DEMOGRAPHIC PROFILE OF SPINAL CORD INJURY: A RETROSPECTIVE STUDY

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

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

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Declaration

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

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Contents

Acknowledgement

Acronyms

ASIA	American Spinal Injury Association
BHPI	Bangladesh Health Professions Institute
CRP	Centre for the Rehabilitation of the Paralyzed
SCI	Spinal Cord Injury
SCL	Spinal Cord Lesion
SPSS	Statistical Package of the Social Sciences
US	United States

List of Tables

List of Figures

Abstract

Purpose: To find out the demographic profile of spinal cord injury patients at CRP. *Objectives*: The aim of this study was to find out the age, gender, causes, type, marital status, educational status and living area of SCI patients. *Methodology*: The study design was cross sectional. The sample size was 426 and purposive sampling technique was used for sample selection who was admitted in Centre for the Rehabilitation of the Paralyzed (CRP) in Bangladesh which is the largest spinal cord injury rehabilitation centre in South Asia. Data was collected by a standard questionnaire and it was analyzed by SPSS software version 16.0. *Results:* Among 426 spinal cord injury patients, most of the patients were young. The age range are 32-45 age and male 87% (n=374) are predominantly higher than female 12.1% (n=52). Majority of the participants were came from rural area (83.8%) and they were farmer 28.4% (n=121). Complete paraplegia was (32.4%), incomplete paraplegia was (24.9%), complete tetraplegia was (23.7%) and incomplete tetraplegia was (19%). The skeletal level of Cervical was most common and then thoracic then lumber level. The skeletal level of cervical were 35% (n=149), thoracic were 31.2% (n=133), lumber 21.1% (n=90) and no 12.7% (n=54). Most of the patients were from low socio economic condition and low educational level. *Conclusion:* From the study it can be concluded that most of the participants were village people. So they cannot understand the preventative measure of SCI. The study may help to provide awareness among the people of Bangladesh. And also express the vulnerable cause, occupation which is responsible for the spinal cord injury. So SCI can be reduced through taking preventative measure.

CHAPTER-I:	INTRODUCTION

1.1Background

The disease and injury which affect the spinal cord and damage the neurological level are the important health problem in our country, so they carry high rates of morbidity and mortality (Hoque et al., 1999). The purpose of this study was to know the Scio demographic profile of the spinal cord injury in Bangladesh. In Bangladesh maximum village people were suffering from spinal cord injury. In order to develop health care and social services it is important to know the epidemiology of spinal cord injury (Dahlberg et al., 2005). Because of their high personal, both knowledge of incidence and prevalence of spinal cord injury (SCI) is important, both bio-psychological impact and of their high socio-economic consequences, it is also important to short-term as well as long-term. For improved prevention incidence rates reflect the level of control of SCI and the possible need. Alternatively, for social and personal resources prevalence rates have an impact on health care (Wyndaele & Wyndaele, 2006).

Prevention is better than cure lost spinal cord function following spinal cord injury there was still a very long way to go to restore. Spinal trauma which could have been prevented, this is the result of spinal cord injuries. The Japanese Medical Society of Paraplegia (JMSOP) which is the prevention Committee conducted the first nationwide epidemiological survey in Japan in order to obtain basic data to organize a prevention campaign for SCI and spinal injuries (Shingu et al., 1994).

Long-term disability or death is the cause of Spinal cord injury (SCI). Leading to permanent paralysis by modern man, it is one of the most catastrophic lesions. The Spinal cord injury patients, the victims who are usually young and in their most productive stage of life multiple medical, social and vocational complications affect to them. Spinal cord injury causes burden and suffering not only of the victim but also to their families, to the health care system and to the community (Maharaj, 1996). In Japan from January 1990 to December 1992 a survey of traumatic spinal cord injuries was carried out by a statistical method of the nationwide epidemiological study showed that the incidence was 40.2 per million in the annual report of spinal cord injury. More caudal SCI was 3:1 is the ratio of cervical cord injuries (Shingu et al.,

1995). The prevalence of SCI at 650–900 per million American epidemiological data approximately showed that (Genis et al., 2005). Expected data showed that the rates of adolescents with disabilities range from 108 per 100,000 in Myanmar to 6,726 per 100,000 in Canada (Groce, 1999).

In Australia a study showed that most devastating medical conditions are Spinal cord injury (SCI) or damage. In all facets of human functioning and existence it causes life changing consequences. The incidence of Traumatic SCI a recent review reported that worldwide varied between 10-4 and 83 per million per year. About 15–17 cases per million per year over the past decade the age-adjusted incidence rate of TSCI in adults aged 15 years has remained at and older surviving to reach hospital. In currently 11.9 cases per million adults per year is the incidence in Victoria in Australia (New & Sundararajan, 2008).

The acute phase ranges from 10 to 25/million inhabitants per year which data is recently published in Europe on the incidence of SCI in survivors. Showing consistent rates between 22 and 25/100 000 inhabitants, in the Nordic countries, two register-based studies have been published (Dahlberg et al., 2005). The retrospective study of Japan showed that the annual incidence of spinal column injuries ranges from 19-88/100,000. 15-50 per million per year is the incidence of spinal cord injury. 480-813 per million is the prevalence of SCI. In Pakistan exact incidence of these injuries in this region is not known though there are few reports on demographics of spinal injuries (Qureshi et al., 2010).

Patients who have been suffering from spinal cord injury often face life threatening complications so they need appropriate management and specialized rehabilitation. The patients of SCI are going into the different hospital for the treatment but they do not have enough facilities for their treatment. In Bangladesh there is only one non government organization is Centre for the Rehabilitation of the Paralyzed, which has conducting a rehabilitation program for the last 32 years through which the patients can improve their life style (Islam et al., 2011).

The nongovernmental special organization, CRP managed the patients with multi and inters disciplinary approach which emphasis on the development of commiunity based

2

rehabilitation programs. There are sufficient stuffs that work there sincerely and supported by short term volunteers from home to abroad (Hoque et al., 1999). For developing effective program and polices the study will help to further enhancing our knowledge about SCI in Bangladesh. In developing countries, advance care ICU and proper, accurate and long term management and rehabilitation have the survival rate and life expectancy which is available only in the non government organization (Islam et al., 2011).

