



## Original Research Article

# A retrospective study - epidemiological analysis of traumatic spinal injuries in Rajasthan, India

Ram Avtar Malav<sup>1</sup>, Gautam Chand<sup>2,\*</sup>

<sup>1</sup>Dept. of Neurosurgery, Jhalawar Medical College, Jhalawar, Rajasthan, India

<sup>2</sup>Dept. of Orthopaedics, Jhalawar Medical College, Jhalawar, Rajasthan, India



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## ABSTRACT

**Background and Aims:** Traumatic spinal injuries (TSI) are major source of morbidity and motility throughout the world. Epidemiological study of TSI has an important role in future planning for prevention and management of them. Aim of this study was determine epidemiology of TSI in Jhalawar Rajasthan state of India.

**Materials and Methods:** Retrospective analysis of patients hospital data records, admitted in Jhalawar medical college Rajasthan from January 2018 to Dec. 2019 (Period of Two Years).

**Result:** One hundred and fifty eight cases of traumatic spinal injuries reported in period of two years from January 2018 to December 2019.

Male to female ratio was 2.16:1, the most prevent age group was 30-39 years (27.8%) followed by 20-29 years (19%). Fall from height (unprotected roof, well, tree, construction site/electric pole) was most common mode of injuries (44.9%) followed by road traffic accidents (43%). Most common level of injury was lumbar spine (55%) followed by thoracic spine (22.78%). Other associated injuries with TSI were head injuries (9.5%) and extremities injuries (9.5%).

Maximum number of TSI cases was reported during summer season (may-14.5% and June 15.8%).

**Conclusions:** TSI is major source of morbidity and mortality in Rajasthan India. Younger age group and Male are more commonly affected as compare to older age group and female. Accidental fall and RTA are major cause of TSI.

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## 1. Introduction

As compare to other traumatic injuries traumatic spinal injuries (TSI) cause greatest amount of morbidity and mortality throughout the world. Like other developing countries, in the India also very little known about epidemiology of TSI. Traumatic spinal injury (TSI, injury to spinal column, spinal cord, or both) commonly leads to significant impairment in the quality of personal and family life.<sup>1</sup>

The overall global incidence of TSI was 10.5 cases per 100000 people resulting in an estimated 768473 new cases of TSI increase annually worldwide. Incidence of TSI is

higher in lower and middle income countries (13.69 per 100000 people) as compared to higher income countries (8.72 per 100000 people).<sup>2</sup>

In Most of cases mode of injuries by fall from height (unprotected roofs, trees, construction site, electric pole fall into uncovered wells) and RTA, which in fact are preventable or reducible causes by taking proper safety measure and strictness in following rules and regulations. A careful epidemiological study can provide information regarding magnitude of the problem of spinal trauma and resultant demand of medical and social resources. It can help to identify the risk factors involved and actual mode of spinal injuries. It also helps to formulate preventive measures / planning's which may modify or eliminate the risk factors and may decrease the incidence of this

\* Corresponding author.

E-mail address: [gautamchand88@gmail.com](mailto:gautamchand88@gmail.com) (G. Chand).

incapacitating injury.

## 2. Aims & Objectives

1. To determine epidemiological, demographical and seasonal variation of TSI.
2. Part/level of spinal column injured.
3. To study the etiological factors in traumatic spinal injuries.

## 3. Material and Methods

This Retrospective study was conducted in SRG Hospital Jhalawar from January 2018 to December, 2019 (Period of Two Years). All the patients of traumatic spinal injuries admitted in our medical college hospital were included in this study. Patients who died before reaching hospital were not considered for study. Detailed history with respect to age, sex, occupation, education, socio-economic status and mode of trauma was taken, followed by a clinico radiological examination to ascertain the exact spinal and associated injuries.

The patient's data was entered in MS Excel sheet and analysis through SPSS 20.0 (Trail version) Software done. All applicable statistical tests were used for data analysis.

## 4. Results

Total one hundred and fifty eight patients (158) with traumatic spine injury included in study.

Out of these there is one hundred and eight patients (68.35%) were male and fifty (31.6%) were female. Male to female ratio was 2.16:1. The most prevalent age group in our study was 30-39 years in 44 cases (27.8%) followed by 20-29 years in 30 cases (19%).

**Table 1:** Age-sex distribution of TSI

Age group (Years)	No of cases		Total
	Male	Female	
0-9	0	0	0
10-19	13	3	16
20-29	23	7	30
30-39	34	10	44
40-49	20	9	29
50-59	10	5	15
60-69	8	8	16
>70	0	8	8
	108	50	158

In our study most common mode of injury was fall from height like unprotected roof, uncovered well, construction work, tree, electric pole in 71cases (44.9%), followed by road traffic accident in 68 cases (43%). other cause of injuries were assaults in 11 cases (7%) and sports in 8 cases (5%).

**Table 2:** Etiology of TSI

Mode of injuries	No of cases (total=158)
Fall from height (roof, tree, electric pole)	71 (44.9%)
Road traffic accident	68 (43%)
Fall of heavy objects or sports	8 (5%)
Assault	11 (7%)

In our study lumber spinal column was fractured in 87 cases (55%) followed by thoracic spine in 36 cases (22.78%). Cervical spine injuries noted in 33 cases (20.8%). Sacral spine injuries noted only in 2 cases (1.26%) but it associated with abdominal and pelvic injuries.

