CHARACTERIZATION OF SPINAL CORD LESION IN BANGLADESH

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

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

CHARACTERIZATION OF SPINAL CORD LESION IN BANGLADESH

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DECLERATION

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

Signature: **Date:**

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CONTENTS

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Abbreviations

ASIA:	American Spinal Cord Injury Association
BHPI:	Bangladesh Health Professions Institute
CRP:	Centre for the Rehabilitation of the Paralyzed
ICECI:	International Classification of External Causes of Injury
NITOR:	National Institute of Traumatology, Orthopaedic and Rehabilitation
RTA:	Road Traffic Accident
SCL:	Spinal Cord lesion
WHO:	World Health Organization

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Abstract

Purpose: To identify the characterization of spinal cord lesion in Bangladesh. *Objective:* To explore socio-demography information, to identify traumatic causes associated with spinal cord injury and to find out non-traumatic causes of spinal cord injury in Bangladesh. *Methodology:* The study design was descriptive cross sectional study. Total 94 samples were selected by purposive sampling from inpatient of Centre for the Rehabilitation of the Paralysed (CRP). Data was collected by mixed type questionnaire. Descriptive statistics were used for data analysis which focused through table, pie chart and bar chart. *Result:* Age of the studied subject range between 8-60 years. Most of them were male (n=85, 90.4%). This study shows major traumatic causes of spinal cord injury were fall (n=62, 66%) and motor vehicle accident (n=25, 18.2%). Major types of fall include fall from height (36.3%), fall from roof (10.6%), fall heavy weight on back (15.9%). Major causes for non-traumatic spinal cord lesion were Pott's disease (3.2%) and spinal tumour (2.1%). The main working areas during spinal cord injury were farm/ranch (44.7%), street (19.1%), home area (12.8%) and construction area (3.5%).*Conclusion:* Fall from height, fall heave weight on back, road traffic accident and pott's diseases are the major causes of spinal cord lesion in Bangladesh. The victims are mostly young. Most of the injuries are found in farm/ranch and home area during working.

CHAPTER – I: INTRODUCTION

1.1 Background

Bangladesh is developing country and most densely populated country in the world. Approximately hundred and fifty million people live in this small country. It is considered as one of the least developed countries in the world as measured in term of average income, calories consumption, high infant mortality rate and low literacy rate. Near about 10% of total population are disable in Bangladesh where 43% are physically disable (JICA, 2002). According to disability in Bangladesh (2002) the total figure of disability is increasing with population growth and aging. With such a large number of disables people it is quite possible to achieve national development. But it is real phenomenon of our society that disable people are very often deprived of their social opportunity and their rights. Spinal cord injury is one of the most debilitating and devastating injuries in the world. It is a catastrophic and devastating condition that often affecting healthy and young individual. This debilitating condition not only creates enormous physical disability but also emotionally depress the patient. It causes important changes within an individual physical and psychological relationship with their environment. Some of the changes involve the loss of motor function, inability to control bladder & bowel function and the vitiated sexual functioning. It also has an Impact on quality of life, life expectancy and economic burden (Wyndaele and wyndaele cited in Ning et al, 2011). In respect to this changes they are likely to have profound effect of an individual social and interpersonal relationship within their community (King and kennedy cited in Chappel and Wriz, 2003). It is one of the most serious injuries that a person can survive. It is probably the most devastating of all the illness that can befall man. Internationally incidence rate for SCI range from 10.4 to 83 case per million of population, with significant difference between different country or region (Wyndaele and wyndaele cited in Ning et al, 2011). There are no effective restorative therapies for SCI as yet, so prevention is the best medicine at present.

1.2 Justification of the study

Injuries and diseases affecting spinal cord are an important health problem in Bangladesh due to high morbidity and mortality rate (Haque, et al, 1999). It is one of the significant causes of physical disability in our country. The number of affecting people is increasing day by day due lack of awareness. It affects a large number of individual that create devastating affect on a family a society as well as in whole country. It is a serious condition which can result in significant morbidity and mortality, therefore prevention is paramount importance. For planning of preventive clinical and community service appropriate data are essential. The researcher is interested to know the causes which are responsible for spinal cord injury in Bangladeshi people. This study will be helpful for physiotherapy professional to get information about Bangladeshi spinal cord injured people. Other health professional will get update knowledge about factor causing spinal cord injury. By this knowledge also mass people will benefited by aware from activity that expose to spinal cord injury.

1.3 Research question

What are the characteristics of spinal cord lesion in Bangladesh?

1.4 Objective

1.4.1 General objective

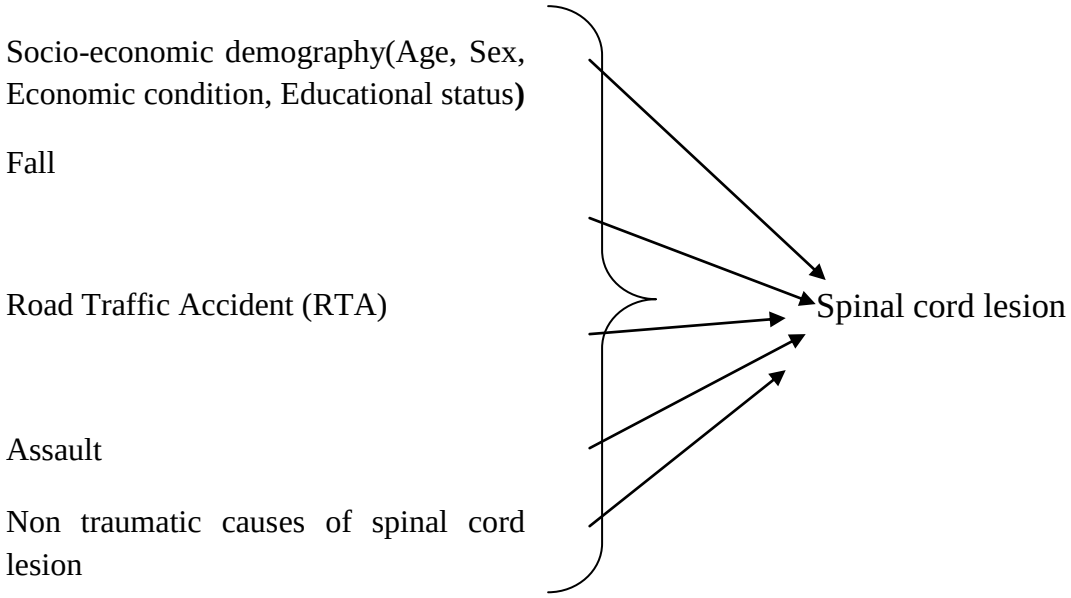
- To find out the characteristics of spinal cord lesion in Bangladesh.

1.4.2 Specific objective

- To explore socio-demography information of patient with spinal cord lesion.
- To identify traumatic causes associated with spinal cord lesion.
- To find out non-traumatic causes of spinal cord lesion in Bangladesh.

1.5 List of variable

Dependent variable **Independent variable**



1.6 Operational definitions

Spinal cord- Cylindrical mass of nervous tissue running through spinal column.

SCI- It is damage to the spinal cord. It may result from direct injury to the cord itself or indirectly from damage to surrounding bones, tissues, or blood vessels.

Key muscle group- The 10 muscle group that are tested in the standardized spinal cord examination.

Motor level- The most caudal key muscle group that is graded3/5 or greater with the segment cephalad to the level graded normally.

Sensory level- It is the most caudal dermatome which have normal sensation for both pinprick and light touch on both sides.

Neurological level- The most caudal level at which both motor and sensory modalities is intact.

Tetraplegia - paralysis of the arms, legs, and trunk of the body below the level of an associated injury to the spinal cord.

Paraplegia - Paraplegia describes complete or incomplete paralysis affecting the legs and possibly also the trunk, but not the arms.

Complete injury- Absence of sensory and motor function in the lowest sacral segment.

Incomplete injury- Preservation of motor or sensory function bellows the neurological level of injury that included the lowest sacral segment.

Zone of partial preservation- All segment bellow the neurological level that have preserve motor and sensory findings, used only in complete injury.

Sacral sparing- Presence of motor function (voluntary external anal sphincter contraction) or sensory function (light touch, pinprick, at s4/5 dermatome, or anal sensation on rectal examination) in the lowest sacral segments.

ASIA impairment scale

Complete: No motor or sensory function is preserved in the sacral segment.

A- Incomplete: Sensory but no motor function is preserved bellow the neurological level and include the sacral segment s4-s5

B- Incomplete: Motor function is preserved bellow the neurological level, and more than half of key muscle bellows the neurological level have a muscle grade less than 3.

