

MORTALITY AND ITS ASSOCIATED FACTORS IN PATIENTS WITH SPINAL CORD INJURIES AT PARAPLEGIC CENTER PESHAWAR, PAKISTAN

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ABSTRACT

OBJECTIVE: To determine mortality and its associated factors in patients with spinal cord injuries (SCI), presenting to Paraplegic Center Peshawar, Pakistan.

METHODS: In this retrospective study, clinical records of SCI patients, admitted to Paraplegic Center from January 2011 to March 2017 were evaluated. SCI patients who died during this period, irrespective of their age, gender, duration of SCI and number of readmissions were included in study. Demographic information, clinical characteristic and complications in eligible patients were recorded and analyzed.

RESULTS: Out of 62 patients, 46 (74.2%) were males. Mean age of patients was 41.7 ± 17.3 years. Twenty-two (35.5%) patients aged ≤ 30 years & 20 (32%) patients aged > 50 years. The most common cause of SCIs was fall from height (n=23, 37.1%), followed by road traffic accident (n=17, 27.4%) and firearm injury (n=11, 17.7%). About 51.6% of patients (n=32) had complete thoracic paraplegia, 30.6% (n=19) had complete cervical tetraplegia and 8.1% (n=5) had incomplete cervical tetraplegia. Complications and co-morbid conditions included pressure ulcers (n=53; 85.5%), limb fractures (n=711.3%), deep venous thrombosis (n=3; 4.8%), hepatitis (n=2; 3.2%) and injury to brachial plexus (n=1; 1.6%). Twenty-two (35.5%) patients underwent spine fixation surgery while forty (64.5%) patients were managed conservatively. Majority of the patients (n=51, 82.3%) died within the first year of SCI.

CONCLUSION: Relatively younger patients were predominant and complete thoracic paraplegia was the commonest SCI level. Presence of pressure ulcers, limb fractures and deep venous thrombosis in patients with SCI were major contributing factors to morbidity leading to mortality in our patients.

KEY WORDS: Death (MeSH); Pressure Ulcers (MeSH); Spinal Cord Injuries (MeSH); Rehabilitation (MeSH).

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INTRODUCTION

Survival rates amongst patients with spinal cord injury (SCI) have improved in the last few decades, yet mortality of these patients due to certain complications still remains a challenge to health care professionals.^{1,2} SCI is a life lasting disability which

affects almost every organ of body due to which they are prone to developing complications throughout life.³ Minor preventable complications such as pressure ulcer (PU), if not prevented and treated timely, can lead to life threatening conditions in such patients.⁴

Despite the large number of studies on

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post SCI mortality in developed countries,^{1,2,4-9} few studies are available regarding mortality of SCI patients from developing countries.¹⁰⁻¹³ Majority of research studies conducted in developed countries in last two decades reported that causes of death in SCI patients have changed mostly decreased due to improved medical care and advances in the management protocols.^{2,7-9} Especially, advances in urologic management and skin care decreases death rates caused by PU and urinary tract infection (UTI).¹⁴ Respiratory complications and cardiovascular diseases are the most commonly reported causes of death among SCI patients in developed countries as per recent data.⁷⁻⁹ Nevertheless, studies from developing countries reported that infections and septicemia due to UTI and/or PU are still the leading causes of death of such patients in developing countries.¹⁰⁻¹³

The higher incidence of untimely deaths in SCI patients is reported in developing countries as compared to developed countries.¹⁰⁻¹³ In Pakistan, most of the data available about SCI patients is limited to demographic information¹⁴⁻¹⁸ and only a single study has published data on mortality among SCI patients.¹⁹ Therefore, the current study was designed to determine mortality and its associated factors in patients with spinal cord injuries. Knowledge of complications of SCI patients at the time of death will help health care professionals in decision making about management of SCI patients. Moreover, it will also provide guidance regarding

