r'. Pearson 'r' may range from -1 (which indicates a perfect negative relationship) to +1 (which indicate a perfect positive relationship) and 0 may indicate no relationship between variables. Decimal factors are used to indicate 'r' score (i.e. 0.87 or -0.66).

Data analysis was calculated to test the hypothesis on the basis of the following assumption:

- Data were ration.
- Stratified systematic randomization of participants was done.
- 45 participants were assessed by two variables (BDI & FIM).
- General observation was used in the course of data collection.

IV. RESULT

1. Demographic Information:

Total patients number was 45. This study has shown that majority of these patients 84% was male patients, 16% female, age range was 14-55 years.

Most of the patients (44%) had lesions of the thoracic, 38% patients had lesion of the cervical spine and 18% lumbo-sacral region. At the time of assessment the distance from the lesion was between 3 months and 10 years.

Most of the patients were employed. Most of them were farmer; some were electrician, shopkeeper or labor. Most of the patients were married and some were single. Most of the patients were educated (53%) and 47% were illiterate. Within this educated person 29% was in SSC level, 2% HSC level, and also 2% university level.

The patients (sample) disability related characteristics, social and demographic characteristics have been given in table 1.

Table 1. Socio Demographic and Disability-related characteristics of the study sample.

Characteristic	Percentages (%)	Number of Participant
Sex		
Male	84%	38
Female	16%	07
Age Range (14-55 years)		
10-30 Years	49%	22
30-55 years	51%	23
Time Since Injury (range- 3 months to 10 years)		
<1.5 years	86%	40
1.5-5years	9%	04
>5years	2%	01
Level of lesion		
Cervical	38%	17
Thoracic	44%	20
Lumbo-Sacral	18%	08
Completeness of Lesion		
Complete	62%	28
Incomplete	38%	17
Etiology of Lesion		
Traumatic	98%	44
Non-traumatic	2%	01
Marital Status		
Single (unmarried)	24%	11
Married	74%	33
Widowed	2%	01
Educational Level		
Primary school	20%	09
Secondary School	29%	13
Higher Secondary School	2%	01
University	2%	01
Illiterate	47%	21
Employment		
Unemployed	2%	01

Individual response item value was cumulated for a total BDI score. By the patients self report measurement scale (BDI) they indicated there was no any patient that the patients consider ups and downs normal. Their digressional level is easily identified by table 2.

Table 2. Depression Level and percentage of the patients.

Number of participants	Percentage (%)	Range of Depression score	Level of Depression
Nil	Nil	0-10	These ups and downs are considered normal
09	20%	11-16	Mild disturbance
03	07%	17-20	Border line clinical depression
15	33%	21-30	Moderate depression
09	20%	31-40	Severe depression
09	20%	Over 40	Extreme depression

After considerable table 2 it is obviously that the patients with SCI suffer depression. Here only 9 patients that were 20% of total patents were mild depressed. They don't need any professional treatment. But another 36 patients required professional treatment for their depression. By table 3 we will be able to know about the relation between BDI and FIM. In acute phase the mean FIM score was 49 and mean BDI score 34. The depression score 34 indicate severe depression. In acute phase the patients faces more depression.

In active phase the mean FIM score was 61 and mean BDI score was 29. 29 indicate moderate depression. The last phase of rehabilitation that is rehab-integration phase was shown the mean FIM score 145 and mean BDI score 26. 26 also indicate moderate depression. In all phases the participant's number was 15.

Table 3. Means score of the FIM and BDI in different phases.

Index	Acute (n=15)	Active Phase (n=15)	Rehab-Integration phase (n=15)
FIM scale 0-231	49	61	145
BDI scale 0-63	34	29	26

So we can see that depression sore was changed with the regard of FIM score. During the change of phases of data collection, the researcher was observed that the depression was reduced gradually with the comparison of FIM improvement. They have the negative relationship with

each other. That is if FIM score increase then BDI will increase.

2. Statistical Analysis:

This study has disproved the null hypothesis, because it has shown the negative correlation between variables. So, if the FIM score is low then BDI score would be high.