C- Incomplete: Motor function is preserved bellow the neurological level, and at least half of key muscles bellow the neurological level has a muscle grade of 3 or more.

D- Normal: Motor and sensory function is normal.

Rural area- Area that locate outside of the cities or town.

Urban area- Area in a city.

Trauma- Body damage produces by sudden physical injury.

Non traumatic injury- Body damage that produced by any diseases condition.

Home- place used for living purpose include ground and building.

Farm/ranch- Any place where plant and animals are grown and raised.

Street/highway- Area that used for transport purpose.

Construction area- Location used at the time primarily for the building.

Motor vehicle- It include vehicle are used in transporting purpose.

Fall-Descend or drop by force.

Struck- Contact with moving object.

Potts disease- Tuberculosis of thorasic or lumber vertebral bodies. It is a common form of skeletal tuberculosis.

Spinal tumors- Tumors that locate in the spinal cord.

Transverse myelitis- Neurological disorder caused by inflammation of the spinal cord.

CHAPTER - II: LITERATURE REVIEW

The spinal cord is part of the central nervous system (CNS), which extends caudally and is protected by the bony structures of the vertebral column. It is covered by the three membranes of the CNS, i.e., the dura mater, arachnoid and the innermost pia mater. In most adult mammals it occupies only the upper two-thirds of the vertebral canal as the growth of the bones composing the vertebral column is proportionally more rapid than that of the spinal cord. According to its rostrocaudal location the spinal cord can be divided into four parts: cervical, thoracic, lumbar and sacral, two of these are marked by an upper or cervical) and a lower or lumbar (Nogradi & Vrobova, 2010).

According to maynard (2007) the spinal cord contains longitudinally oriented spinal tracts (white matter) surrounding central areas (gray matter) where most spinal neuronal cell bodies are located. The gray matter is organized into segments comprising sensory and motor neurons. Axons from spinal sensory neurons enter and axons from motor neurons leave the spinal cord via segmental nerves or roots. The roots are numbered and named according to the foramina through which they enter/exit the vertebral column. For example, the two C6 roots (left and right) pass through foramina situated between the C5 and C6 vertebrae. Each root receives sensory information from skin areas called dermatomes. Similarly, each root innervates a group of muscles called a myotome. While a dermatome usually represents a discrete and contiguous skin area, most roots innervate more than one muscle, and most muscles are innervated by more than one root.

Dawodu (2008), described spinal cord injury (SCI) as an insult to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function. There are mainly two types of spinal cord injury, complete and incomplete. Complete spinal cord injury is defined as absence of sensory and motor functions in the lowest sacral segments (Dawodu, 2008). An over view of complete spinal injury provided by complete spinal cord injury (2011) is that a complete spinal cord lesion is the term used to describe damage to the spinal cord that is absolute. It

causes complete and permanent loss of ability to send sensory and motor nerve impulses and, therefore, complete and usually permanent loss of function below the level of the injury. This will result in complete paraplegia or tetraplegia.

The term zone of partial preservation (ZPP) refers to those dermatomes and myotomes caudal to the neurological level that remain partially innervated. When some impaired sensory and/or motor function is found below the lowest normal segment, the exact number of segments so affected should be recorded for both sides as the ZPP. The term is used only with complete injuries (maynard, et al, 1997). According to (maynard, et al,1997) If partial preservation of sensory and/or motor functions is found below the neurological level and includes the lowest sacral segment, the injury is defined as incomplete. Sacral sensation includes sensation at the anal mucocutaneous junction as well as deep anal sensation. The test of motor function is the presence of voluntary contraction of the external anal sphincter upon digital examination.

There is some cord syndrome associated with spinal cord injury, they are anterior cord syndrome, conus medullaris syndrome, brownsequard syndrome, cauda equine syndrome and central cord syndrome. Anterior cord syndrome is associated with a lesion causing variable loss of motor function and sensitivity to pain and temperature; proprioception is preserved (Dawodu, 2008). According to (maynard et al, 1997) lesion that produces variable loss of motor function and of sensitivity to pain and temperature, while preserving proprioception.

Conus medullaris syndrome is associated with injury to the sacral cord and lumbar nerve roots leading to areflexic bladder, bowel, and lower limbs, while the sacral segments occasionally may show preserved reflexes (Dawodu, 2008). Brown-Séquard syndrome is defined as an incomplete lesion of the spinal cord characterized by ipsilateral upper motor neuron paralysis and loss of proprioception, with contralateral loss of pain and temperature sensation. A zone of partial preservation or segmental ipsilateral lower motor neuron weakness and analgesia may be noted (Albanese, 2011).

According to (Dawodu,2008) Cauda equina Syndome is defined as injury to the lubosacral nerve roots within the neural canal resulting in areflexic bladder, bowel and lower limbs. It occurs when the spinal canal becomes significantly narrow. As the spinal canal narrows the cauda equina, or the bundle of nerves below the spine, become compressed. The most common symptoms of cauda equina syndrome include lower back pain, a decrease or complete loss of lower extremity reflexes, pain in the legs (typically just one leg), Lower extremity weakness, loss of sensation in the lower extremities, buttock pain, difficulty having bladder or bowel movements, loss of control over bladder or bowel and numbness in the groin (kitchen, 2009).

Central cord syndrome is the most common form of incomplete spinal cord injury characterized by impairment in the arms and hands and to a lesser extent in the legs. The brain's ability to send and receive signals to and from parts of the body below the site of injury is reduced but not entirely blocked. This syndrome is associated with damage to the large nerve fibers that carry information directly from the cerebral cortex to the spinal cord **(**NINDS central cord syndrome information page, 2011). Here lesion, occurring almost exclusively in the cervical region, that produces sacral sensory sparing and greater weakness in the upper limbs than in the lower limbs (Dawodu, 2008).

Most spinal cord injuries occur as the result of direct or indirect trauma to the vertebral coloumn. Approximately 10% of these spinal cord injuries occur with no detectable vertebral injury. In 3% to 5% of cases of vertebral injury, however spinal column sustain damage at two or more level that are separated by undamaged vertebrae. The secondary level of injury is often located at the rostral or caudal part of the spine. Multiple, noncontageous vertebral injuries are associated with severe trauma. They occur most commonly associated with injuries of the upper and middle thorasic spine (Paraplegia 2011). Spinal column injuries are rarely caused by direct trauma to the vertebrae, most result from that creat violent motion of the head or trunk (spinal cord, 2011).

Cause of spinal cord injury varies from country to country. According to spinal cord injury statistics (2003) annual incidence of spinal cord injury (SCI), not including

those who die at the scene of the accident, is approximately 40 cases per million population in the U. S. or approximately 12,000 new cases each year. Here the cause of SCI is RTA 36.8%,falls 41.7%, sharp trauma 2.7%, sports 11.6%,collision/lifting 4.2%, nonspecific trauma 3.3%. In Australia transport related injuries (52%) and falls (29%) accounted for over three-quarters of the 271 cases of traumatic SCI. Cases also occurred during sport and working for income, including travel to and from work. Falling was the most common type of event leading to traumatic SCI at older ages (Spinal cord injury, Australia, 2006-07).

In united state the number of people in the who are alive in 2009 who have SCI has been estimated to be approximately 262,000 persons, with a range of 231,000 to 311,000 persons where vehicular 41.3%, falls 27.3%, violence 15%, sports 7.9%, other/unknown cause 8.5%(Spinal Cord Injury Facts and Figures at a Glance 2010). In India the most common cause of injury was fall from height including roof, trees, and electricity pole (44.5%) followed by motor vehicle accidents (34.7%). Falls were more prominent in second and third decades. Roadside accidents were common in third and fourth decade (Singh et al 2003, p 184-86).

In Canada there are currently 85,556 persons living with spinal cord injury in Canada. Of this total, 51 Percent (43,974 people) were the result of traumatic, and 49 percent from non-traumatic causes. 4,259 new cases per year of SCI in Canada today. Of this total, an estimated 42 percent (1,785 cases) are the result of traumatic spinal cord injury and 58 percent are from non-traumatic causes (Farry & hansen). In Iran according to Chabok, et al (2009) the most common cases of spinal injuries are motor vehicle accidents (52%) and fall (43%) the remainder was caused by falling heavy object on spine (2.4%) and other mechanism (2.4%).