1.2 Rationale

Now a day Spinal cord Injury is most commonly occurring disabling condition in all developing and developed countries in the world and it will increase day by day due to lack of awareness. Injuries that are affecting the spinal cord and complicated by physical damage are an important health problem in Bangladesh as they carry a high rate of morbidity and mortality. Demography of spinal cord injury is important to know as Bangladesh is a developing country and trying to develop health care system. It is generate exact information considering detail about which causes, occupation, age, gender, diagnosis, residential area, educational level and economic level were responsible for that injury. It is also help to raise awareness among the population and will help full to get information about spinal cord injury. And indicate that the spinal cord injury patient who needs a specialized and comprehensive rehabilitation services to continue their activities of daily living in the community. In our country we are not conscious about spinal cord injury. Spinal cord injury can destroy of one's life and his whole family. The patient can survive with full struggle. Life is so much challenging to him. In some area people think that spinal cord injury is the curse by Allah. It is just an accident which destroys the whole life. So it is very important to aware about the incidence so that we can prevent the injury. In SCI patient's rehabilitation program or long time management is major treatment, where physiotherapy is essential. So the study enhances the knowledge about SCI and its nature such as type, extent etc. The preventative measure may help about SCI. As if we concern about road traffic accident the injury rate may reduce. If people from all corner of the Bangladesh are aware about the cause of SCI then it can help to lowering the rate of injury.

1.3 Research question

What are the demographic profiles of spinal cord injury?

1.4 Objectives

a. **General objective**

- To find out the Scio demography of the spinal cord injury attended at CRP.

b. **Specific objectives**

- To explore which age grope and gender are more vulnerable for the injury.
- To identify the causes and the common type of spinal cord injury.
- To find out vulnerable occupation and common diagnosis of spinal cord injury for injury.

1.5 List of Variables

Independent Variables		Dependent Variable

Age

Gender

Marital status

Occupation

Living area

Level of Injury

Educational status

Cause, Type

Spinal cord injury
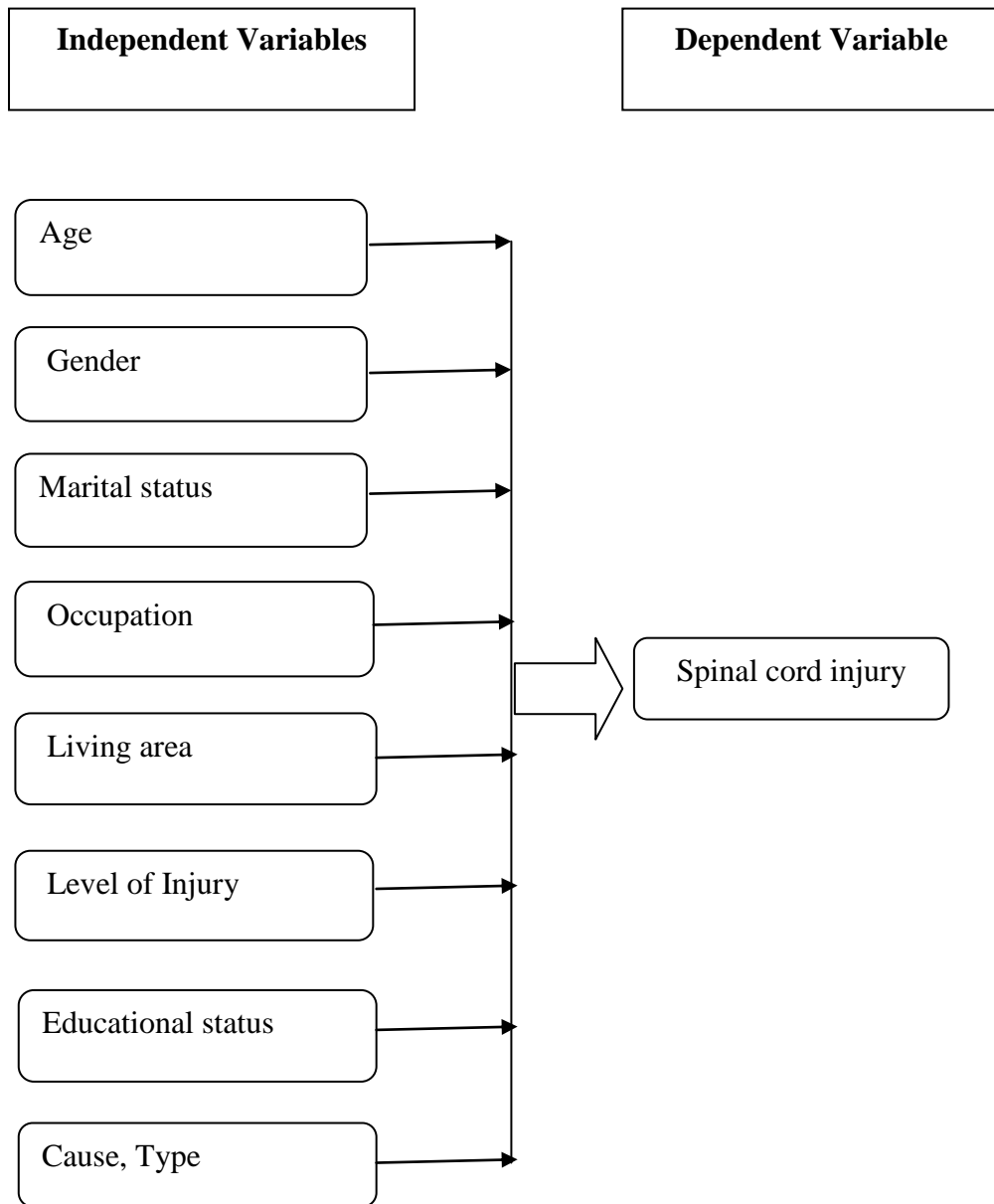
1.6 Operational definition

Paralysis

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

Neurological level

Up to the level where both sensory and motor function is remains intact.

Paraplegia

The term paraplegia means impairment of motor and/ or sensory function in the thoracic, lumber and sacral segments of the spinal cord which is secondary to the damage of neural elements within the spinal canal. Paralysis occurs of lower portion of the body and of both legs.

Tetraplegia

Injury of the spinal cord in the cervical region, with associated loss of muscle strength in all 4 extremities is called tetraplegia. Paralysis of both legs and both arms, it is also called quadriplegia.

Complete lesion

Absence of sensory and motor functions in the lowest sacral segments is called complete lesion.

Incomplete lesion

An incomplete lesion is the term used to describe partial damage to the spinal cord. With an incomplete lesion, some sensory and/or motor function remains at the lowest sacral segments. Including the lowest sacral segments preservation of sensory or motor function below the level of injury is called incomplete lesion.

| CHAPTER-II: | LITERATURE REVIEW |

The spinal cord injury causes serious injuries and permanent impairments due to incomplete documentation and transfers to tertiary institutions and creates a life threatening situation (Phalkey et al., 2011). On the neurological examination by the completeness of the injury the severity of spinal cord trauma is clinically determined. In prognosis associated with recovery the classification of injury which completely assists to the clinician. Those with incomplete injuries have a less favorable recovery potential than patients with complete injuries persisting after the initial acute injury phase. Common two definitions of complete spinal cord injury (SCI) are used in more common (Waters et al., 1991).

