



Original Article

Decubitus Ulcers in Patients with Spinal Cord Injury in Different Hospitals of Lahore

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ABSTRACT

Background: Spinal cord injury is a debilitating neurological disorder that has a significant economic, social and psychological burden on those who are affected as well as the healthcare system. The spinal cord can be damaged due to either trauma to the cord or its dysfunctions. Pressure injuries are the leading secondary complications in patients with spinal cord injuries.

Objective: To evaluate the prevalence of decubitus ulcers in patients with spinal cord injuries from different hospitals in Lahore. **Methods:** It was a cross-sectional study that included a sample of 114 patients with traumatic or non-traumatic spinal cord injury with age ranges from 25 to 55 years from various hospitals in Lahore using non-probability convenient sampling. Written consent was taken from all patients before the collection of data. Pressure ulcer assessment was done using the European pressure ulcer prevalence study questionnaire. Categorical variables were presented as frequencies and percentages with the use of bar or pie charts. **Results:** About 68(59.6%) patients were males and 46(40.4%) were females. This study concluded that 58.9% of patients had decubitus ulcers whether severe or at stage I of pressure ulcers as a secondary complication of spinal cord injury. About 49.9% of participants had the most severe decubitus ulcers mostly on the sacrum which can lead to infection and requires surgical interventions like debridement. Stage I decubitus ulcers were seen on the elbow and back. **Conclusion:** In the current study, about 58.9% of patients had decubitus ulcers while 49.9% of participants had the most severe decubitus ulcers which require debridement or surgical procedure. More than half of the patients included in this study had one or more pressure ulcers that can be damaging to their health and quality of life.

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INTRODUCTION

The spinal cord is an extended, cylindrical bundle of nervous tissue that runs down from the foramen known as the foramen magnum protected by the vertebral canal which ends at the upper border of the L2 vertebra.¹ Spinal cord injury (SCI) is a devastating neurological state producing physical reliance, morbidity, mental stress and fiscal burden.² It has a huge impact on the socioeconomic status and vocational well-being of the affected individual as well as on the health care system. Its prevalence has risen from 236 to 1298 cases per million people globally over the past 30 years. SCI is thought to affect between 250,000 and 500,000 people worldwide each year.²

The incidence of traumatic spinal cord injury (TSCIs) in the US is estimated to be around 40 occurrences per million people or roughly 12,000 new cases per year, according to the National Spinal Cord Injury Statistical Center, the longest-running and largest database gathering details on TSCIs in the country.³ The average age at the time of SCI is estimated to be 42.6 years of age with males accounting for 80.7% of new cases, vastly outnumbering their female counterparts.⁴

A sudden blow to the spine that can fracture, dislocate, crush or compress one or more vertebrae, incidents such as gunshot and knife penetration that cuts the spine, falls at work or home mainly in the elderly population, sports and recreational activities contribute to the traumatic causes of spinal cord damage.⁵ A rapidly moving object striking the spine directly can cause spinal cord damage, but it can be caused by indirect force from the spine moving beyond its physiological range. Typically, compression, flexion, extension or rotation are the causes of these injuries.⁵ The clinical presentation is frequently complicated by disc prolapses, ligament tears, and

vertebral injuries. The spinal cord's protecting characteristic may be disrupted by intense sufficient trauma to the vertebrae and the structures that aid them.⁶

Generally, SCI can be classified as either complete or incomplete. In complete SCI, neurological assessments show no spared motor or sensory function below the level of injury.⁷ Depending on the level of SCI, patients experience paraplegia or tetraplegia. Patients with incomplete paraplegia generally have a good prognosis of regaining locomotor ability within a year.⁸ Lesions at the cervical level are associated with tetraplegia, whereas lower thoracic lesions can lead to paralysis. The SCI usually affects the spinal cord at the cervical level (50%), with C5 most commonly affected. Other injuries included lumbar (11%) and thoracic (35%) injuries.⁹

Most patients suffering from TSCIs have permanent sensory impairments, autonomic dysfunction, and motor deficits i.e. weakness or paralysis.¹⁰ The SCI due to non-traumatic causes are referred to as spinal cord dysfunction. The pathogenesis of these includes aetiologies like congenital disease, tumorous compression, and vertebral spondylosis (spinal stenosis). For the documentation of non-traumatic spinal cord injuries (NTSCIs), there are basic and extended data sets of SCI.¹¹

Skin and soft tissue injuries called decubitus ulcers occur when pressure is applied to the skin continuously or for an extended period. These bony body parts-the ischium, greater trochanter, sacrum, heel, malleolus (lateral as opposed to medial) and occiput are where these ulcers are seen in the majority. These injuries are seen in patients that struggle to change their posture and are confined to bed

or wheelchairs thus limiting their ability to move.