TABLE I: AGE DISTRIBUTION AND EDUCATION LEVEL

		Frequency (n=62)	Percentage
Age group	< 10 years	1	1.6
	11-20 years	3	4.8
	21-30 years	18	29
	31-40 years	11	17.7
	41-50 years	9	14.5
	51-60 years	9	14.5
	>60 years	11	17.7
Education Status	Uneducated	35	56.5
	Primary	7	11.3
	Middle	6	9.7
	Matric	7	11.3
	Intermediate	2	3.2
	Graduate	2	3.2
	Master	2	3.2
	Ph.D	1	1.6

TABLE II: SPINAL CORD INJURY LEVEL OF PATIENTS

Spinal Cord Injury Level	Frequency (n=62)	Percentage
Complete cervical tetraplegia	19	30.6
Incomplete cervical tetraplegia	5	8.1
Complete thoracic paraplegia	32	51.6
Incomplete thoracic paraplegia	2	3.2
Incomplete lumbar paraplegia	4	6.5

TABLE III: COMPLICATION AND CO-MORBIDITIES IN STUDY POPULATION

Complications		Frequency (n=62)	Percentage
Pressure Ulcer	Single pressure ulcer	24	38.7
	Multiple pressure ulcer	29	46.8
Limb Fracture	Upper limb	3	4.8
	Lower limb	4	6.5
Others	Deep venous thrombosis	3	4.8
	Hepatitis	2	3.2
	Brachial Plexus Injury	1	1.6

specific protocols and preventative strategies which should be followed to increase survival of SCI patients.

METHODS

This retrospective cross sectional study was conducted in Paraplegic Center Peshawar, Pakistan, in which clinical records of SCI patients admitted to Paraplegic Center from January 2011 to March 2017 were evaluated.

All those SCI patients were included in

study that died in rehabilitation center, irrespective of their age, gender, duration with SCI, and number of readmissions. The only exclusion criteria were non-traumatic spinal cord injury patients. Sixty-two patients based on inclusion and exclusion criteria were identified, who died in rehabilitation center, their demographic information, clinical characteristic and complications at the time of death were noted and analyzed. Ethical approval was obtained from institutional ethical review committee of Paraplegic Center,

Peshawar. All patients reported in current study were admitted to Paraplegic Center for rehabilitation and/or pressure ulcer management after their initial treatment/acute management in acute care hospitals.

RESULTS

Out of 62 patients died during the study period, 46 (74.2%) males and 16 (25.8%) females. The mean age of the SCI patients who died in rehabilitation center was 41.7 ± 17.3 years. Twenty-two (35.5%) of patients aged ≤ 30 years & 20 (32%) patients aged > 50 years (Table 1). Fifty-four (87.1%) patients were from Khyber Pakhtunkhwa (KPK), five (8.1%) patients were from other provinces of Pakistan while three (4.8%) patients were from tribal areas.

More than half of patients (n=43; 69.4%) patients were married while remaining (n=19; 30.6%) patients were unmarried. All (n=16; 25.8%) females were housewives, while in male patients (n=46), 19.4% (n=12) were farmers, 9.7% (n=6) were laborer, 37.1% (n=23) were having other professions while 8.1% (n=5) were having no profession. In education status, 56.5% (n=35) patients were uneducated while 43.5% (n=27) patients were having different level of education (Table I).

The most common cause of SCI in these patients was fall from height (n=23; 37.1%), followed by road traffic accident (n=17; 27.4%) and then fire arm injury (n=11; 17.7%) while remaining (n=11; 17.7%) patients was having other causes.

Majority of patients (n=32; 51.6%) were having complete thoracic paraplegia (Table II). Analysis of data regarding complications and co-morbid conditions showed that 85.5% (n=53) patients were having pressure ulcers while 11.3% (n=7) patients were having limb fractures (Table III).

Twenty-two (35.5%) patients managed through spine fixation surgery while forty (64.5%) patients were managed conservatively. Majority of patients died 82.3% (n=51) within the first year of SCI while remaining 17.7% (n=11) patients survived from more than one year.

DISCUSSION

This study was focused on determining demographic information and complications of sixty-two SCI patients who died in rehabilitation center during the study period. Due to retrospective nature of study and incomplete documentation, we were unable to report exact causes of death. The only way to determine causes of death in situations where documentation regarding causes of death is poor is verbal autopsy,²⁰ however due to limited resources and quantitative nature of study, current study was not able to apply verbal autopsy.