The cause of spinal cord injury may traumatic or non traumatic. Auto crash, including jeep, truck and bus, fall: including jumping and being pushed accidentally (not as an act of violence), gunshot wound motorcycle crash: 2-wheeled, diving, medical/surgical complications: impairment of spinal cord function resulting from adverse effects of medical, surgical or diagnostic procedures and treatment, bicycle, tricycles, Pedestrian, including falling/jumping into the path of a vehicle, auto racing, glider kite, slide, swimming, bungee jumping, scuba diving, lightning, kicked by an animal, machinery accidents, tractor, bulldozer, go-cart, steamroller, train, road grader, forklift, sledding, snow tubing, tobogganing, playing ice hockey, snowboarding. Personal contact, including being hit with a blunt object, falls as a result of being pushed. Football and other penetrating wounds: stabbing, impalement, boat and parachuting, para-sailing, etc gymnastic activities other than trampoline baseball/softball, water skiing, basketball/volleyball, high jump, bomb, grenade, dynamite and gasoline. These are traumatic cause. The non traumatic cause is spinal tumor, TB spine, transverse myelitis, physical assault, physical weakness etc (Chen et al., 2013).

The leading causes of spinal cord injuries are the auto and motorcycle accidents. In USA a study showed that more than 40 percent spinal cord injuries occur in each year. According to the National Institute of Neurological Disorders and Stroke 1.5 percent of spinal cord injuries resulting from violent encounters, gunshot and knife wounds.

Caused by fall is most common among the old age about 65. One-quarter of spinal cord injuries occurs by falls. About 8 percent of spinal cord injuries occur by the athletic activities, such as impact sports and diving in shallow water. About 1 out of every 4 spinal cord injuries occurs by using of alcohol. Spinal cord injuries also caused by cancer, arthritis, osteoporosis and inflammation of the spinal cord may cause (Coppla & Marlin, 2013).

Spinal tumors which cause rare cancers reduce the quality and quantity of life and present an enormous challenge to patients and their physicians. The low incidence of these tumors that might defines the disease more clearly and identifies effective therapies. Consequently, progress in the treatment of rare tumors often proceeds slowly and typically which need for better treatments. Spinal cord tumors can affect the morbidity and mortality in children and adults (Claus et al., 2010). Tentorial spinal cord compression injuries are easily produced using forceps; however the primary trauma varies as a function of compression rate and duration. The amount of major trauma also is expected to vary function. The spinal cord that is compressed and the size of compression across the ventral-most part of the spinal cord (Popovich et al., 2012).

A five scale subdivision was used: A = complete motor and sensory function disorder; B = motor complete and sensory incomplete function disorder; C = motor and sensory incomplete function disorder; D = useful motor function with or without auxiliary means; E = no motor or sensory function disorder which is the modified by Frankel and known as Frankel score (Capaul et al., 1994). The epidemiological study in Japan showed that no survivors with complete tetraplegia, mostly paraplegics (89%), a significant pediatric population (17%), predominant female victims (ratio of 1:1.3) (Rathore et al., 2007).

In South African society the Frankel classification was used to assess neurological recovery. Defined the recovery was as improvement from Frankel group A, B or C to Frankel group D or E during the period of rehabilitation (Hart & Williams, 1994). National Database is overall cumulative survival rate of the entire population is 10 years. The statistical the database of the patients, probability of dying was determined

declining somewhat thereafter to be greatest during the first post-injury year (Stover & Fine, 1987).

Spinal cord injury is two types such as complete and incomplete. A person loses all ability to feel and voluntarily move below the neurological level of the injury which occurs in a complete injury, on the other hand there is some functioning below the level of the injury which occurs in an incomplete injury (WebMD, 2011). Complete loss of function below the level of the injury when complete spinal cord injuries occur, while incomplete spinal cord injuries are those that result in some sensation and feeling below the point of injury. The way in which the spinal cord has been damaged it dependent upon the level and degree of function in incomplete injuries is highly individual (Brain and Spinal Cord.org, 2012).

A person with traumatic or non-traumatic SCI the potential changes are similar regarding their ability to feel, move, control their bladder and bowel and other possible problems. Traumatic SCI are at higher risk than those with non-traumatic SCI. Non-traumatic SCI patients have a better recovery in affected areas and stay for shorter periods in hospital compared with those with a traumatic SCI who have worse prognosis and long durations. A specialized team of health care professionals it is best to have periodic reviews for anyone with SCI. Prevent and treat SCI complications help to achieve the best possible outcomes for health and well-being (Spinal Hub, 2010).

Loss of function is the symptom of spinal cord injury. Impaired functioning occurs by spinal cord injury. Severe headache, backache, tingling or loss of sensation in the hand, fingers, feet, or toes, feeling of pain or pressure in the neck, partial or complete loss of control over any part of the body, impaired breathing after injury, urinary or bowel incontinence, or retention, difficulty with balance and walking, unusual lumps on the head or spine (Medtronic, 2013).

80% of spinal cord injuries occurred in men, 16 to 30—more than half of spinal cord injuries occur in young adults, they are the high risk of Spinal cord injury. Diving into shallow water or playing sports without proper safety gear or precautions, they are in risky. Arthritis, osteoporosis or any other joint disorder are also caused of Spinal cord

injury (Medtronic, 2013). The literature of an excellent review of and comprehensive study of SCI describes the changes over the past 20 years in survival and causes of death where using data from the US Spinal Cord Injury Model Systems. A population based sample of SCI survivors in Great Britain to examine long-term survival which is the aims of that study, explore trends in cause of death identify and risk factors contributing to deaths. 50 years of spinal cord injury experience, the investigation which is covering, and the longest follow-up SCI survival study to date. Any results of SCI mortality data were compared with from the United States (Frankel et al., 1998).

Without radiographic abnormality the epidemiology of spinal cord injury is less frequently reported in adults as compared with children. Epidemiological characteristics, such as injury origin, injury level or severity, neurological scale and MRI feature were acquired. As the young adult population increases, it is very important to set up an individualized evaluation system based on a nationally scaled epidemiological database (Guo et al., 2012).

Long-term impact on physical and mental health with paralysis is common causes of spinal cord injury. Secondary complications may focus sometime and the complications are the main cause of life changing effect (Bellon et al., 2013). The prolong period of spinal cord injury (SCI) on the health care system imposes a need for greater efficiency in the use of resources and the management of care. Access Care of Training project is part of a broader vision to create a methodological framework to evaluate clinical practices, and in particular to develop a certification process for SCI Programs (Noonan et al., 2012).