In Finland the mean annual incidence for entire population was 13.8/1000 000, person for men 23.8/1000 000 and for women4.6/1000 000. The external cause of injury was fall 41.2%, traffic in 39.5%, violence in 2.7% and other in 10% (Ahoniemi, et al, 2008). In china, average incidence rate was 23.7/1000 000 in year from 2004 to 2008. Leading cause of injury was fall (56.9%) which include high and low fall. Next common cause was motor vehicle accident (34.1%). Other cause include 6.3% of

being struck by an object, 1.4% of assault 0.8% of work accident and 02% was sports related injury (Ning et al, 2011).

In Ireland most prominent cause of spinal cord injury was motor vehicle collision (50%). Fall (37%) was the second most causes of injury. 9% was injured during sports or recreational activity (Connor and Murray, 2006). According to Divanoglou and Levi, 2009, in Greece, leading cause of spinal cord injury was transportation accident (51%), fall were 37%, iatrogenic 4%, assault 2%, sports related injury include diving in (4%) and other in (2%). Divanoglou and Levi, (2009) shows in Sweden the leading cause o injury was fall occurred in (47%). Transportation accident occurred in (23%), sports injury including diving (17%), iatrogenic in (4%), assault in (4%) and other cause in 3%.

Important non-traumatic etiology of spinal cord lesion is spinal tumor, pott's spine, transverse myelitis, ischemic myelopathy (Gupta, A., et al, 2009). In Bangladesh a epidemiological study was conducted by Hoque et al 1994 and it revealed most important cause was fall and road traffic accident and most common non-traumatic cause was potts diseases, spinal tumour and transverse myelitis.

CHAPTER – III: METHODOLOGY

3.1Study design

Descriptive cross sectional survey methodology was chosen to meet the study aim as an effective way to collect data. Descriptive cross sectional study is one of the forms of observational study. It is one of the most commonly used survey research design. The study will conduct among the patients admitted injury department of center for the rehabilitation of the paralyzed.

3.2 Target population and sample population

Spinal cord lesion patient in Bangladesh and collect by using purposive sampling.

3.3 Study site

Center for the rehabilitation of the paralyzed was chosen for the study.

3.4 Study area

Spinal cord injury department of the Center for the rehabilitation of the paralyzed.

3.5 Inclusion and exclusion criteria

Inclusion criteria

- Patient with spinal cord lesion.
- Patient admitted in hospital.
- By born Bangladeshi people.

Exclusion criteria

- Un conscious patient
- Undiagnosed injury
- Undiagnosed non-traumatic spinal cord lesion patient

3.6 Sample size

Generally survey needs large sample that will represent whole population. Due to limited set of time frame the number of the sample of the study was 94.

3.7 Data collection methods and tools

Pen, papers, consent form, questionnaire, SPSS, Harvard reference system 2011, pen drive, computer. Questionnaire was developed according to follow the guideline of International Classification of External Causes of Injury (ICECI).

3.8 Inform consent

Researcher has taken permission during interview from every single participant with signature on a written consent form of the participants who were interested to take part in the study. The participants were informed about their role in the research process. The researcher had informed the participant about the aim of the research and procedures involved in the study. They had also informed that if they wish they were free to withdraw from the study any time. The researcher had also mentioned the participants that the information provided by the particular might be published but their name and address would not be used in research project. The study information only discusses with supervisor but this would not share with any other person. These materials were disposed off after completion of the research project. Participants were also informed that they would not get any harmful things from the study.

3.8 Ethical Consideration -

It should be ensured by the researcher that it would maintain the ethical issue at all aspects of the study. Because it is a crucial part of the all form of research. At first to conduct this study, ethical committee will check the proposal and grant approval. Permission will also be taken from the head of physiotherapy department. The researcher will give detailed and clear information about the purpose of the study of the participant of the research verbally in Bengali and written in English. During the course of the study, interested subject will be given consent form. The researcher will give the treatment protocol to the physiotherapist. The entire participant will take the same treatment. For this study, the researcher will not interfere with their clients and clinical practice. They will inform that their participation is fully voluntary and they

have the right to withdraw or discontinue from the research at any time without any hesitation or risk. Confidentiality of information will be maintained and client code will be used to make clients identity invisible. They were assured that taking part in this study would cause them no harm. They would not be embarrassed by the study. But in future new generation of physiotherapy will be benefited from this study. At any time researcher will be available to answer any additional question in regard to the study.

3.10 Limitation of the study –

- This was done in a short period, researcher should take more time to conduct this study
- Total number of sample was small and that may affect the study
- Purposive sampling procedure was used to select participants
- Only 1 hospital was selected to collect sample.

CHAPTER – IV: RESULTS

This was a descriptive cross sectional study. The main objective of the study was to find out common causes of spinal cord lesion patient according to international classification of external causes of injury (ICECI) in Bangladesh. Purposive sampling was done to select samples. Total 94 data were collected from the CRP. Data were numerically coded and captured in Microsoft Excel, using an SPSS 16.0 version software program. The investigator collected the descriptive data and calculated as percentages and presented by using bar charts.

Demographic information of the participants

A total 94 participant was selected, most of them ware male (n=85, 90.4%), and female (n=9, 9.6%) (Figure-1).

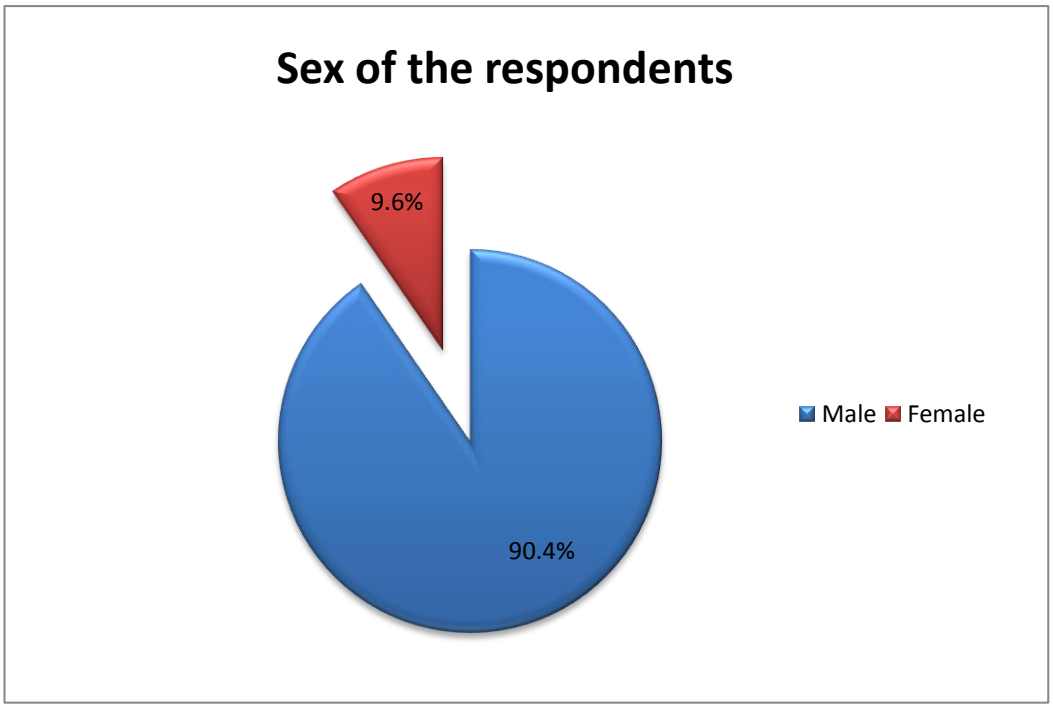


Figure-1: Sex of the SCI patients

Participant's age

The age range was 8-60. The mean age of the participants was 32.54 years. Standard was deviation 13.8 (Table-1).

Title	Number
Mean age	32.54
Median age	30.00
Mode age	30[a]
Std. Deviation	13.750

Table-1: Age of the participants

Marital status of the participants was married 64(68.1%), unmarried 29(30.9%) and divorced 1(1.1%).In case of residential area distribution most of the participant was rural people82 (86.3%) and urban people was 12 (12.2%) (Figure-3).