Loss of sensory perception, locally and generally impaired loss of consciousness, as well as restricted movement because patients are unaware of their suffering and do not release the pressure are the most important reasons that produce these ulcers. Pressure on the tissues for an extended time results in the obstruction of the blood flow in the beds of capillaries which results in a lower oxygen level in that specific tissue area. Over time, the ischemic tissue starts accumulating toxic waste metabolites which eventually leads to ulceration and then leads towards necrosis of the tissue.¹²

Pressure ulcers (PU) are a serious, costly and life-long complication of SCI. Around, 30-40% of patients with SCI develop pressure ulcers during the acute and rehabilitation phases¹³. It highly affects the psychological, physical, and social well-being and the quality of life of the affected individuals.^{14,15} These are very expensive to cure, with treatment costs far surpassing prevention expenses. For instance, a Canadian study found that the total monthly expense for treating PU in SCI patients was 18,758 USD.¹⁶ Treatment for paraplegic and tetraplegic patients may cost 25% more overall because of pressure ulcers.¹⁷ Patients with spinal cord damage that have developed decubitus ulcers have their hospital stays lengthened and necessitate more intensive medical care, which raises the financial burden in low and middle-income nations.¹⁸

Patients who have developed pressure ulcers before the surgical procedure for SCI are more likely to have an infection after the surgery than those who have not developed any PU, so it is needed to prevent the formation of pressure ulcers in traumatic spinal cord injury patients before undergoing surgery to avoid

postoperative complications.¹⁸ “The National Pressure Ulcer Advisory Panel (NPUAP) and European Pressure Ulcer Advisory Panel” have created a standardized pressure ulcer classification system (EPUAP). They have agreed on categorizing the level of decubitus ulcers ranging from stage I which represents intact skin with no blanchable erythema to stage VI which represents full-thickness tissue loss.¹⁹

The purpose of this study was to find out the prevalence of decubitus ulcers in patients that are suffering from TSCI and NTSCI from different hospitals in Lahore that have left them with devastating disabilities and dependency. This study was conducted to highlight the increased risk of ulcers in these patients as well as help in a way to design more detail-oriented and proper treatment strategies that can improve patients' quality of life and reduce complications that can lead to severe outcomes during their period of rehabilitation. This study was also going to give us insight into how healthcare professionals are dealing with PUs and what protocols are being taken to prevent this injury in hospitals of Lahore in patients with SCIs.

METHODS

The study design was cross-sectional and the sample size was calculated by using the formula, $n = z^2 - \alpha^2 / 2P(1-P) / d^2$. The sample was 114 patients with SCI and NTSCI admitted in ICUs and neurosurgery wards of various hospitals such as the University of Lahore Teaching Hospital, Lahore general hospital, Jinnah Hospital, Services Hospital, Ghurki Hospital Lahore and those who undergo rehabilitation programs in different rehabilitation centers like PSRD Lahore and Sehat Clinic Hanjarwal. Patients with SCI (traumatic or non-traumatic). Patients' age ranges from 25 to 55 years old. Both males and females were included. The patients who

are admitted to the neurosurgery ward and ICU of hospitals or taking rehabilitation sessions. Patients with cerebral pathology, congenital paralysis, psychiatric issues and polyneuropathy were excluded.¹⁹

Written consent was taken from all patients before the collection of data. Pressure ulcer assessment was done using the European pressure ulcer prevalence study questionnaire. Data were analyzed using the IBM SPSS statistics-25.0 version. Categorical variables were presented as frequencies and percentages, with the use of bar or pie charts.