Acute hospital care is needed after immediately following a SCI where all medical and surgical treatment is completed. After complete acute care, they should be considered for rehabilitation. Rehabilitation care is the most effective for traumatic or non-traumatic events. A research showed that specialist spinal rehabilitation unit has great outcomes for people with a SCI. Specialist rehabilitation unit are better than a general rehabilitation unit (Spinal Hub, 2010).

Breathing and the heart is beating is the first step of management of a suspected spinal cord injury patient. A loss of control of normal breathing is the cause in spinal cord injury when injury occurs in upper neck. Use of a ventilator or breathing tube may require placement. Immobilization is the treatment spinal cord injury after complete previous treatment. A cervical collar or on a backboard prevent the spine from moving in emergency condition. Further damage may occur if the patient moves vigorously after spinal cord injury (Medicine net.com, 2009).

Patient care is centered on a multi-disciplinary team consist by the Model Regional Spinal Cord Injury Center's approach where several medical specialists headed by the attending physiatrist, and personnel from the disciplines of rehabilitation nursing, physical therapy, occupational therapy, psychology and social service. A statistics has been analyzed a set of data which captures medical, demographic, social and psychological information (Fine et al., 1980).

During the rehabilitation program in South African Society the commonest complications were pressure sores, developed in a further 23 patients which were present in 47 cases at the time of arrival in the rehabilitation unit. In 43 cases (7%), severe spasticity occurred, in 18 cases (3%) urological complications and debilitating pain in 12 (2%). 7.4% was the overall mortality rate. Analysis of the causes of death as autopsies were not performed routinely could not be included in this study (Hart & Williams, 1994).

Patients of pressure sore who had stage III/IV pressure ulcers underwent surgical reconstruction play an important role in the management of pressure ulcer in patients with spinal cord lesions. At a time surgery are necessary for Stage III to IV pressure ulcers. In rehabilitation program reconstructive procedures are effective. Prevent weight bearing otherwise wound or pressure ulcer may increased (Srivastava et al., 2009). The proper wound management immediately after the injury, health education programs to create awareness among the public and establishing an ICU facility in the hospital would definitely decrease the morbidity and the mortality (Marulappa et al., 2012).

In acute phase the dermatological changes simple skin and nail local fungal infections. The patient and staff education regarding the importance of proper skin care may help in innate these infections. It occurs commonly during the first months after spinal cord injury (Asher et al., 2005). From disability programs young people are not always excluded. In voluntary organizations, government programs, community-based rehabilitation and local social- service agencies initiatives from Brazil to Malaysia to Tunisia, adolescents and youth with disabilities are considered to be covered by programs for children with disabilities. However, are usually strikingly different from those of a 14 or 18 year-old which needs of a disabled five-year-old (Groce, 1999).

A spinal cord injury (SCI) is a devastating event that, depend on the level and severity. The affected area mark for rehabilitative interventions is the regaining of independence and thus a good quality of life. It is now widely accepted that the central nervous system is able to recover following incomplete SCI with functional training (Hubli & Dietz, 2013).

Trauma care requires to be singled out by the availability of rehabilitative care, prosthetic devices, and age appropriate and culturally sensitive because of significant problems world-wide. The most important medical need identified is the continuing lack of rehabilitation services for adolescents and youth with disabilities. Who have to rehabilitation any sort of care only 5 per cent receives in the United Nations estimates that of those worldwide. Often in urban areas rehabilitative services tend to be intense and are very expensive. Often unavailable programs that require long-term residency are also to girls in societies where females are not permitted to travel or live on their own. Growing young person would need frequent replacements where prosthetic devices are often difficult and expensive to acquire. Appropriate physical and psychological support developmentally services are often unavailable. At the side of infants and pre-school children unlike their non-disabled peers, adolescents and youth who receive medical care are often served in clinics (Groce, 1999).

The concept of a multidisciplinary team in Pakistan was generally equated with 'physiotherapy', is best treatment rather than the medical specialty of Physical Medicine and Rehabilitation. So, SCI unit and disaster planning did not include

disability management despite neurosurgical departments in nearly all major teaching hospitals, there existed no. The Armed Forces Institute of Rehabilitation Medicine (AFIRM) only one dedicated rehabilitation medicine institute was functioning at the time of the disaster, providing rehabilitation services to persons with SCI, stroke, amputation, musculoskeletal disabilities, and pediatric disabilities (Rathere et al., 2007).

There is no effective pharmacological treatment for acute or chronic SCI manifested in uncontrolled muscle spasms or autonomic dysreflexia. The current drug treatments which aim to be degrade of spasticity and autonomic dysfunction in the chronic SCI population. Usually anti-spastic medications include baclofen, tizanidine, clonidine, benzodiazepine, dantrolene, and cannabis are used to improve autonomic dysreflexia include anti-hypertensive nitrates, nifedipine, and adrenergic blockers. The drugs are used to prevent the secondary complication. The quality of life is degraded of SCI patients who suffer from secondary complications (Rabchevsky & Kitzman, 2011). Earlier re-training sessions with more repetitions and critical neural circuitry may be necessary to engender a rehabilitation effect. Task-specific rehabilitative training can be employed clinically for the frequent contusive spinal cord injury contusive thoracic SCI requires frequent re-training and initiating the re-training for spontaneous recovery (Onifer et al., 2011).

Traumatic spinal cord injury (TSCI) is one of the most devastating types of injury, and causes paralysis, sensory loss, and bladder/bowel dysfunction. The epidemiological understanding is important for preventative measures and planning clinical services. In Asia the purpose of epidemiological characteristics of TSCI in orders to increase prevention and creates awareness. Thus we create social and worldwide awareness about spinal cord injury (Ning et al., 2012). The common principal end-point of the trial on treatment of traumatic spinal cord injury (SCI) is the degree of impairment. Motor function and pin-prick and light-touch sensory function are widely used which is allowed by The American Spinal Injury Association (ASIA) (Furlan et al., 2011).

The primary causes of death were pneumonia, accidents and suicides. Septicemia, pneumonia and pulmonary emboli are the highest ratios of actual to expected deaths

where pneumonia was the leading cause of death. The secondary causes of death were accidents and suicides. Both accidents and suicides were the leading cause of death. Actual-to-expected deaths Septicemia had the main ratio. The principal causes of death among paraplegics' accidents, suicides and cancer were major where pneumonia was the leading cause of death among quadriplegics. Until the mid-1970s overall leading cause(s) of death were traditionally known renal failure and other urinary tract complications, which decline in their role in recent data, reflect a significant as the primary killer of SCI patients (Stover & Fine, 1987).