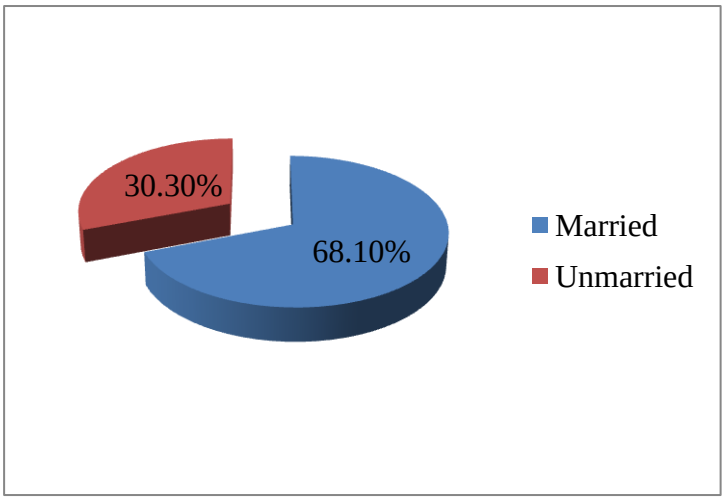


Figure-2: Marital status of the participants

Family income

Average family income of the participants was 1000-3000taka (27.7%), 3100-5000taka (32.34%), 5100-10,000 taka (27.7%) and 10,100-30,000 taka 10.6% (Figure-3).

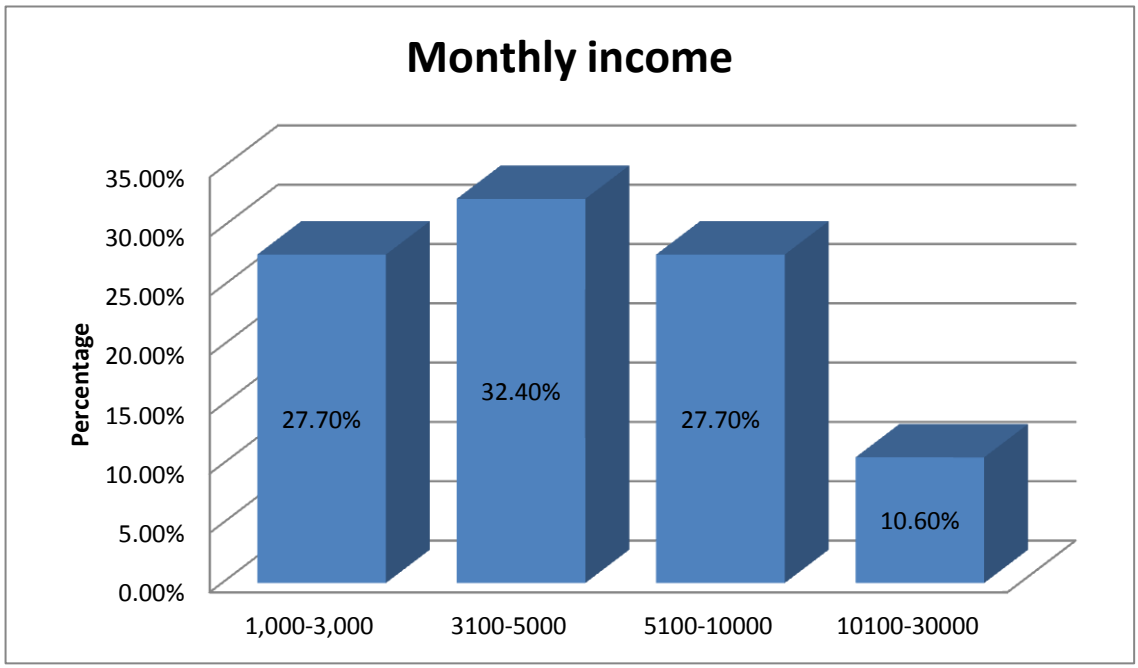


Figure-3: Average family income of SCI patients

Educational status

According to studies educational status of the participants was illeterate15(16%), literate 20(21.3%),primary34(36.2%),SSC14(14.9%),HSC 3(3.2%) ,bachelor8(8.5%) (Table-2).

	Number	**Percentage**
Illiterate	15	16
Literate	20	21.3
Primary	34	36.2
SSC	14	14.9
HSC	3	3.2
Bachelor	8	8.5
Total	**94**	**100**

Table-2: Educational status of the SCI patient

Cause of lesion

The primary and main cause of spinal cord lesion of my participants was traumatic 89 (94.7%) & non-traumatic was 5(5.3%) within them 3 has pott's diseases (3.2%) & 2 has spinal tumour (2.1%) (Figure-4).

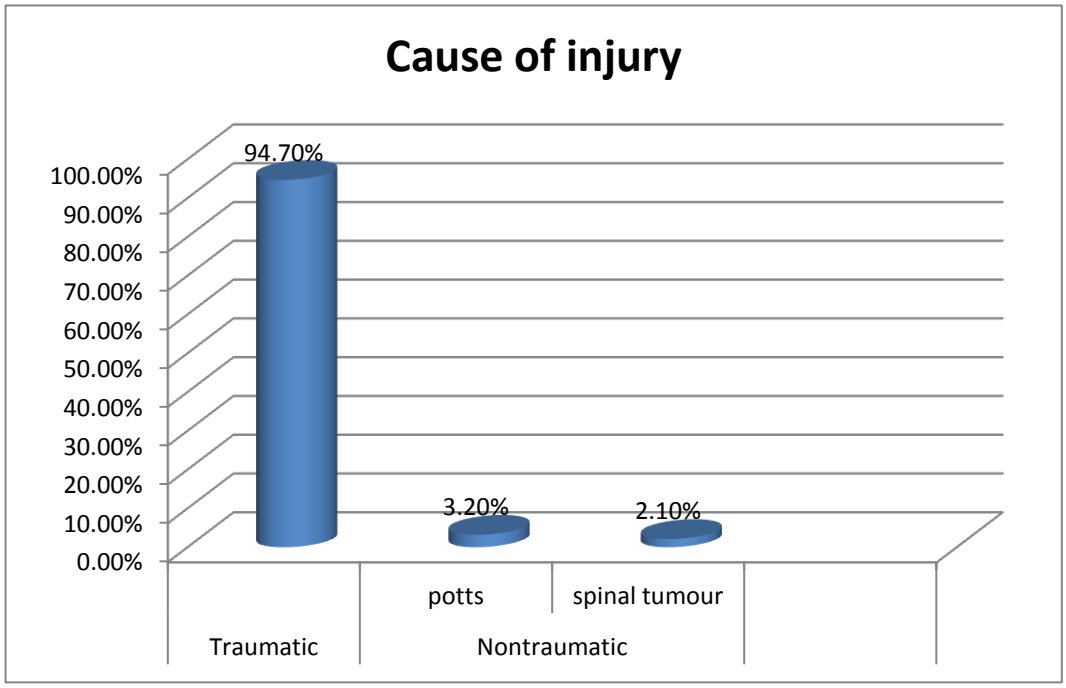


Figure-4: Causes of lesion of the participants

Work relation during injury

In relation to work most of the injury occurred in working hour47 (50%) & not work related 42 persons (44.7%) (Table-3).

	Number	**Percentage**
Work related	47	50.0
Not work related	42	44.7
Non traumatic	5	5.3
Total	**94**	**100**

Table-3: Relation of work during injury

Acvities of SCI patient durinh injury

During injury30.9% performed unpaid work, paid work 29.8%, Leisure20.2%,travelling 12.8% and sports 1.1%(figure-5).