**Table 3:** Level of spinal injuries distributions

Level of spine/site	No of cases
Cervical	33 (20.8%)
Thoracic	36 (22.78%)
Lumbar	87 (55%)
Sacral	2 (1.26%)

Out of 158 cases of Traumatic Spinal Injuries 47 cases (29.7%) found to be had other associated injuries. Most common of them was head injuries in 15 cases (9.5%) and extremities injuries 15 cases (9.5%) followed by chest injuries 9 cases (5.6%), abdominal injuries 4 cases (2.5%) and pelvic injuries 4 cases (2.5%).

**Table 4:** Other Associated injury

Head	15(9.5%)
Chest	9(5.6%)
Abdomen	4(2.5%)
Pelvic	4(2.5%)
Extremity	15(9.5%)

We also notated seasonal variation in traumatic spinal injuries cases. There is high incident of spinal trauma in summer. Maximum 25 cases (15.8%) occurred in june month followed by 23 cases (14.5%) may month.

## 5. Discussion

Traumatic spinal cord injuries produce profound emotional and psychological impact on personal and family's life.

Epidemiological and demographic distribution data of TSI in our country is essential for strengthening the health care facility, taking preventive measure along with conservative treatment and rehabilitation of patients. So many studies from developed countries available in the matter of traumatic spinal injuries but their epidemiological data are different to Indian scenario. This is because of difference in literacy, occupation, available health care facilities and demographic distribution of population in developed countries.

**Table 5:** Reported cases of TSI month wise

Month	Year 2018	Year 2019	Total
January	2	2	4
February	9	9	18
March	4	9	13
April	10	4	14
May	9	14	23
June	17	8	25
July	5	5	10
August	12	4	16
September	6	8	14
October	4	5	9
November	4	4	8
December	2	2	4
	84	74	158

The age distribution of patients of our studies is comparable with studies from the other parts of the India and World.<sup>3-5</sup> The most prevalent age group in our study was 30-39 years (27.8%) followed by 20-29 years (19%) that is similar to other studies.<sup>3-5</sup>

In previous study younger age group male are more prone to spinal injury due to more outdoor, occupational activity and driving activities.<sup>1,6,7</sup>

In older age group female is more risk than male for traumatic spinal injuries due to osteoporotic bony changes.

In our study Sex distribution has shown a male predominance with Male to female ratio was 2.16:1 that is comparable to other recent studies.<sup>3,4,7-9</sup>

There is gradually changing trend in society where females are more actively participating in earning activity like working at constructional site, driving the vehicle and other outdoor activities.

In rural areas agriculture being the main profession where females are

Also equally participate in work, so male-female ratio gradually decreases As compared to studies conducted 15 to 20 year's back.<sup>5,10-13</sup>

**Table 6:** Comparison of sex ratio in deferent series

Series	Year	M:F ratio
Cheko et al (India)	1986	13.5:1
Shanmugasundram (India)	1987	8.98:1
Lan et al (Taiwan)	1993	4:1
Shingu et al (japan)	1994	4.3:1
David chen (India)	1999	3.7:1
Karachan et al (Turkey)	2000	2.5:1
Roop singh et al (India)	2001	2.96:1
Present study (India)	2020	2.16:1

In our study most common mode of injury was fall from height like unprotected roof, construction work, tree, electric pole (44.9%), followed by road traffic accident (43%). In study of R. Singh et al also most common cause of injury was fall from height including roof, trees, electricity

pole (44.5%) followed by

Motor vehicle accidents (34.7%) that is almost similar to our study.<sup>14</sup>

Mode of TSI depends on local factor like occupation, literacy, strictness of traffic rules and regulation.<sup>4,5,10</sup>

Like other developing countries there is tremendously increase in number of vehicle which is not proportion to quality of road in India further raises the incident in of road-traffic accident in younger group of people.

**Table 7:** Comparison of mode of injuries in different series

Series	Fall from height (%)	RTA (%)
Chacko et al (India 1986)	55.2	12.8
Lan et al (Taiwan,1993)	23.3	61.6
Shingu et al (Japan, 1994)	29.2	44.6
Karachan et al (Turkey,2000)	36.5	48.8
Birua et al (India,2018)	59.42	35.08
Present study	44.9	43

In our study lumber spinal column was fractured (55%) followed by thoracic spine (22.78%) and cervical spine injuries noted in (20.8%) that results are similar to other studies like ville niemi et al.<sup>15</sup>

The dorsal spine is fixed and less mobile because of rib cage as compared to lumbar spine which is very mobile portion of spine.<sup>14</sup> The sudden transition from fixed to mobile portion makes dorso-lumbar area as a precarious site for TSI.<sup>14</sup>

In our study highest incidence of traumatic spinal injuries noted in summer (may-june) that is similar to studies of G J S Birua et al.<sup>16</sup>

It can be explained by more agriculture and social activities in summer season and people try to confined in their home in rainy and winter season.<sup>14,16</sup>

## 6. Conclusions

TSI is major source of morbidity and mortality in Rajasthan India like throughout the world. Younger age group and Male are more commonly affected as compare to older age group and female. Accidental fall and RTA are major cause if TSI.

Prevention remains the most effective way to reduce the burden of the traumatic spinal cord injuries. Government should work to strengthen the neurosurgical capacities for traumatic spinal cord management and rehabilitation.

## 7. Abbreviation

RTA (Road Traffic Accident), TSI (Traumatic Spinal Injuries)

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## 9. Conflict of Interest

The authors declare that they have no conflict of interest.

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## Author biography

**Ram Avtar Malav**, Assistant Professor

**Gautam Chand**, Resident

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