After spinal injury many people are not immediately treated and a person acquiring a spinal cord injury stays at home and wants to a traditional treatment. So, many people face medical complications such as urine infections and bedsores. In other hand, the other hospital refers the patient to a specialized hospital or medical college hospital or to CRP for further treatment although there are no specialized government hospitals for the treatment and rehabilitation of people with SCL. Most of the patients come from the rural area and their career is also illiterate as a result they cannot know about the lesion of spinal cord. So they think the patient will be recovering by day to day. The patient believes that he will come back his normal life and provide support to his/her family. CRP has enhanced a full and average system to provide services for people with SCL. CRP is all-time ready to play a vital contribution to the rehabilitation of paralyzed people. A social worker or a Community Based Rehabilitation (CBR) worker visits the patient's home, because after rehabilitation they need some necessary things which they supplied. CRP wants to give the fully support to people with SC, so the people can lead a normal, happy and peaceful life (Momin, 2005).

Social isolation and discrimination in society is the major and common problem. For the non-disabled majority must be undertaken and legal guarantees time honors and compulsory to improve the lives of those with disabilities, education. People with disabilities with some cultures are more tolerant than others. Believe to be the cause of disability (for example, bad blood, divine displeasure or punishment for actions in a previous life) by the people of a society's attitude towards disability is created in nature. Always such beliefs are not negative. For example, God often gives children with a disability to couples who are able to show them special compassion and care

influences the way the surrounding community responds to these children in northern Mexico that the belief. The manner in which families and communities, how people expect individuals with disabilities to contribute to society also shapes respond to children and youth with disabilities (Groce, 1999).

3.1 Study design

Quantitative research model was used in the form of retrospective type of descriptive survey in the design. Retrospective design is the most common survey approach to focus on the past as well as present experience. Descriptive study design was chosen because the aims of the study are to know the demography of spinal cord injury.

3.2 Study site

The SCI registered unit of physiotherapy department of at the Centre for the Rehabilitation of the Paralyzed (CRP) in Bangladesh which is the largest spinal cord injury rehabilitation centre for the patient with spinal cord injury in Bangladesh was selected. At first the standard questionnaire was developed and then collected data from SCI registered unit.

3.3 Study area

Spinal Cord Injury (SCI) Unit of CRP was selected for data collection.

3.4 Sample size

Sampling procedure for cross sectional study done by following equation-

$$n = \left\{ \frac{z\left(1-\frac{\alpha}{2}\right)}{d} \right\}^2 \times pq$$

Here, $z\left(1-\frac{\alpha}{2}\right) = 1.96$

P= 0.47

q= 1-p=0.53

d= 0.05

The actual sample size for the study is 383. But it is an educational research and the study is retrospective. All information and files were available when the data was collected. So, 426 data was collected from the SCI registered unit to complete the research objectives.

3.5 Study population and Sampling

The target population was the patient with Spinal Cord Injury who was admitted at CRP spinal cord injury unit, Savar, Dhaka. The target population was about 426.

3.6 Sampling technique

Purposive sampling technique was used for sample selection. Purposive sampling starts with a purpose in mind and the sample is thus selected to include people of interest and exclude those who do not suit the purpose. Usually, the population is too large for the research to attempt to survey all of its members. A small, but carefully chosen sample can be used to represent the population. The sample reflects the characteristics of the population from which it is drawn.

3.7 Inclusion criteria

Spinal cord injury patients admitted into CRP.

- The assessment which has diagnosed.
- The complete and well fill out assessment (assessment form and discharge summery) for the necessary information.

3.8 Exclusion criteria

- Incomplete document due to lack of information
- Patients without spinal cord injury

3.9 Data collection tools

Data was collected by using Papers, Pen, Pencil, Diary, Computer and pen drive, file.

3.10 Data management and analysis plan

The data that was collected is descriptive data. The graph technique was used for analyzing data, calculated as percentages and presented this using bar and pie charts by SPSS (Statistical Package of Social Science) software version 16.0. SPSS is a comprehensive and flexible statistical analysis and data management solution. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics and conduct complex statistical analyses.

3.11 Ethical consideration

The permission was initially taken from the supervisor of the research project and from the course coordinator before conducting the study. The necessary information has been approved by the ethical committee of CRP and was permitted to do this research. A research proposal was submitted to the physiotherapy department of BHPI for approval and the proposal was approved by the faculty members. Beginning the data collection, permission was obtained from the concerned authorities ensuring the safety of the participants. The formal permission was taken from the head of the physiotherapy department to check patient file and collect the data. Data collection was started and completed within the allocate time frame. All information was kept in secure. World Health Organization (WHO) and Bangladesh Medical and Research Council (BMRC) rules were followed to conduct the study.

3.12 Limitations

Complete accuracy is not being possible in any research so that some limitations may exist. Regarding this study, there were some limitations or barriers to consider the result of the study as below:

- The first limitation of this study was small sample size. The data was taken only in one year.
- As the study was conducted at Centre for the Rehabilitation of the paralyzed (CRP) which may not represent the whole country.
- The study was only the demography of the spinal cord injury patients, in further study would be carry out the other sectors of the Spinal cord injury.

Age and Gender

Among the 426 participants 282 participants were male and 41 participants were female below or up to 45 years age group, 92 were male and 11 were female above 45 years age group. There mean age 33.84 years and minimum age was 4 years and maximum age was 75 years. In percentage 102 (23.94%) participants were between 4-24 years, 114 (26.76%) were between 25-32 years, 104 (24.41%) were between 32-42 years and 106 (24.88%) were between 43-75 years. Overall 75.82% participants were below or up to 45 years age group and 24.17% participants were above 45 years age group where 87.79% participants were male and 12.20% participants were female.

Age group	Gender of the participants		Total
	Male (%)	Female (%)	
< 45 years	282 (66.2%)	41 (9.6%)	323 (75.8%)
≥ 45 years	92 (21.6%)	11 (2.6%)	103 (24.2%)
Total	**374 (87.8%)**	**52 (12.2%)**	**426 (100%)**