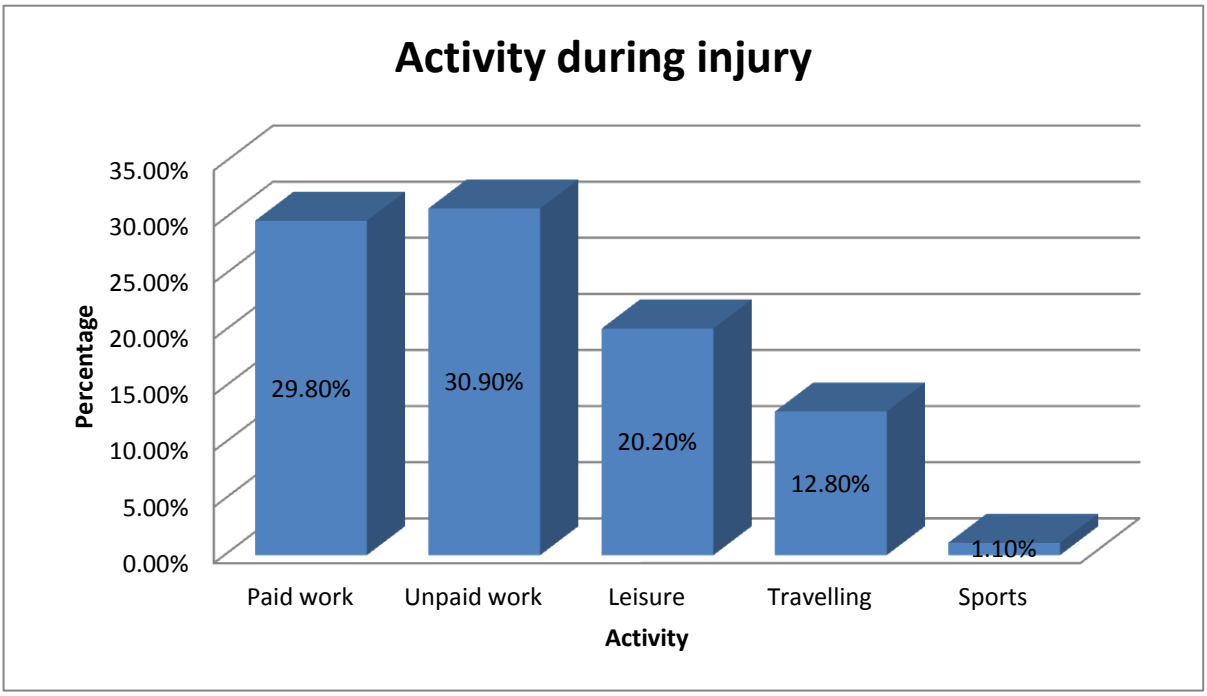


Figure-5: Acvity of SCI patient durinh injury

Working area during injury

Study shows during injury maximum patient was in farm/ranch (44.7%). Others are in street/ highway (19.1%),trade /service area(6.4%), home(12.8%), industrial /construction area(8.5%), resendential institution (3.2%) (figure-6).

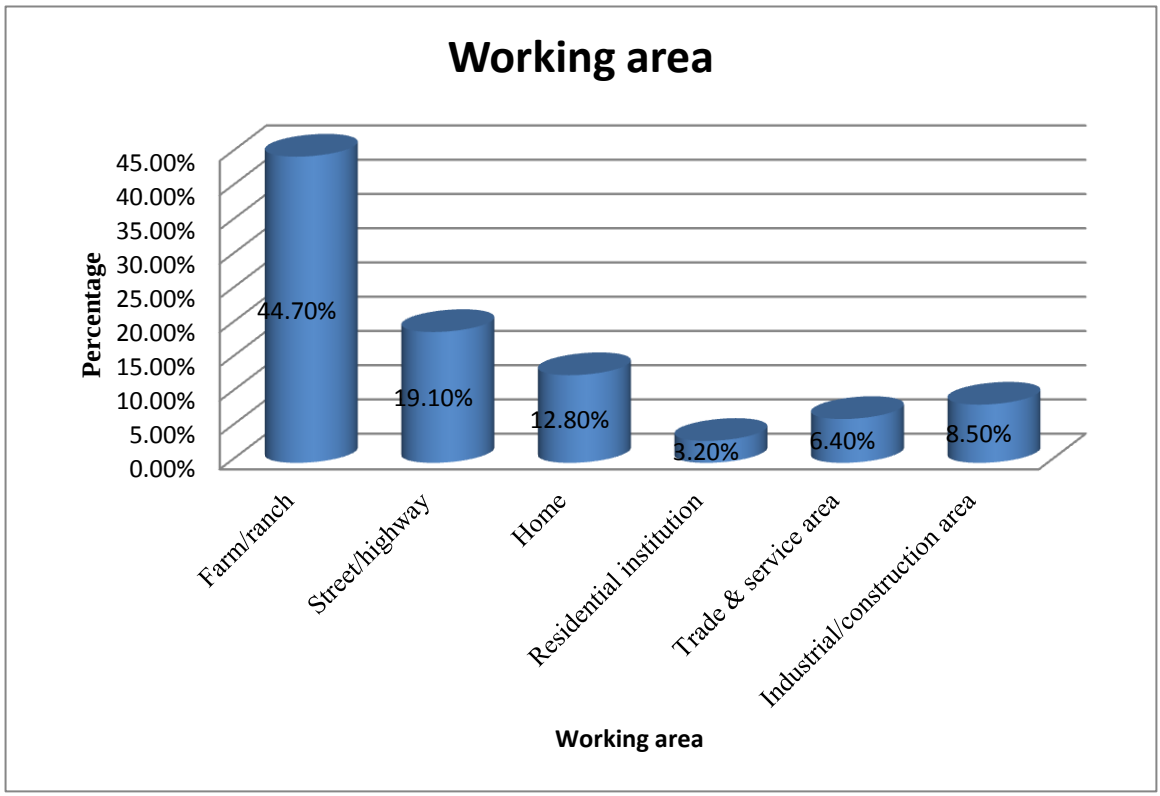


Figure-6: Area of working of SCI patients during injury

Intent and mechanism of injury

According to study most of the injury was unintentional (92.6%) & 2.1% injury was by assault.The main mechanism of injury was fall (66%).Other mechanism was motor vehicle accaident (12.8%), pedestrianvehicle crash (1.1%), motorcycle (3.3%), pedalcycle (1.1%), struck or crush 8.5%, gunshot (1.1%) (Figure-7).

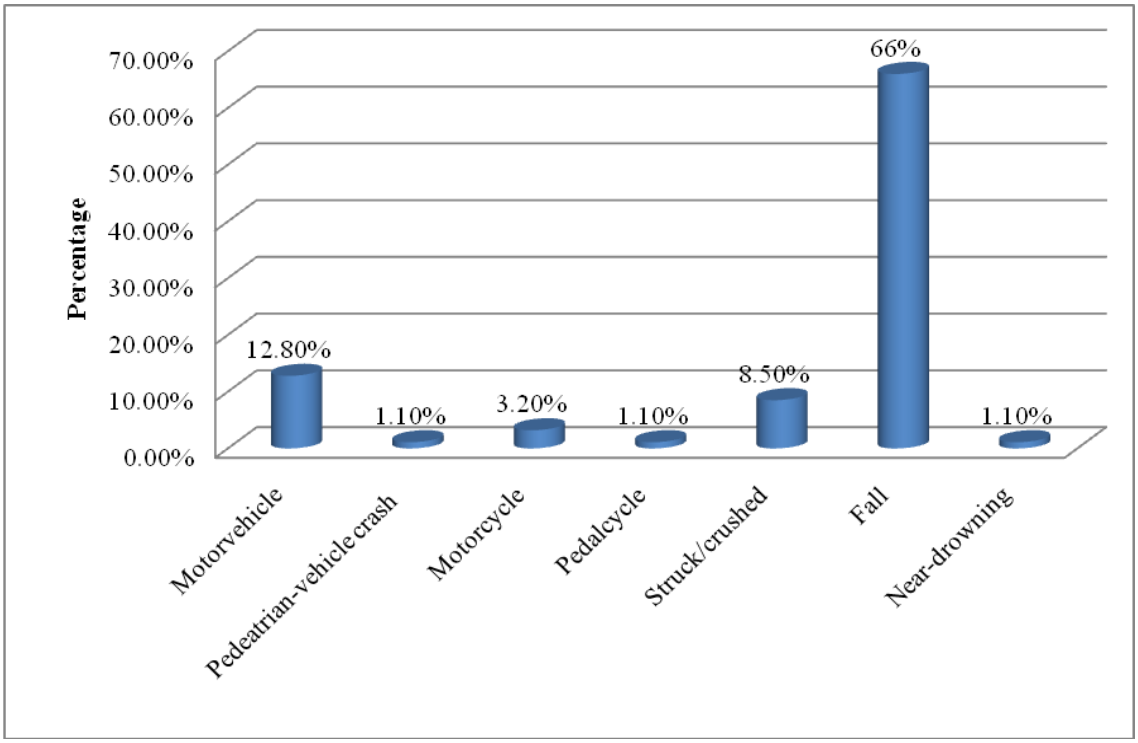


Figure-7: mechanism of injury

Type of fall

According to studies SCI caused by fall from tree was 34.6%, fall heavy object on back 14.9%, fall from roof was 10.6% and others type of fall was 4% (Figure-8).

