

## Epidemiology of Traumatic Spinal Injury: A Descriptive Study

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**Abstract-** Acute injuries of the spine and spinal cord are among the most causes of severe disability and death after trauma. Data about spine fracture with or without cord damage are different. The aim of this study was to determine epidemiology and demographics of spinal injury in main trauma center, Guilan, an Iranian province. The present study was a descriptive study of all cases of traumatic spine injury. Who were admitted to Poursina Hospital, main trauma center of Gilan. The scoring Systems used to evaluate severity of injury were American Spinal Injury association (ASIA) and The Injury Severity Score. Among a total of 245 cases, 71.8% were male and 28.2% were female. Male/Female ratio was 2.55:1. The most common age group at which spinal injury occurred in males was 25-44-year-olds and in females was 45-64 year olds. The most common causes were motorcycle vehicle accidents and falls. The most common fracture in spine was thoracolumbar (T<sub>10</sub>-L<sub>2</sub>). Among Forty four of patient with abnormal findings on neurological examination, fifteen of them had complete spinal cord injury (class A of ASIA) and twenty nine of them had incomplete spinal cord injury (class B, C, D, of ASIA). Our focus on the spinal injury and its major etiology revealed that efforts should be made to prevention. More detailed information about the causes of spinal injury should be sought as it might lead to more targeted intervention.

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**Key word:** Epidemiology; injuries; spinal injuries; Iran

### Introduction

Acute injuries of the spine and spinal cord are among the most causes of severe disability and death after trauma (1). The costs to the patient, their family and the health care system can be enormous (2). In the United States, approximately 11,000 cases of spinal cord injury occur annually (3). The estimated lifetime cost of treating a 25-year-old patient with a SCI can reach \$2.8 million (4).

Data about spine fracture with or without cord damage are different. The aim of study was to determine the regional epidemiology and demographics of SCI, mechanisms, describe clinical syndromes and severity of spinal cord injury. Over the past few decades, public health and prevention initiatives have targeted young males as the group known to be at highest risk for spinal cord injury. We were particularly interested in

determining whether the elderly should become the new focus of prevention efforts.

### Patients and Methods

The present study was a descriptive study of all cases of traumatic spine injury admitting to Poursina hospital, the major trauma center in Guilan, an Iranian province, between August 2005 and November 2006.

The scoring systems used to evaluate severity of injury were explained by American Spinal Injury Association (ASIA) and The Injury Severity Score (ISS). We defined severity trauma. Score regarding ISS (severe: ISS>12, moderate: ISS 7-12, mild: ISS<7) and ASIA (A: complete; B, C and D: incomplete; E: normal). Patients were grouped in:

Complete Tetraplegia, Incomplete Tetraplegia, Complete Paraplegia, Incomplete Paraplegia. All data analyzed by SPSS 16.0.

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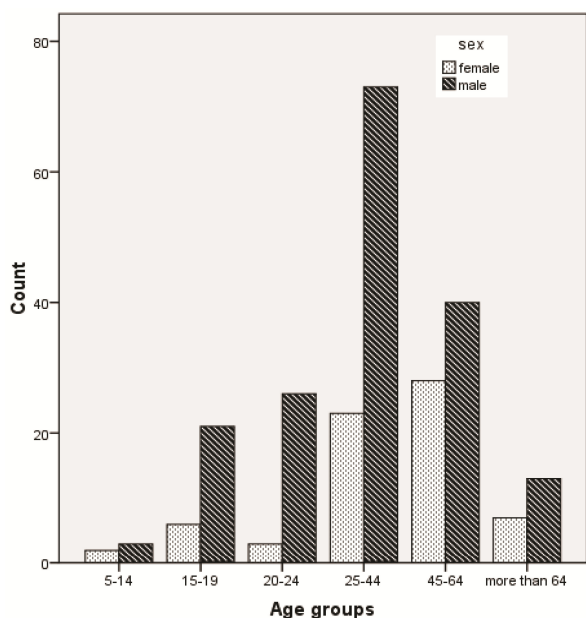
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**Results**

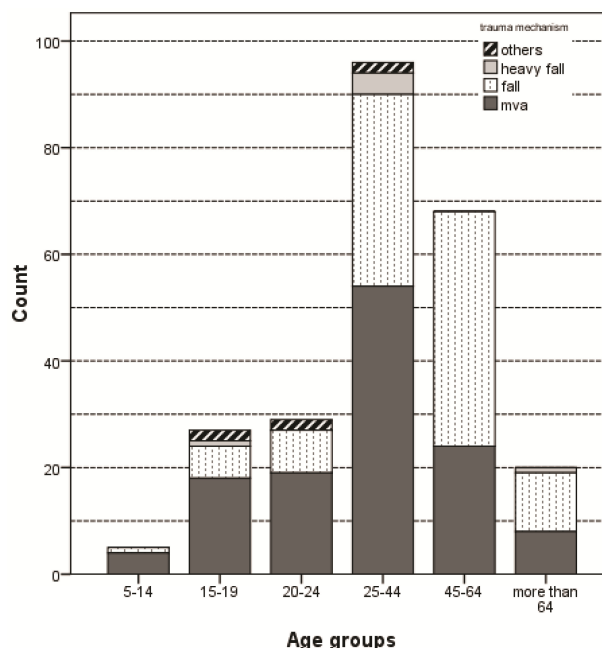
Among a total of 245 cases of spinal trauma injury, 71.8 % (n=176) were male and 28.2% (n=69) were female. Male/Female ratio was 2.55:1. The most common age group at which spinal injury Occurred in males was 25-44year-olds and in females was 45-64 year-olds. Mean age over all was 38.2 (Figure 1).