This can be shown as –

$$H^1 = X_1 > X_2 \text{ (Here, } X_1 = \text{BDI and } X_2 = \text{FIM)}$$

Looking up the value or 'r' for significance:

From the calculation, calculated 'r' value of significant was -0.3586 for two tailed hypothesis, where the 'p' value (in serial 0.02) can be shown as,

$$p < 0.02 \text{ (Hicks, 2000)}$$

Therefore, the null hypothesis is rejected and thus the negative correlation hypothesis is accepted.

$$\text{i.e. } H_1 = X_1 > X_2 \text{ (Here, } X_1 = \text{BDI and } X_2 = \text{FIM)}$$

3. Findings:

For the whole sample a negative correlation between FIM and BDI score existed, but when the researcher calculated the scores in different phases separately, there was no significant correlation between BDI and FIM. But when calculated together the all scores then he got the significant value. Both score were analyzed by using the Pearson (r) parametric test as a co relational coefficient test and were found to be significant ($r = -0.3586$, $df = 43$, $p < 0.02$ for two tailed hypothesis).

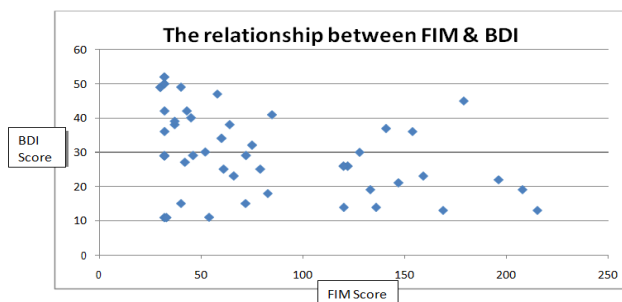


Fig 1. Text Here Your Fig Title.

The Scattergram is a one kind of graph, which is indicating that the high score on BDI are associated with low score of on the FIM. They are represented by a down ward slope on a scatter gram, so by this scatter gram it is very easy to understand that they have a negative relationship. This negative relationship is not particularly strong. The correlational coefficient figure has explained this-



By the above picture we can see that the negative 'r' score is not much closer from 0 to (-1). But it is negative score and indicating negative relationship. Above graph's 'r' value and 'p' value indicate that the probability of random error was responsible less than 2 in 100. As the usual cut off point for claiming support for the co relational hypothesis 2%, it could be interpreted that the result was significant (Hicks, 2000).

V. DISCUSSION

During research, the researcher considered two points. First no evidence has been presented that Functional Independent Measurement score is causally related to Beck Depression Inventory score. This sort of investigation does not allow the researcher to conclude that functional disability causes depression. Second considerable point is there are many other variables, which are also related to the incidence of depression – such as pain in body, pressure sore, environmental cause, financial problem and family related problems. This may also be correlated with the probability of depression.

In this study the researcher has reported that the BDI score has decreased gradually during the rehabilitation process. The patients of acute phase suffer more depression than active phase and the patients of active phase suffer more depression then rehab-integration phase. One of the main reasons was increase functional independence. Saikkonen, et al. (2004) also reported that higher frequency of sports activity of patients with SCI reflects better psychological status, especially reduction of depression. So, the patients of rehab-integration phase can actively involve in sports activity, ADL activities, and also recreational activities.

As a result they suffer less depression. Active exercise can also reduce the depression. Saikkonen et al. (2004) reported that those who exercised three times a week or more had lower scores in BDI than those who exercised less frequently. This is possible then when a person with SCI functional ability increases. It is giving us the result that sports activities and physical exercises reduce depression. All of these activities are functional activities, but this result is not true for all patients with SCI. some patients with SCI have shown the negative result. The researcher observed that, some patients were more depressed in rehab- integration phase. For those patients the reason was to go back in their own home.

The patients did not want go at his or her own home, because they were worried, what things they will do after go back. They had no proper career, poor functional capability, had the feelings of more punishment after go back. In rehab-integration phase only 5 patients has shown severe to extreme depression and they had the reason so. All of these patients were lived in their own home before accident. Then they were able to help their family.

But now they will not be able to help their family. So, some head of the family members were demotivated to take return their patients with SCI. some patients said that they were total able to do ADL but now they don't have suitable technical aids for daily living and enough personal assistance at their home. So, they are afraid and more depressed.

In this study only 5 patients were readmitted in this hospital. The most common causes for that were urinary tract infections and decubitus ulcers. Two patients used intermittent self-catheterization, which has been found to increase the risk of bacteriuria. Three patients used w/c in these readmissions. They have suffered decubitus ulcers because they did not follow – up annually with an urologist.