Table-1: Cross tabulation between age and gender of the participants

Marital status

The married person was 304 (71.4%) and unmarried person were 122 (28.6%).
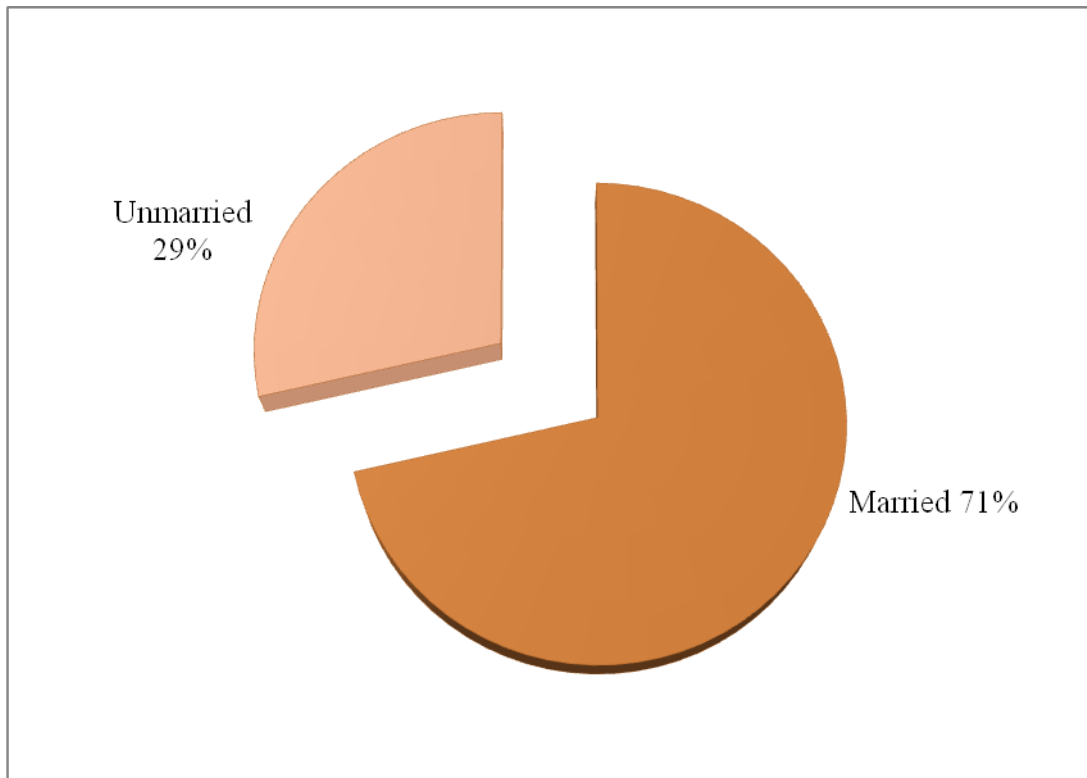
Figure-1: Marital status of the patients

Educational level

Among of the 426 participants most of them were 150 (35.2%) no formal schooling. Less than primary school completed were 41 (9.6%), primary completed were 84 (19.7%), JSC completed were 69 (16.2%), SSC completed were 46 (10.8%), HSC completed were 18 (4.2%), Graduation completed were 10 (2.3%), Masters completed were 6 (1.4%) and others completed were 2 (0.5%).

Educational Status	Number	Percentage
No formal schooling	150	35.2
Less than Primary	41	9.6
Primary completed	84	19.7
JSC completed	69	16.2
SSC completed	46	10.8
HSC completed	18	4.2
Graduation completed	10	2.3
Masters completed	6	1.4
Others completed	2	0.5
Total	**426**	**99.9**

Table-2: Educational status of the participants

Occupation

Out of the participants, most of them were farmer 121 (28.4%), Electrician were 3 (0.7%), House wife were 31 (7.3%), Students were 39 (9.2%), Mason were 15 (3.5%), Service holder were 44 (10.3%), Day labor were 81 (19%), Business man were 24 (5.6%), Beautician was 1 (0.2%), Driver were 35 (8.2%), others32 (7.5%).

Occupation	Number	Percentage
Farmer	121	28.4
Electrician	3	0.7
House wife	31	7.3
Student	39	9.2
Mason	15	3.5
Service holder	44	10.3
Day labor	81	19
Business man	24	5.6
Beautician	1	0.2
Driver	35	8.2
Others	32	7.5
Total	**426**	**99.9**

Table-3: Occupation of the participants

Residential area

The analysis showed that most of the sufferers came from rural area. Most of participants among 426 patients who sufferings from spinal cord injury urban people were 69 (16.2%) and rural people were 357 (83.8%).
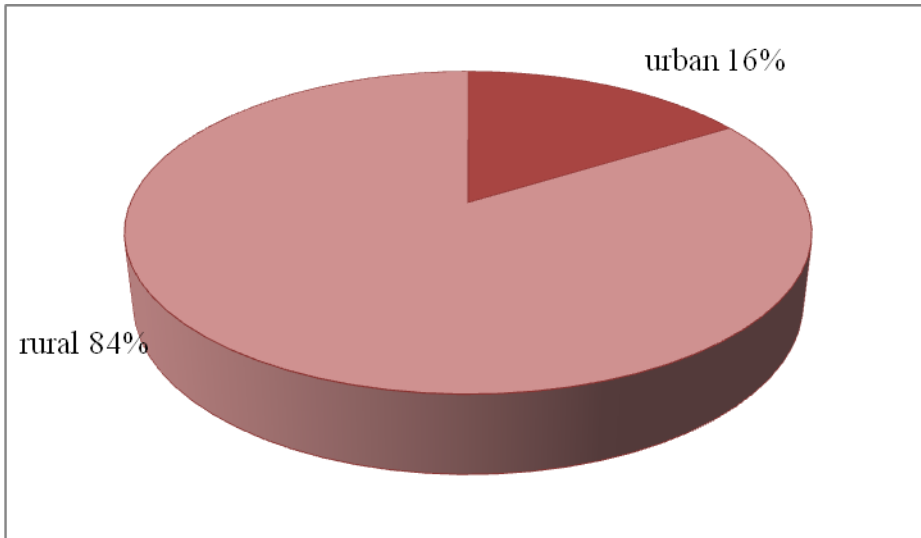
Figure-2: Residential area of the patients

Skeletal level of injury

Among the participants the skeletal level of cervical were 149 (35%), thoracic were 133 (31.2%), lumber were 90 (21.1%) and no were 54 (12.7).

Skeletal Level	Number	Percentage
Cervical	149	35
Thoracic	133	31.2
Lumber	90	21.1
No	54	12.7
Total	**426**	**100**

Table-4: Skeletal level of the participants

Impairment grading in ASIA Scale

Out of 426 patients the impairment grading in ASIA scale A were 316 (74.2%), ASIA scale B were 23 (5.4%), ASIA scale C were 25 (5.9%), ASIA scale D were 57 (13.4%), ASIA scale E were 3 (0.7%) and normal were 2 (0.5%).

Impairment according to ASIA Scale	Number	Percentage
ASIA scale A	316	74.2
ASIA scale B	23	5.4
ASIA scale C	25	5.9
ASIA scale D	57	13.4
ASIA scale E	3	0.7
Normal	2	0.5
Total	**426**	**100**

Table-5: Impairment grading in ASIA scale

Type of injury

Among the participants complete paraplegia patient's were138 (32.4%), incomplete paraplegia patient were 106 (24.9%), complete tetraplegia were 101 (23.7%) and incomplete tetraplegia were 81 (19%).