RESULTS

Out of 114 patients, 30.7% of patients belong to the age group of 40-59 years and 2.8% to the age of >89. years Throughout this study, men were in the majority documented as 68 (59.6%) than women 46 (40.4%). Three expected time intervals; < 6 days, 6 days-1 month and >1 month were included. About 52 patients out of 114 had a length of stay of 6 days-1 month and were admitted to the neurosurgery ward and ICU. Based on the

type of SCI 56.1% of respondents have the TSCI whereas 43.9% have SCDys i.e., NTSCI. Out of the sample of 114, 58.9% of patients had developed at least one pressure ulcer during their stay in different wards of the hospital. 21.9% of patients had greater than 3, and 19.3% had between 2 to develop on their body that varied in terms of severity. In the category of the location of most severe decubitus ulcers majority of patients have pressure sores at the sacrum which accounts for 21.9%, 17.5% have pressure injury on the hip and 10.5% bed sores were present on the heel.

When using the Braden scale for accessing risk factors sensory perception is highly limited in 40.4% of patients whereas moisture 36.8% of patients report an increased amount of sweat. The majority of respondents had their activity limited to bed which accounts for almost 66.7% of the total sample, 15.8% required wheelchairs and 39.5% of patients were completely immobile, 31.6% have very been completely immobile, 31.6% have very limited mobility. Superficial pressure ulcer at the back was recorded for 23.7% and at the elbow and heel accounted for 10.5% of PUs.

Figure 1: Percentage of the Gender of Patients

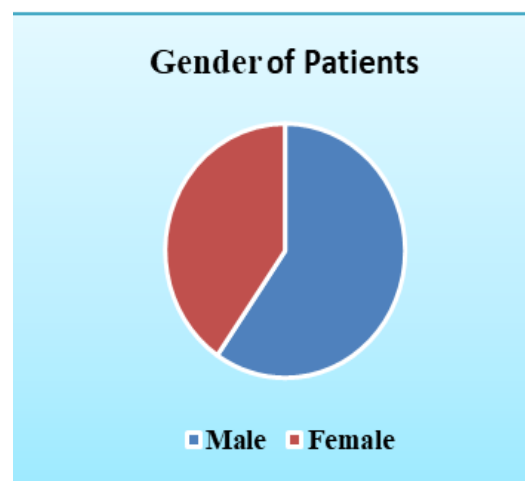
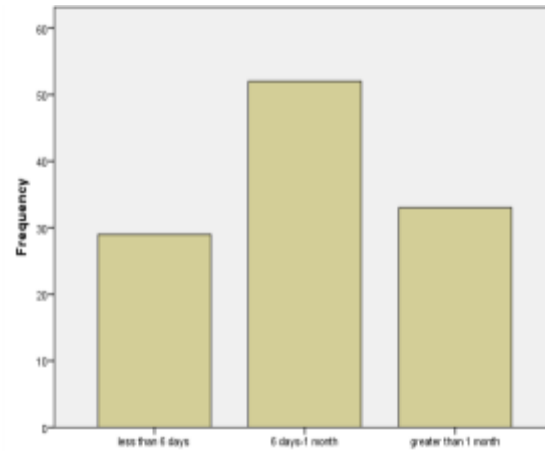
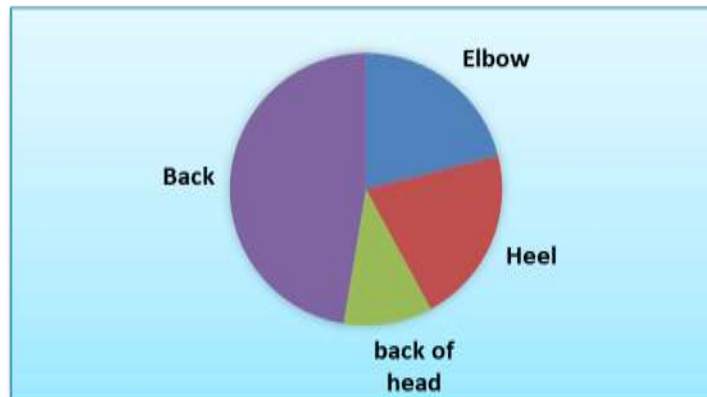