The most common cases of spinal injuries were motor vehicle accidents (52%) and fall (43%) the remainder was caused by falling heavy object on spine (2.4%) and other mechanism (2.4%).

One hundred and twenty seven people had spinal injury due to Motor Vehicle Accidents (MVAs) that ninety (71%) of them were male and one hundred and six people had spinal injury due to fall and seventy five (71%) of them were male.



**Figure 1.** Cause of traumatic spinal injury according to patient gender



**Figure 2.** Cause of traumatic spinal injury classified by age group

A hundred and fifteen (46.9%) of 245 people with spinal trauma had thoracolumbar Spine fractures (T<sub>10</sub>-L<sub>2</sub>) (Figure 3) and sixty two (53.9%) of thoracolumbar spine fractures were Occurred duo to fall (Table 1).forty four of 245 people with spinal trauma had abnormal findings on neurological examination (18%).fifteen of them had complete spinal cord injury (class A of ASIA scoring system) and twenty nine of them had incomplete spinal cord injury (class B,C,D of ASIA scoring system). Four of people with complete spinal cord injury had tetraplegia and eleven of them had paraplegia. Seven of people with complete spinal cord injury (46%) had fracture or dislocation of cervical spine.

**Table 1.** Location of spinal fracture by trauma mechanism

	trauma mechanism				Total
	MVA <sup>1</sup>	fall	FHO <sup>2</sup>	others	
Number	12	3	0	0	15
cervical	17	4	1	2	24
thoracic	6	3	0	0	9
thoracolumbar	48	62	3	2	115
lumbar	12	11	0	0	23
Dislocation	13	8	1	1	23
multi regional	19	15	1	1	36
<b>Total</b>	<b>127</b>	<b>106</b>	<b>6</b>	<b>6</b>	<b>245</b>

1. Motor Vehicle Accident

2. Falling Heavy Object

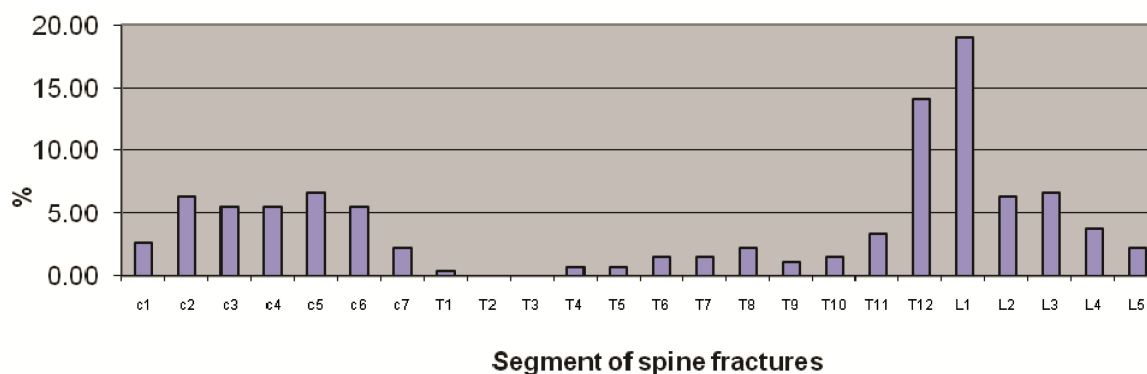


Figure 3. Incidence of spine fracture from traumatic causes

Forty percent of people that had incomplete SCI had suffered severe injury (ISS>12) and 28.6% of people with incomplete SCI and 4.7% of people without SCI had suffered severe injury (ISS>12). Seven people with complete SCI had tetraplegia and 8 of them had paraplegia. Just one person with incomplete SCI had tetraplegia and 6 of them had paraplegia.

## Discussion

Traumatic spinal injury in adults is very expensive for both the patient and the health care delivery system (4). The purpose of the study was to determine incidence and etiology of traumatic spine injury. According to the results of the study, in all age groups, male injury was markedly more than female. This finding is confirmed with other studies. Male/Female ratio was 2.55:1. In other articles, this ratio was between 0.99:1 to 8.3:1 (5, 6). In Iran, Taghipour M. *et al* and Fakharian E. *et al* had notified 4:1, 3.7:1 for male/female ratio (7,8). The peak of male injury occurs in 25-44 year-olds.

Over all 51% of people with spinal injury were between 20 and 44 year-olds (Fig-1). The most common cause of spinal injury in 25-44 year-olds was motor vehicle accidents.

Other wise fall was the most common cause in  $\geq 45$  and was second cause of spinal injury in all (Figure 2). Falls and motor vehicle accidents accounted for approximately equal numbers of spinal injury over all. This finding also was confirmed with other studies. Spinal injury due to fall appeared to be predominant features in developing countries (9). As the other studies, thoracolumbar spine fracture was the most common spine fracture (46.9%), but cervical spine trauma were seen more in spinal cord injuries (38.6%). In north America cervical spine trauma (55%) is the most common anatomic region for spinal cord

injury (10). Fakharian *et al* said the most common cause of spinal cord injury was cervical spine trauma (34%) due to MVAs (8).

Eighteen percents of traumatic spine people had positive neurologic finding in their examination, but in Irish study just 4.91% of traumatic spine people had positive neurologic finding in their examination (4), in Kashan 17.4% of people with spinal trauma had neurologic finding (8). This difference may be cause of severity of our accidents or transport errors in Iran. In conclusion, we found that most common causes of spinal injury are motor vehicle accidents and fall. Because, these injuries due to expensive costs for patients and their family so that prevention and education are effective in diminishing of injuries. More detailed information about the causes of Spinal injury should be sought, based on in-depth investigation, as it might lead to more targeted intervention

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