Type of injury	Number	Percentage
Complete paraplegia	138	32.4
Incomplete paraplegia	106	24.9
Complete tetraplegia	101	23.7
Incomplete tetraplegia	81	19
Total	**426**	**100**

Table-6: Type of injury

Cause of injury

The major cause of injury of Spinal Cord Injury of the study was traumatic 385 (90.4%) and non traumatic cause of injury was 41 (9.6%).
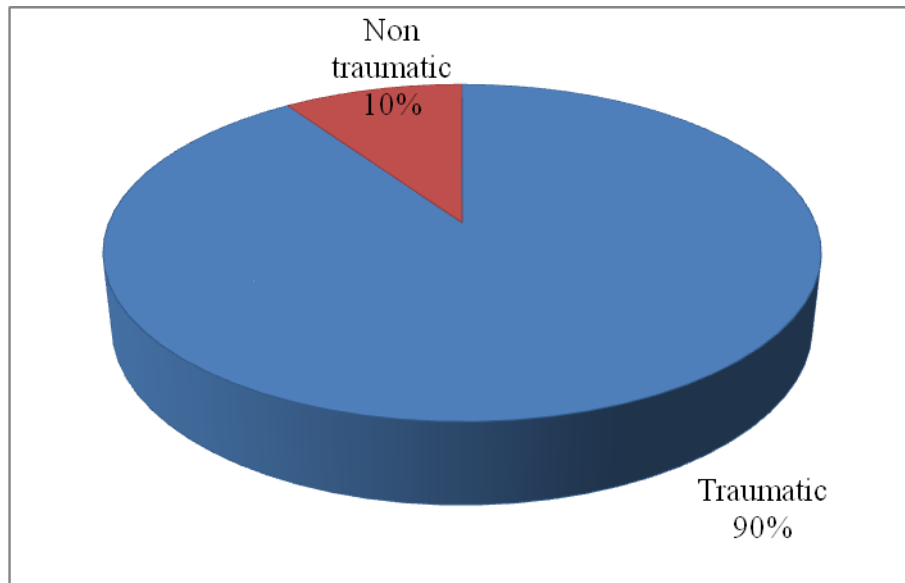

Figure-3: Cause of injury

Traumatic injury

Most of the traumatic cause of injury was fall from height and second cause was road traffic accident. Among the participants Road traffic accident were 103 (24.2%), fall from height were 186 (43.7%), Fall of over loading were79 (18.5), Shallow diving were 4 (0.9%), Gunshot injury were 3 (0.7%), Bomb blast injury was 1 (0.2%), others were 11 (2.6%) and not applicable 39 (9.2%).

Traumatic injury	Number	Percentage
Road traffic accident	103	24.2
Fall from height	186	43.7
Fall of over loading	79	18.5
Sallow diving	4	0.9
Gunshot injury	3	0.7
Bomb blast injury	1	0.2
Others	11	2.6
Not applicable	39	9.2
Total	**426**	**100**

Table-7: Traumatic injury of the participants

Non traumatic injury

Out of 426 patients 3 (0.7%) were Physical assault, Sudden weakness were 17 (4%), Spine tuberculosis were 10 (2.3%), Transverse militias were 4 (0.9%), others were 5 (1.2%) and not applicable were 387 (90.8%).

Non traumatic injury	Number	Percentage
Physical assault	3	0.7
Sudden weakness	17	4
Spinal tuberculosis	10	2.3
Transverse militias	4	0.9
Others	5	1.2
Not applicable	387	90.8
Total	**426**	**99.9**

Table-8: Non traumatic injury of the participants

Monthly income

Average family income of the participants was 0-3300 taka (24.64%), 3500-4000 taka (22.77%), 4500-5500 taka (21.36%) and 6000-25000 taka (31.22%).

Monthly family income	Number	Percentage
0-3300	105	24.6
3500-4000	97	22.8
4500-5500	91	21.4
6000-25000	133	31.2
Total	**426**	**100**

Table-9: Monthly income of the patients

CHAPTER-V:	DISCUSSION

The aim of the study was to find out the demography of the spinal cord injury patient who admitted into CRP from January-December, 2012. Even it is not possible to know the total number of patient of spinal cord injury in Bangladesh. Currently there is lack of survey information on spinal cord injury in CRP. In this study there was about 426 samples was taken.

In this study the mean ages was 33.84 years, in other study conduct in Brazil the mean age was 30.3 ± 1.1 years (Paz et al., 1992). Another study showed that the mean age was 40.8 ± 14.1 years (Groot et al., 2006). In USA a study showed that the mean age was 29·7 years (Stover & Fine, 1987). In Pakistan mean age 28.3 ± 12.4 years (Rathore et al., 2007). In India another study showed that the mean age was 34.3 years (Chhabra & Arora, 2012).

In the study there was 87% male and 12.1% female and the male female ratio was 7.2:1. In Brazile male female ratio was 3.9:1 (Paz et al., 1992). In USA male female ratio was 4:1 (Stover & Fine, 1987). In Fijians male female ratio was 35:6 and in India the ratio was 7:2 (Maharaj, 1996). Majority of victims 57.2% were women in Pakistan (Rathore et al., 2007).

The married person was 71.4% and the unmarried person was 28.6% in this study. Another study showed that 59.3% were married person and 37.1% were unmarried person in Fiji (Maharaj, 1996). In Pakistan a study showed that the married person was 65% (Rathore et al., 2007).

The study showed that primary level completed person were 19.7%, SSC level completed were 10.8% and 2.3% was graduation level completed. The majority of the patients in Fiji there were 61.4% had only primary level, 28.6% had SSC level and 10.4% had graduation level completed (Maharaj, 1996).

Here the students were 9.2%, farmer 28.4%, service holder 10.3% and others 7.5%. In Fiji student's were17.1% and service holder were 30.0% (Maharaj, 1996). In China a

study showed that farmer was 57.2%, labor was 13.3%, student 2.6%, service holder 3.4% and others 12.4% (Wang et al., 2013). In Nigera showed that students was 20%, farmers 12.9%, service holders 14% (Nwankwo & Uche, 2013).

The research showed that most of the patients were village people. The rural patients were 83.8% where as the urban patients were 16.2%. The Indian research showed that 53.95% were from rural areas and 40.51% from the urban areas (Chhabra & Arora, 2012).

The study showed that cervical injury was 35%, thoracic was 31.2% and lumber injury was 21.1%. In China cervical injury was 46.3%, thoracic injury was 20.4% and lumber injury was 33.3% (Wang et al., 2013). In this Study according to the grading scale ASIA A were 74.2%, ASIA B were 5.4%, ASIA C were 5.9% and ASIA D were 13.4%. In Pakistan there was no case of ASIA A, 46% were in ASIA B, 41% were ASIA C and 8% were ASIA D (Rathore et al., 2007).