Figure II: Estimated Time Duration of Stay**Table I: Frequency & Percentage Distribution According to Type Of SCI And Number of Existing Decubitus Ulcers in SCI Patients**

	Type of SCI	Frequency	Percentage
Traumatic SCIs		64	56.1
Non-traumatic SCIs		50	43.9
No. of Existing PUs	None	48	42.1
	1	19	16.7
	2-3	22	19.3
	> 3	25	21.9
	Total	114	100.0

Table II: Location of the most severe Pus

Location of Most Severe Pressure Ulcers	Frequency
Sacrum	21.9
Hip	17.5
Heel	10.5
None	50.0

Figure III: Location of Superficial Decubitus Ulcers

DISCUSSION

In patients with SCI, both short and long-term secondary medical problems are frequent. However, chronic problems in particular have a severe effect on patients' lifestyles and daily functioning and independent lifestyle. Therefore, reducing these consequences, enhancing survival, social and community participation, and health-related quality of living depends on prevention, timely detection, and treatment of chronic secondary comorbidities in people with Spinal cord damage.²⁰ According to a previous study elderly age was linked to more frequent daily nursing care and less independence at discharge.

Co-morbidities, secondary complications and the severity of spinal cord injury affected individuals of both younger and older age, however, older age was linked to greater secondary problems and a higher number of co-morbidities.²¹ According to the results of the current study, 30.7% of participants lie in the age group of 40-59 years and 21.1% are of 19-39 years. Men (59.6%) were more affected than women (40.4%) by both TSCI and NTSCI conditions. About 52 patients out of 114 have the expected length of stay of 6 days to 1 month and 33 have a stay greater than

1 month. About 46 patients were admitted to neurosurgery wards of hospitals whereas 33 were in ICU, 11 were in HDU and 24 (21.1%) were in rehabilitation centers.

In our study sample, 56.1% of participants were suffering from traumatic injury whereas 43.9% have spinal cord dysfunctions. A study conducted in 2019 discussed the comparison of TSCI and NTSCI in terms of primary rehabilitation outcomes and complications during hospital admission and concluded that the average length of stay was 3.4 weeks greater with TSCI. The length of stay in both groups was strongly impacted by urinary tract infections and PUs. The NTSCI had a higher prevalence of PUs (24%) as compared to TSCI (14%).²²

According to a systematic review of risk factors for PU formation, the three main domains of mobility/activity, perfusion, and skin/pressure ulcer status were the risk factors that emerged as independent predictors of PUs development.²³ While documenting the risk factors for bed sores development in our study, sensory perception is highly limited in 40.4% of patients with SCI whereas moisture in 36.8% of patients reports

an increased amount of sweat. According to a study that discussed activity limitations in SCI patients, tetraplegia was found to be the main factor contributing to activity restrictions in SCI patients.

Tetraplegic individuals face more physical difficulties than paraplegic individuals, which may be one factor. When compared to paraplegia, tetraplegia patients are more prone to suffer from secondary complications and increased stiffness.²⁴ Majority of respondents of this study had their activity limited to bed which accounts for almost 66.7% of the total sample and 15.8% required wheelchairs or other assistive devices after their injury. For the category of mobility in the Braden scale, 39.5% of patients were completely immobile and 31.6% have very limited mobility and slightly limited 28.9% of participants.

According to the results of my study, 58.9% of patients had decubitus ulcers whether severe or at stage one of PU as a secondary complication of spinal cord injury. From the total sample of 114 patients 49.9% of participants had the most severe decubitus ulcers which require debridement or surgical procedure.

CONCLUSION

Most patients included in this study had one or more pressure ulcers that can be damaging to their health and quality of life. The results of the study highlighted the requirement for suitable preventive actions for PI. A key component of the initial management of patients with SCI should be the early diagnosis of PI. Preventive measures such as patient and attendant education, health care workers' education, adequate patient-to-nursing staff ratio and proper positioning and transition knowledge are required to lessen the burden of PI.

DECLARATIONS

Consent to participate: Written consent had been taken from patients. All methods were performed following the relevant guidelines and regulations

Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.

Competing interests: None

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