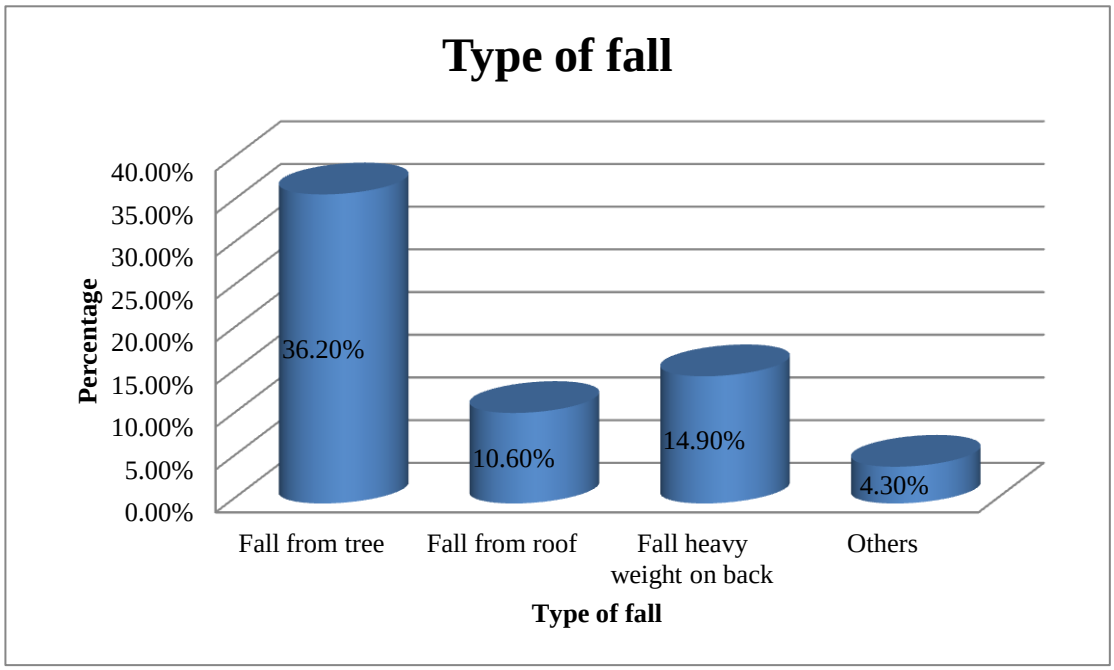


Figure-8: Type of fall of the SCI patients

Type and activity of person in vehicle

Within 12person motor vehicle injury automobile was 3(3.2%) (N=94), pickup 1 (1.1%),heavy vehicle1(1.1%),bus(4.3%) bus 3(3.2%). Patient activity on motor vehicle and motor cycle was,driver 4 person & passenger 11.7%.

Source &type of force

Within 12 injured by struck/crushed force 5 injured by inaminate force,2 by animal & 1 by human.4 injured by striking force,3 by crushed force & 1 striking against force.

Safety equipment

According to the studies on SCI patients no one use safety equipment during injury.

CHAPTER – V: DISCUSSION

The aim of this study was to find out the causes of spinal cord lesion in Bangladesh. Currently there is lack of survey information on spinal cord injury in Bangladesh. Even it is not possible to know the total number of patient of spinal cord lesion in Bangladesh. In these study there was total 94 samples was taken. Here mean age was 32.54years, in other study conduct in Haryna, India mean age was 35.4 years (Singh et al, 2003). Otom et al,. 1997; showed in Jordan mean age of spinal cord injury was 33. Spinal cord injury mostly occurred in this age due to in this age most of the people work outside to earn.

In this study there was 90.4% male and 9.6% female. Male female ratio was 9:1.It is higher in Grece 7:1 (Divanoglou&Levi, 2009) and Jordan 5.8:1 (Otom et al,. 1997). These is due to majority of woman are remain in home in Bangladesh and are not subjected to violent form of work to which men are more exposed.

In case educational status most of them up to primary level 34 (36.2%). Others are illiterate 15 (16%), literate who only can sign their name 20 (21%), SSC14 (14.9%), HSC3 (3.2%), bachelor8 (8.5%). In Greece up to basic education 42(53%), further 28(35%), advance10 (13%) (Divanoglou and Levi, 2009).

Here participants monthly income was 1000-3000tk 26 (27.7%), 3100-5000 tk 32 (34.4%), 5100-1000tk 26 (27%) and only 10 (10.6%) earn more than 10100 tk. It manifest that most of spinal cord injured patient are come from middle or lower income family. It is nearly similar with Singh et al, 2003, p.185, within 483 participant's 217 participants' family income less than Rs.5000 per month. This type of population are less concern with safety measure and more vulnerable to injury.

These study shows most spinal cord lesion occurred in farm/ranch area (44.7%), other important area are street/highway (19.1%), home area (12.8%), industrial /construction area 8.5%. In Bangladesh most of the people live in rural area and their

work in directly or indirectly related with agriculture. These may play an important role in injury occurring area.

Etiology of spinal cord injury varies from region to region. According to these study the main mechanism was fall(66%) that include fall from tree 36.2%,fall heavy weight on back 14.9%,fall from roof 10.6%. 18.2% was injured by road traffic accident that include motor vehicle accident 12.8%, pedestrian vehicle crush, motor cycle and pedal cycle accident. Study conduct in Jordan, Otom, Doughan&Kawar, (1997) shows fall 21.2% & RTA 44%, in Iran Chabok, et al (2009) RTA 52% & fall 45.4%. But in India Singh et al, 2003, p.185 fall was 47% & RTA 34.78%. The other case of injury was struck\crushed by object\animal 8.5%. In Otom, Doughan&Kawar, 1997; study it was 3.3%.

This study also shows no one of participants use safety equipment during injury period. It also plays a major role injury because safety equipment may minimize or reduce extends of injury.

CHAPTER – VI: CONCLUSION AND RECOMMENDATION

6.1 Conclusions

Spinal cord lesion is one of the most devastating conditions in human life. Millions of people in every year face spinal cord lesion. In Bangladesh there is lack of information and proper database about spinal cord lesion. Even there in no estimating number of spinal cord lesion people in Bangladesh. Bangladesh is a developing country. Most of them live with low economic level and poor educational status. In these countries there is also lack of awareness about injury especially caused by spinal cord lesion. This study shown fall from height, fall heave weight on back, road traffic accident and pott's diseases are the major causes of spinal cord lesion in Bangladesh. The victims are mostly young. There is also absence of safety equipment use which can prevent or minimize extend of injury. It is very hard to stop road traffic accident totally by taking proper measure extend of loss can be minimized. Spinal cord lesion management and rehabilitation is a cost effective and long time process. So it is necessary to raise awareness and take proper step to reduce the risk of spinal cord lesion.

6.2 Recommendation

The aim of this study was to find out causes of spinal cord lesion in Bangladesh. Researcher found from the study has fulfilled the aim of this research project. The researcher recommended the following things-

- Should take more samples for generating the result and 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 different hospital, clinic, institute and organization in different district of Bangladesh to generalize the result.

  This is an undergraduate study and doing the same study at graduate level will give more precise output. There was some limitation of this study mentioned at the relevant section. It is recommended to overcome those limitations during further study.

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APPENDIX

মৌখিক অনুমতি পত্র

(অংশগ্রহনকারীকে পড়ে শোনাতে হবে)

আস্‌সালামুওয়ালাইকুম/ নমস্কার, আমার নাম কাজী ইমদাদুল হক। আমি এই গবেষণাটি বাংলাদেশ হেলথ্ প্রফেশনাল ইনস্টিউট (বি এইচ পি আই) এ করছি যা আমার অধিভুক্ত। যার শিরোনাম হল- "বাংলাদেশে স্নায়ুরজ্জুতে আঘাতের বৈশিষ্ট্য সমূহ"। আমি এক্ষেত্রে কিছু ব্যক্তিগত এবং আনুষঙ্গিক প্রশ্ন স্নায়ুরজ্জুতে আঘাত সম্পর্কে জানতে চাচ্ছি। যা আনুমানিক ২০-৩০ মিনিট সময় নিবে। আমি আপনাকে অবগত করছি যে, এটা আমার অধ্যয়নের অংশ এবং অন্য কোন উদ্দেশ্যে এটা ব্যবহৃত হবে না। গবেষক সরাসরি এই স্নায়ুজ্ঞান অধ্যয়নের সাথে অন্তর্ভুক্ত নয়। তাই এই গবেষণায় অংশগ্রহণ আপনার বর্তমান এবং ভবিষ্যৎ চিকিৎসায় কোন প্রভাব ফেলবে না। আপনি যে সব তথ্য প্রদান করবেন তার গোপনীয়তা বজায় থাকবে এবং আপনার প্রতিবেদনের ঘটনাপ্রবাহে এটা নিশ্চিত করা হবে যে, এই তথ্যের উৎস অপ্রকাশিত থাকবে। এই অধ্যয়নে আপনার অংশগ্রহণ স্বেচ্ছাপ্রণোদিত এবং আপনি যে কোন সময় এই অধ্যয়ন থেকে কোন নেতিবাচক ফলাফল ছাড়াই নিজেকে প্রত্যাহার করতে পারবেন। এছাড়াও কোন নির্দিষ্ট প্রশ্ন অপছন্দ হলে উত্তর না দেয়ার এবং সাক্ষাৎকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকার আপনার আছে। এই অধ্যয়নে অংশগ্রহণকারী হিসেবে যদি আপনার কোন প্রশ্ন থাকে তাহলে আপনি আমাকে অথবা ওবায়দুল হক, কোর্স সমন্বয়কারী, ফিজিওথেরাপী বিভাগ যোগাযোগ করতে পারেন। এটা শুরু করার আগে আপনার কোন প্রশ্ন আছে?