From the result (table-2) it is easily clear that four-fifth of the subjects who completed the BDI form had mild, moderate, severe and extreme depression, but during research, the researcher has observed and talked with the therapist that the therapist does not take any intervention for depression management. Several patients were used relaxing type medication. Although the treatment of spinal cord injury has increased in the side of physical and for this reason the therapist know more about the management of physical problems and was more sensitive about physical problems. But the assessment and treatment procedure of psychological problems has not improved much, for this reason therapist is less informed about the significance of psychological problem. So, therapist does not take any plan for reduction of psychological problems such as – depression, anxiety, phobia etc and it is affecting proper rehabilitation.

The severity of depression mainly depends upon the extent of patient's losses. Due to the immobility and loss of sensation, the patients with SCI experience other unpleasant effects, such as pain and impaired urinary sexual functioning; these physical symptoms often result in vocational and social losses. So, it may be a cause for depression of patients with SCI.

Scivolet, et al. (1997) agreed that, knowledge about adjustment to SCI is still incomplete, and psychological distress, in particularly depression is a universal reaction following SCI, current literature reports the presence of depression in only 20%-40% of patients.

Researcher observed that functional limitation is not the only variable for depression, he observed the other variables- such as age, generally the older patients tend to be less well adjusted, education, low education is associated with worse adjustment, completeness and level of lesion, gender: generally male patients are more anxious and female patients are more depressed and marital status. All of the factors are associated with depression. The poor adjustment in the community, society and patients own

house causes poor functional ability and thus causes depression. Although these were the variables of depression, they cause little pathogenesis of psychological distress. But severe complications interrupt life routines and restrict social roles. Patient's level of autonomy is a medical variable of depression. A lower of autonomy on the wheel chair and daily living activity is associated with higher levels of anxiety and depression.

The age is closely related with the depression. The older age's patients with SCI suffer more depression than young-adult. In this research 4 patients were students and their age range was 14-17 years. All of them are suffering mild depression.

According to Saikkonen, et al. (2004, p463) those who were injured in the 1990s had the highest scores in BDI. The BDI scores associated significantly with the subject's age at the time of the injury. The older the subject was when injured, the higher were the scores and perhaps had more difficulties in adapting to disability.

Zabber, (2000) studied with different professional groups. From his study he found out that, the higher professional group survives with better mental health. As a result of SCI most patients lost their previous occupation and cannot return. Their previous occupation might be high or low it did not matter, they are now totally out of job. For this reason they suffer more depression.

In this study females were more depressed than males. As males are the dominant persons in Bangladesh, they are the earning members and they lead a family. Male is the independent person in his family. On the other hand females are some one's wife, sister or daughter. They have to maintain the family. Due to the SCI, they fail to complete their duties. Then they thought that their husband may divorce them or they might have to bear a negligible life. So, female suffers more depression.

Difficulty in adjusting with hospital setting is a factor in bed rest stage. Which is supported by Hanson, et al. (1993) they said that poor coping skills and adjustment appears in patients with SCI. from the literature review, it could be said that, depression is a common psychological problem in patient with SCI, and observing normal reactions to an abnormal situation could identify it? Sometimes the patients with SCI deny the sudden changes that have occurred due to SCI.

The immediate reaction is characterized by a range of conflicting emotions which may include numbness, disbelief, anger, fear, hope and despair. It is viewed as a period of emotional turmoil and disorganization in which the individual may see their world as fragmented and uncertain. These emotional reactions follow particular sequence with fixed stages (North, 1999). So the person with SCI will not be able to overcome a problem easily.

This will affect their functional improvement. So it is understandable that psychological problems closely related with SCI. if one is affected then other will be changed automatically. This change will vary from person to person. Every person with SCI is heterogeneous in terms of age, level of injury; social class and education and the immediate reactions may be as varied as the pre-injury personalities (Scivoletto, G. et al. 1997).

When an individual has positive mental states then it can actually trigger the immune system. According to the demand the brain release a variety of mental and physical painkillers, motivating substances and thus the brain can self medicate. So, the way an individual think (psycho), which then affects the central nervous system (neuro), and then affects the immune system (immunology), called psychoneuroimmunology (Alder, Felten and Cohn, 1991 cited in Bruess and Richardson, 1994).

So, person's positive mental states will be created that time, when s/he will be able to do his or her own self care, productivity and leisure activity independently. When the person's functional ability is very poor then it will affect automatically their thinking process. The negative thought wills affects the central nervous system then it wills affects the immune system. Then brain cannot release a variety of mental and physical painkillers and motivating substances. So it is cleared that poor functional ability causes psychological and physical both problems.