Here the complete paraplegia patients were 32.4%, incomplete paraplegia patients were 24.9%, complete tetraplegia patients were 23.7% and incomplete tetraplegia patients were 19%. In Turkey 85.12% was complete paraplegia, 6.85% were incomplete paraplegia, complete tetraplegia were 4.84% and incomplete tetraplegia were 3.19% (Dincer et al., 1992). In Pakistan 46% patients had incomplete paraplegia, 43.3% had complete paraplegia, 4.8% had incomplete tetraplegia, and 5.9% had no neurological deficit (Rathore et al., 2007). In Istanbul Turkey 33% patients were tetraplegic and 67% patients were paraplegic (Karamehmetoglu et al., 1995).

In the study the traumatic cause was 90.4% and non traumatic cause was 9.6%. Other hand in Netherland traumatic cause was 75% (Groot et al., 2006). In Fiji there were 53.6% traumatic cause and 46.4% non-traumatic cause (Maharaj, 1996). The study showed that road traffic accident was 24.2%, fall from height was 43.7% and gunshot injury was 0.7%. In Australia traffic accident was 48.7%, for falls 26.6%, 5.8% gunshot injury. In America traffic accident was 42.8%, for fall 19.2%, for gunshot injury 12.3%. In England traffic accident was 46.8%, for fall 25.7% and 0% for gunshot injury (Dincer et al 1992). In Nigeria a study showed that road traffic accident was 55.3%, fall from height 23.5%, assault 7.1%, and gunshot injury was

8.2% (Nwankwo & Uche, 2013). Motor vehicle collisions were 56.4%; individuals were involved in a collision with a motorized vehicle, including drivers, passengers, pedestrians and bicyclists. 86 (19.1%) were the second most common cause of injury was fall. Falls from height, stairs, roofs or ladders, slipping or tripping were another cause. In Canada a research showed that the third most common cause of SCI is head injuries, including hemo- or pneumothorax and multisystem trauma (Dryden et al., 2003).

In the study cervical injury was 35%, thoracic injury was 31.2% and lumber injury was 21.1%. In South Affrica 25% was cervical spine injury, 63% was thoracic injury and 12% was lumbar spine injury (Hart & Williams, 1994). And in Bangladesh another study showed that 44% had cervical lesion, 27% had thoracic and 29% had lumber lesion (Islam et al., 2011).

CHAPTER-VI: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Spinal cord injury (SCI) is an insult to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function. In Bangladesh the number of spinal cord injury patient is increasing day by day. Spinal cord injury (SCI) is one of the most destructive conditions known to mankind. Although spinal cord injury is one of the most serious injuries that a person can survive, it is possible to return to a healthy, happy and productive life after even the most severe of cord injuries. In Bangladesh many of people in every year face Spinal Cord Injury and there is lack of much information. And paraplegia is more common then tetraplegia. This study was aimed to find out the demography of the Spinal Cord Injury patient. For the fulfillment of the study, I was designed a quantitative and retrospective study design and collected 426 data from the samples through a standard questionnaire from the registered unit of Spinal Cord Injury. From the data base, it was found that the age range between 25-32 years is more vulnerable to have spinal cord injury (SCI). Male are predominantly more affected than female. The educational level were very poor in most the patients, and most of them are from rural areas who live with low economic level. It is difficult to stop the responsible cause of Spinal Cord Injury. Spinal Cord Injury management and rehabilitation is a long time process so it is important to create awareness and receive proper step to reduce the risk of Spinal Cord Injury.

6.2 Recommendations

The aim of the study was to find out the demography of the spinal cord injury in Bangladesh. I recommended the following things:

- Should take more samples for generating the result and try to make more valid and reliable.
- Should take more samples for pilot study to establish the accuracy of the questionnaire.
- Should take more time.
- Sample should collect from the only rehabilitative institute in Bangladesh.
- But research would need to be carried out considering proof of hypothesis; the method should be changed from cross sectional to case control.

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Title: Demographic profile of Spinal Cord Injury: A retrospective study

Questionnaire

<u>**Participants**</u>

    A. ID no:

    B. Name:

    C. Age:

    D. Sex:

      1= Male

          2= Female

    E. Marital status:

         1= Married

         2= Unmarried

         3= Divorced

         4= Widow

    F. Educational level:

1= No formal Schooling

2= Less than primary School

3= Primary Completed

4= JSC Completed

5= SSC Completed

6= HSC Completed

7= Graduate Completed

8= Masters Completed

9= Others Completed

G. Occupation:

1= Farmer

2= Electrician

3= Housewife

4= Students

5= Mason

6= Service holder

7= Day labor

8= Business

9= Beauty parlor

10= Driver

11= Others

H. Residential area :

1= Urban

2= Rural

I. Date of injury : DD/MM/YY----------

J. Date of admission : DD/MM/YY--------

K. Date of data collection : DD/MM/YY--------

L. Skeletal level of injury:

1= Cervical

2= Thoracic

3= Lumber

4= No

M. Neurological level:

1= ASIA scale: A

2= ASIA scale: B

3= ASIA scale: C

4= ASIA scale: D

5= ASIA scale: E

6= Normal

N. Type of injury :

1= Complete paraplegia

2= Incomplete paraplegia

3= Complete tetraplegia

4= Incomplete tetraplegia

O. Cause of injury :

    1. Traumatic

        1= Road traffic accident

        2= Fall from height

        3= Fall of over loading

        4= Shallow diving

        5= Motor vehicle

        6= Motor cycle

        7= Pedestrian – vehicle crashes

        8= Bicycle

        9= Gunshot injury

        10= Bomb lust injury

        11= Others

    2. Non traumatic

P. Monthly family income:

1= No income

2= 1000 – 5000

3= 6000 – 10,000

4= 11,000 – 15,000

5= > 15,000

Permission letter

Date: March 15, 2013
To
Head of the Department,
Department of the physiotherapy,
Center for the Rehabilitation of the paralyzed (CRP),
Savar, Dhaka-1343

Subject: Application for permission to collect data to conduct a research study.

Sir,
I respectfully state that I am Ziniya Mustary Rahman student of fourth year B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). In fourth year course curriculum, we have to do a research project. I have chosen a research title that "Demographic Profile of Spinal Cord Injury: A retrospective study over January 2012 to December 2012" And my superviser is Md. Shofiqul Islam Lecturer of Physiotherapy department. For this reason, I need to permission for collect data from the inpatient registered unit of Spinal Cord injury, CRP at Savar, Dhaka.

Therefore, I pray and hope that you would be kind enough to grant my application and give me the permission for collect data from inpatient registered unit of Spinal Cord injury.

Yours faithfully

Ziniya Mustary Rahman

Ziniya Mustary Rahman
4th year B.Sc. in physiotherapy
Session: 2007-2008
BHPI, CRP, Savar, Dhaka-1343