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে যাচ্ছি?

হ্যাঁ ☐

না ☐

সাক্ষাৎকারীর স্বাক্ষর .....

VARBAL CONSENT STATMENT

(**Please read out to the participant**)

Assalamu alaikun/nomosker, my name is *Kazi Imadadul Hoque*, I am conducting a research project (dissertation) study which included in our course curriculum of Bangladesh health professions institute (BHPI). The title of the study is 'Characterization of spinal cord lesion in Bangladesh'. I would like to know about some personal and other related question about your spinal cord lesion. This will take approximately 20 to 30 minutes.

I would like to inform you that this is purely academic study and will not be used for any other purpose. The researcher is not directly related with this musculoskeletal area, so your participation in the research will have no impact on your present or future treatment. All information provided by you will be treated as confidential and in the event of any report or publication. It will be insured that the sources of information remains anonymous.

Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any consequence. You also have a right not to answer a particular question that you do not like or do not want to answer during interview.

If you have any query about the study or your right as a participant you may contact with me and / or Obaidul Haque, Course Coordinator, Department of physiotherapy.

Do you have any question before you start?

So may have your consent to proceed with the interview?

YES ☐

NO ☐

Signature of the interviewer_____

প্রশ্নবলী

সনাক্তকারী সংখ্যাঃ **সাক্ষাৎকার গ্রহণের তারিখঃ**

মোবাইল নাম্বার ঃ ----------

ঠিকানা ঃ

শাখা-১ জনসংখ্যাতাত্তিক প্রশ্ন

১০১. বয়স ☐☐ বছর

১০২. লিঙ্গ ১। পুরুষ ২। নারী

১০৩. বৈবাহিক অবস্থা ঃ

১। বিবাহিত

২। অবিবাহিত

৩। তালাকপ্রাপ্ত

৪। বিধবা

১০৪. ধর্ম

১। ইসলাম

২। হিন্দু

৩। বৌদ্ধ

৪। খ্রিষ্টান

১০৫. শিক্ষাগত যোগ্যতা

১। নিরক্ষর

২। সাক্ষর করতে পারে

৩। প্রাথমিক

৪। মাধ্যমিক

৫। উচ্চ মাধ্যমিক

৬। স্নাতক

৭। স্নাতোকোত্তর অথবা অধিক

৮। অন্যান্য

১০৬. আবাসিক এলাকা

১। গ্রামীণ

২। নগরস্থ

১০৭. পরিবারের গড়পড়তা মাসিক আয় ---------- টাকা।

শাখা-২ ঃ আঘাতের ধরণ

১০৮. আঘাতের কারণ

১। দূর্ঘটনা সংক্রান্ড়

২। দূর্ঘটনা সংক্রান্ড় নয়

যদি ১০৮ নং প্রশ্নের উত্তর ২ হয় দয়া করে ১০৮ এর ক নং প্রশ্নের উত্তর দিন অন্যথায় ১০৯ এ যান।

১০৮. ক. আপনি কি এগুলোর কোন একটি রোগে ভুগছেন

১। পটস ডিজিস

২। মের"দন্ডের টিউমার

৩। ট্রান্সভার্স মাইলাইটিস

৪। ইন্টারার্টিব্রাল ডিস্ক পেণ্ঢালাপস

৫। সারাইকাল স্পনডাইলোসিস

৬। অন্যান্য

৭। নির্ণয় করা হয় নি

ঘটনার ধরণ ঃ

১০৯. আঘাতটি কাজের সাথে সম্পর্কিত অথবা নয়

১। কাজের সাথে সম্পর্কিত

২। কাজের সাথে সম্পর্কিত নয়

৩। অনির্দিষ্ট

আঘাতের ঘটনাস্থল

১১০. আঘাতটি ঘটেছিল কোথায়

১। ঘরে

২। আবাসিক এলাকায়

৩। খামারে

৪। সড়কে/মহাসড়কে

৫। বাণিজ্যিক এলাকায়

৬। শিল্প এলাকায়

৭। বিদ্যালয়ে

৮। অজানা

আঘাত পাওয়ার সময়ের কার্যকালাপ

১১১. আঘাত পাওয়ার সময় রোগী যে ধরনের কাজ করছিল

১। খেলাধুলা

২। অবকাশ যাপন

৩। ভ্রমন

৪। বেতন ভূক্ত কাজ

৫। বেতন ছাড়া কাজ

৬। শিক্ষামূলক কাজ

৭। জীবন সম্পৃক্ত কাজ

৮। অন্যান্য

৯। অনির্দিষ্ট

আঘাতের উদ্দেশ্য

১১২. আঘাতটা কি উদ্দেশ্যমূলক অথবা একটি উদ্দেশ্যহীন কাজের দ্বারা হয়েছিল

১। উদ্দেশ্যহীন

২। উদ্দেশ্যমূলক স্বপ্রনোদীত

৩। আকশ্মিক আঘাত, সন্দেহতীত অথবা সন্দেহমূলক আঘাত-উদ্দেশ্যমূলক অন্য কোন

লোকের দ্বারা

৪। বৈধ প্রক্রিয়া- পুলিশ অথবা অন্য কর্তৃপক্ষের দ্বারা আইন প্রয়োগের সময়

৫। যুদ্ধের কারণে এবং বেসামরিক অভ্যুত্থানে।

৬। অনির্ধারিত

আঘাতের পদ্ধতি

১১৩. আঘাত পাওয়ার কারণটি ছিল-

১। মোটর যান (১১৩ এর ১ এর ক থেকে গ এর উত্তর দিন)

২। পথচারী- যানবাহণ সংঘর্ষ (১১৩ এর ১ এর ক উত্তর দিন)

৩। মোটর সাইকেল (১১৩ এর ১ এর ক, খ উত্তর দিন)

৪। সাইকেল (১১৩ এর ১ এর ক উত্তর দিন)

৫। আঘাত/ সংঘর্ষ/ চাপজাতির আঘাত (১১৩ এর ১ রে ঘ, ঙ উত্তর দিন)

৬। পড়ে যাওয়া (১১৩ এর এর চ উত্তর দিন)

৭। বন্দুকের গুলি, আগ্নেয়াস্ত্র সম্পর্কিত (বারুদ ছাড়া গুলি বাদ দিতে হবে)

৮। ছুরিকাঘাত/ খোঁচা/ ছুরিবিদ্ধ

৯। অগ্নিদগ্ধ

১০। অগভীর পানিতে ঝাপ দেওয়া/ ডুবে যাওয়া

১১। ঔষধের পার্শ্ব প্রতিক্রিয়া

১২। অস্ত্রপচার এবং চিকিৎসার পার্শ্ব প্রতিক্রিয়া

১৩। অন্যান্য.....

১৪। অনির্ধারিত

যদি ১১৩ নং প্রশ্নে ১ এর অধিক পদ্ধতি নির্বাচিত হয় তাহলে সবচেয়ে বেশি আঘাতের তাৎক্ষনিক কারণটি নির্বাচিত করতে হবে।

যদি ১১৩ নং প্রশ্নে আপনার উত্তর, মোটরযান, পথচারী-যানবাহন সংঘর্ষ হয় তাহলে দয়া করে ১১৩ নং প্রশ্নের ১ এর ক থেকে গ এর উত্তর দিন। অন্যথায় ১১৩ এর ১ এর ঘ তে যান।

১১৩. ১.ক. দূর্ঘটনাটি কি যাতায়াত সম্পর্কিত

১। যাতায়াত সম্পর্কিত (সড়কে/মহাসড়কে হয়েছে)

২। যাতায়াত সম্পর্কিত নয় (মানুষ চলাচলের রাস্ড়া ব্যতিত অন্য কোথাও হয়েছে)

৩। অজানা

যদি ১১৩ নং প্রশ্নের উত্তর মোটরযান হয়, তাহলে ১১৩ এর ১ এর খ এর উত্তর দিন। অন্যথায় ১১৩ এর ১ এর গ তে যান।

১১৩. ১.খ. রোগী যে ধরনের যানবাহনে ছিল

১। অটো মোবাইল

২। পিকআপ/ ভ্যান

৩। ভারি মালবাহী যান

৪। বাস

৫। ৩ চাকার যান

৬। অন্যান্য.....