Hundreds of studies have documented that physical activity improves subjective well-being, mood and emotions, and self-perceptions such as body image, physical self-worth and self esteem (Anon, 2003). Functional activity is also one kind of physical activity. So, when the patient with SCI can do functional activity then their mood, emotion, self esteem stay in normal position. So, functional independence has the relation with depression and it is negative relationship.

Trieschmann, (1986) added that active participation in therapies and recreational activities can also reduce boredom, promote better sleep at night and facilitate the grieving process. So, with the words of Trieschmann the researcher wants to say that, the patient with SCI should to engage in various purposeful and interesting activities according to their need, interest and capability. It will be help full to overcome their depression and also to increase the functional independency.

Major Depressive Disorder (MDD) makes the general population disabled. The patients with chronic medical condition such as SCI, MDD makes their physical condition worse. According to Charles Bombardier, Ph D, associate professor in the Department of Rehabilitation Medicine and project co-director for the Northwest Regional SCI system, "most people with SCI are not depressed. They adjust and gradually feel better about

their lives". On the other hand, the medical, social, and functional challenges of SCI conspire to create higher than normal rates of depression in this population. MDD is common among all medical patients (6% - 10%), but much more common after SCI (23%-30%).

From the above statement it is seen that, there are contradictory opinion between depression and SCI, but from the researcher's view maximum literature has suggested that about 20%-30% patients with SCI suffer major depression.

It is more difficult to adjust to SCI in Bangladesh than USA because the patient with SCI who live in USA have more of every resource that is essential to live independently, such as access road, electrical operated wheel chair, more improve in the side of treatment, home accessible, wealth, more educated person, job accessibility, many recreational options and more improvement in the side of science, but the patient with SCI who live in Bangladesh have less of all of these things. So, due to the proper adjustment the people with SCI who live in Bangladesh suffer more depression.

There are some factors that cause depression in the patient with SCI such as longer length of hospital stay and fewer functional improvements, increase occurrence of pressure sore and urinary tract infection, and greater use of paid personal care and higher medical expenses. Depression is more common after soon of injury and it subsides after several months. Some studies suggest that about 30% of patients with SCI remain highly depressed and anxious at least two years after injury. Then symptoms will be despondency, hopelessness and apathy, and hope to suicide between one to nine years after SCI (Bombardier, 2002, cited in Michael, 2003).

Bombardier, (2002) has suggested that less functional improvement is one of the causes of depression, he not only included functional factor and another many factors were included by him.

A spinal cord injury requires major adjustments to physical, psychological, mental and social domains, the extent to which people manage the consequences of the disability depend on internal psychological factors, such as self-efficacy and coping styles and external factors such as social support. The immediate psychological impact of the injury may be compounded but severe pain and disturbs consciousness because of brain injury, medication or sensory deprivation. Emotional liability, fear and denial of disability are examples of common mental problems in the early stages recovery from are often coupled with confusion (Thompson Morgan, 1995, cited in Farhaduzzaman, 2003). More over psychological effects such as anxiety, agitation or clinical depression requires more specific intervention. A man who is severely depressed will lack motivation to perform even the

simplest task, such as maintaining posture, attempting communication etc (Ebrahim, 1995, Collin, et al. 1987, cited in Farhaduzzaman).

The majority of the clients in mental health have a chronic illness, which has a severe impact on the client's abilities to function (Mce and Somsion, 2001, cited in Farhaduzzaman, 2003).

Thrieschmann (1988) points out that in the acute phase psychological disturbances may result sensory responses to injury the hospital environment and procedure in the survival of a person, rather than of the SCI itself.

In case of SCI, the psychological impact is very important. For example depression (associated with avoidance behavior), indirect self-destructive behavior, increased suicidal communication problems and social isolation are found. It was discovered that between 20% and 34% SCI people during the acute rehabilitation phase are depressed, Frank, Corcoran, et al. (1987) found that about 30% of SCI patients develop major depression.

According to Beck and Shaw, (1987) the cognitive basis for depression can be exemplified through the core cognitive triad in depression, which consist of negative view of self, negative view of the world and a negative view of the future. These three factors are also significant in the rehabilitation of SCI patients.

1. Limitations:

The researcher faced some limitation in this study. To solve this limitation the researcher has tried best to minimize the effect of limitations. Though SCI is one of the major public health problems, no survey was conducted by any organization to find out the number of the patient with SCI in Bangladesh. Therefore no data was found to visualize the situation.