Results of current study showed that the mean age of the SCI patients who died in rehabilitation center was 41.7 ± 17.3 years. Previous studies conducted in Pakistan regarding SCI reported lower mean age of SCI patients,^{15,16} which shows that majority of SCI patients who died in rehabilitation center tended to be older as compared to SCI patients admitted to rehabilitation center in Pakistan. In current study, more than half of SCI patients (56.5%) who died in rehabilitation center were uneducated while previous study from same rehabilitation center reported that 43.0% of the SCI patients were uneducated,¹⁶ which shows that deaths are more common among uneducated SCI patients. Educated SCI patients may take extra care to prevent secondary complications, which can be reason for low mortality among educated SCI patients.

The majority of patients in current study were having complete thoracic paraplegia (51.6%) followed by complete cervical tetraplegia (30.6%). Previous studies reported that high neurological level and complete SCI are associated with increased risk of mortality.^{2,4,6-8} Similarly, Levy L, et al.¹² reported that 2/3 of SCI patients who died within 1st year post injury were tetraplegics while 1/3 were paraplegics. However, in current study paraplegic patients were more as compared to tetraplegic patients. The only explanation for this is less admission of tetraplegics to Paraplegic Center, Peshawar that reported to be only 10.8%.¹⁶ Though studies from

developing countries reported that due to improvement in the management protocols, mortality rate of SCI patients in 1st year post injury has been decreased in last decades but still majority of previous studies reported high mortality rates of SCI patients during the 1st year post injury.^{4,15,18} In accordance with results of previous studies, current study also reported that majority of patients died (82.3%) within the first year of SCI.

The most common complication among patients who died in the rehabilitation center was PU. Previous study in same rehabilitation center reported that prevalence of PU in SCI patients to be 63.8% while current study reported that 85.5% patients were having PU at time of death. Two major reasons for high prevalence of PU in SCI patients reported in previous studies can be that, in most hospitals of Pakistan facilities regarding PU prevention are scarce and that's why majority of SCI patients develop PU in hospital. Secondly due to lack of awareness in Pakistani society about rehabilitation most patients visit rehabilitation center after developing PU mostly they stay at home.^{16,21,22} Lack of awareness among health care professionals and general population regarding PU prevention and management, inadequate access to health care services, poor hygienic conditions and warm weather are believed to be the additional contributing factors for the development of PU in SCI patients of the country. Due to advances in management and skin care, death rates due to PU have been decreased in last two decades,¹⁰ however, studies from developing countries still has same old high figure of PU as leading cause of death in SCI patients.¹⁰⁻¹³

In current study, 4.8% patients were having DVT at the time of death, while previously 2.7% prevalence of DVT was reported in SCI.¹⁵ DVT and its complications are reported to be the 3rd major cause of death in SCI survivors. Previous studies reported suicide to be one of the leading cause of death among SCI patients.^{2,8,13} Though our study as well as other previously conducted studies regarding SCI failed to report suicide among SCI patients. Strong

religious beliefs, joint family system and support of local community are believed to be the contributing factors for the low rate of suicides among SCI patients in Pakistan.

The data presented in current study was limited to only those patients who died in rehabilitation center that is why all those patients who died in other hospitals or in homes are missed. Secondly, due to retrospective nature of study and incomplete documentation, exact cause of death was not reported. Regardless of these limitations, current study was unique which reported demographic information and complications of patients with SCI who died in rehabilitation center.

CONCLUSION

In our study, relatively younger patients were predominant and complete thoracic paraplegia was the commonest SCI level. Presence of pressure ulcers, limb fractures and deep venous thrombosis in patients with SCI were major contributing factors to morbidity leading to mortality in our patients.

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AUTHORS' CONTRIBUTIONS

Following authors have made substantial contributions to the manuscript as under:

AA: Conception and design, drafting the manuscript, final approval of the version to be published

HD: Analysis and interpretation of data, critical revision, final approval of the version to be published

AZ: Acquisition of data, final approval of the version to be published

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SK: Data collection, drafting the manuscript, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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