৭। অজানা

যদি ১১৩ নং প্রশ্নের উত্তর মোটরযান অথবা মোটর সাইকেল হয় তাহলে দয়া করে ১১৩ এর গ এর উত্তর দিন। অন্যথায় ১১৩ এর ১ এর ঘ তে যান।

১১৩. ১. গ. মোটর সাইকেল অথবা মোটরযানে রোগি যা করছিল

১। চালক

২। যাত্রী

৩। নামছিল

৪। গাড়ির বাইরে ছিল

৫। অজানা

যদি ১১৩ নং প্রশ্নের উত্তর আঘাত/সংঘর্ষ হয় তাহলে দয়া করে ১১৩ এর ১ এর ঘ ও ঙ তে যান। অন্যথায় ১১৩ এর ১ এর চ তে যান

১১৩. ১. ঘ. প্রয়োগকৃত বলের উৎস ছিল

১। মানুষ

২। পশু

৩। কোন বস্তুর সাথে সংঘর্ষ

৪। অজানা

১১৩. ১. ঙ. প্রয়োগকৃত বলের ধরন

১। আঘাত দ্বারা

২। চাপ দ্বারা

৩। কিছুর সাথে সংঘর্ষ

৪। অজানা

যদি ১১৩ নং প্রশ্নের উত্তর পড়ে যাওয়া হয় তাহলে দয়া করে ১১৩ এর ১ এর চ প্রশ্নের উত্তর দিন। অন্যথায় ১১৪ তে যান।

১১৩. ১. চ. পড়ার ধরন

১। গাছ থেকে পড়া

২। ছাদ থেকে পড়া

৩। পিঠে ভারি কোন বস্তু পড়া

৪। অন্যান্য

নিরাপত্তা সামগ্রির ব্যবহার

১১৪. আঘাত পাওয়ার সময় রোগী কোন নিরাপত্তা সামগ্রী ব্যবহার করছিল

১। হ্যাঁ

২। না

Questionnaire

Identification number:	Date of Interview
Contact number:	
Address:	

Section 1: Demographic Questions

QN	Questions and filters	Responses	Code
101.	Age (in year):	__|__| yrs	
102.	Sex:	Female …….. Male …….. Married…….……..… Unmarried……..…… Divorced……..……..……... Widow…….……..	01 02 01 02 03 04
103.	Marital status:		
104.	Religion	Islam …….…… Hinduism…….. Christianity...….…… Buddhist…… Other (Specify):_____	01 02 03 04
105.	Educational status	Illiterate…… …….. Literate…….. ….…….. Primary……...….... Secondary school certificate (SSC) -- Higher secondary certificate (HSC)… Bachelor ……... Masters or above……. Other (Specify): _____	01 02 03 04 05 06 06 07
106.	Residential area	Rural……. Urban…….	01 02
107.	Average monthly family income	_____(*Taka*)	

Section 2: Type of injury

QN	Questions and filters	Responses	Code
108	Cause of injury.	Traumatic…… Non traumatic…….	01 02
If answer is 02 please answer 108 a otherwise go to 109			
108. a	Did you suffered with any of these diseases?	Potts diseases……... Spinal tumor…… Transverse myelitis……. Intervartebral disc prolapsed……... Cervical spondylosis…….. Other(specify)…….. Not applicable…….	01 02 03 04 05 06 07

Type of incident

109	Injury incident was work-related (i.e. occur on the job) or not?	Work-related……. Not work-related…… Not applicable…….....	01 02 03

Locale of injury

110	Injury occurred in? (Check One)	Home/mobile home…… Residential institution…… Farm/ranch…… Street/highway……. Trade and service area…… Industrial/construction area…… School/educational area…….. Not applicable……..……..	01 02 03 04 05 06 07 08

Type of activity when injured

111	Type of activity was the patient doing at the time of injury?	Sports…….. Leisure…….. Traveling…… Paid work……. Unpaid work…… Educational activity……. Vital activity……. Not applicable……..……. unspecified……..	01 02 03 04 05 06 07 08 09

Intent of injury

112	Did the injury result from an unintentional event or intentional act?	Unintentional……..	01
		Intentionally self-inflicted…….	02
		Assault, confirmed or suspected — Injury Purposely inflicted by another person ……..	03
		Legal intervention — Injured by police or other authorities during law enforcement……	04
		Operations of war and civil insurrection……..	05
		Not applicable…….....	06

Mechanism of injury

113	Mechanism of injury was	Motor vehicle (Answer Questions 113.1.a,113b,and 113.1.c.)……	01
		Pedestrian-vehicle crashes (Answer Questions 113.1.a.).....	02
		Motorcycles (Answer Questions 113.1.a, 113.1.c. .)……	03
		Pedal cycles (Answer Questions 113.1.a..)……..	04
		Struck by/against or crushed (Answer Questions 113.1.d and 113.1.e)……	05
		Fall (Answer question 113.1.f)…….	06
		Gunshot, firearm-related (excludes nonpowder guns) …….	07
		Stab/cut/pierce……	08
		Fire/burn…….	09
		Near-drowning/drowning/submersion...	10
		Adverse effects of therapeutic use of drugs…….	11
		Adverse effects of surgical and medical care……..	12
		Not applicable……..	13
		Undetermined……..	14

If more than one mechanism was selected in Question 113, which one is the immediate cause of the most severe injury being treated?

If one of your responses to Question 113. was "Motor vehicle," "Pedestrian-vehicle crash," "Motorcycle," or "Pedal cycle," please answer Questions 113.1 through113.1c., otherwise go to Question 113.1.d.

113.1.a	Was the crash traffic-related	Traffic (occurs on a public highway/street/road)…… Nontraffic (occurs in any place other than a public highway/street/road)…… Not applicable…….	01 02 03
If one of your responses to Question 113 was "Motor vehicle," please answer Question 113.1.b., otherwise go to Question 113.1.c.			
113.1.b	Type of vehicle that the patient was riding in.	Automobile…… Pickup truck or van…….. Heavy transport vehicle…….. Bus……. 3 wheel motor vehicle…… Other…… Not applicable ……	01 02 03 04 05 06 07
If one of your responses to Question 113 was "Motor vehicle" or "Motorcycle," please answer Question 113.1.c.,otherwise go to Question 113.1.d.			
113.1.c	Patient activity on the motor vehicle or on the motorcycle.	Driver…… Passenger……. Person boarding or alighting……. Person on outside of motor vehicle… Not applicable …….	01 02 03 04 05
If one of your responses to Question 113 was "Struck by/against or crushed," please answer Questions 113.1.d. and 113.1.e., otherwise go to Question 113.1.f.			
113.1.d	Source of the force was applied	Human…… Animal……. Inanimate object or force……. Not applicable ……...	01 02 03 04
113.1.e	Type of force was applied	Struck by…….. Crushed by…….. Striking against…….. Not applicable ……..……..	01 02 03 04
If one of your responses to Question 113 Was "Fall" pleases answering Questions			

113.1.f.other wise go to question 114.			
113.1.f	Type of fall	Fall from tree…….. Fall from roof…… Fall heavy object on back……. Not applicable……. Others……..	01 02 03 04 05

Safety equipment use

114	Used safety equipment	Yes……. No……	01 02

April 24, 2011

To
Head of the Department
Department of Physiotherapy
Center for the Rehabilitation of the Paralyzed (CRP),
Savar, Dhaka -1343.

Subject: Application for permission of data collection at Spinal cord inpatient unit.

Sir,

I respectfully state that I am Kazi Imdadul Hoque student of fourth year B. Sc in Physiotherapy at Bangladesh Health Professions Institute (BHPI). In fourth year course curriculum we have do a research project. I have chosen a research title that "Characterization of Spinal Cord Lesion in Bangladesh". For this reason, I need permission for collect data from the CRP Spinal cord inpatient unit at Savar.

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

Yours faithfully
Kazi Imdadul Hoque

Kazi Imdadul Hoque
4th year B.Sc in Physiotherapy
Session: 2005-2006
BHPI, CRP, Savar, Dhaka-1343

Give permission for Data collection. Consult with Mr. Mozaffor Hossain lecturer, SCI unit.
25/04/11

He is allowed to collect data from SCI unit.
25/04/11