The sample number was 45. It was a big sample size which needed more time to complete the interview but time was limited (3 weeks only). For a quantitative study the sample size was too small for generalisability with minimum 150 participants required for good generalizability (Loether & Tavish, 1980 cited in Ullah, 2003). Sample was collected only from the CRP SCI hospital in door department, because there is no any other SCI hospital in Bangladesh.

2. Recommendations:

- All patients should be screened for depression using BDI or another standardized tool.
- Occupational therapist should provide treatment for patients with depression alongside their physical rehabilitation.
- As the researcher view, it was the first research on the correlation of BDI & FIM in Bangladesh of people with SCI; this area needs further investigation and

study. Future study should include a large number of samples, so that the result will be generalisable for other populations.

- Researcher should be conducted to explore effective treatments for depression in the context of Bangladesh.
- It will be beneficial to the patients to get early recovery, if they are given some counseling about why they should keep better mental status during rehabilitation period and how they will achieve it.

VI. CONCLUSION

SCI is a condition, which results in paralysis of body parts. It is one of the major health problems in Bangladesh with high rates of morbidity and mortality. Many patients with spinal cord injury suffer from depression. One of the main reasons is decreased functional independence. One of the main reasons is decreased functional independence. Many patients with SCI are totally dependent upon their carer. For the reason of depression, the patient sometimes is not able to take the treatment properly due to poor interest. So depression is affecting their treatment thus affecting their improvement.

In CRP indoor department, the professionals do not use any measurement scale for depression. So, they don't know about depressed state of patients. Sometimes these depressive states hamper patient's functional improvement.

So, by this study the researcher tried to find out the correlation between FIM score and BDI score. The study displayed that there have a negative correlation. In conclusion the researcher want to say that SCI related functional limitation remained the most important predictor of depression outcome. The BDI score not only the factor that depend on functional limitation but also depend on family support, physical problem, financial problem, etc.

As a occupational therapist, we should not work only in medical settings, providing orthotics to assist hand function, or operating on burn unit, cardiac wards, training CBR worker, spinal cord injury department prescribing special seating to both adults and children in order to increase functional independence and decrease tone but also should work in psychiatric problem. Because we focus not only the functional status of an individual but assesses and treats the whole of the individual holistically.

Because the physical ability alone cannot secure the patients effective performance it also depends on the good mental status. The effectiveness of depression may diminish the effectiveness of therapy. Inattention to the psychological problem with depression can result in lack of rapport and communication problem that can lead to non compliance and dissatisfaction with occupational

therapy. As a result the aim of the therapy may not be achieved. So, the depression has a strong impact on the rehabilitation process, but the therapist of CRP spinal cord injury hospital does not use any measurement tool for depression measure and does not take any intervention for decreasing depression. The therapist should assess the depression of patient with SCI in more detail by using this BDI form for each patient and for each period of time.

The depression intervention of therapist should be aimed at helping individuals develop their functional improvement might be of substantial value in the rehabilitation process after SCI.

Kupfer (1991) discovered the treatment of depressive disorders into three phases. First is active phase which lasting 4 to 12 weeks, during which the remission of depressive symptoms is induced; second phase is continuation phase which lasting 4 to 9 months, during which remission is preserved; last phase is maintenance phase, during which remission is sustained.

Psychotherapy, pharmacotherapy and electro convulsive therapy is effective for acute phase treatment for general populace, which is, deepened on the severity of the depression. Psychotherapy and pharmacotherapy are more effective for patients with mild to moderate depression. Pharmacotherapy alone or combined with psychotherapy is effective for patients with severe depression. There is some evidence that cognitive therapy may be the psychotherapy of choice in terms of effectiveness in the treatment of depression, but this evidence is not conclusive (U.S. Dept. of HHS, 1993).

The person with SCI suffers from clinical depression not only mentally but also functionally. In essence his activities of daily living deplete, he or she may begin to neglected personal hygiene, loss confidence in work, neglect domestic work, and relationship with family members may became unhealthy. The persons begin to cut themselves off from the rest of society. For these reasons occupational therapist should to explore the patient's painful unresolved issues which precipitate the depression.

The occupational therapist may well educate with careers and family members about depression and how it can manifest itself. Occupational therapist will assess what purposeful activities the client may enjoy, these activities should encourage and positive reinforcement will be given to enhance confidence and performance. If the treatment is in this way then rehabilitation program will be fulfill and effective.

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