



# Traumatic spinal cord injuries in Jordan – an epidemiological study

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To survey the situation of traumatic spinal cord injuries (SCI) in Jordan and for a future nationwide epidemiological survey, a retrospective study was conducted at the Royal Jordanian Rehabilitation Centre (RJRC) King Hussein Medical Centre (KHMC) Amman-Jordan, where all traumatic cases within this centre in addition to a few nontraumatic spinal injury patients are referred to the spinal unit which has a capacity of 30 beds. 151 traumatic SCI patients who were admitted to the spinal unit at RJRC during the period January 1988 to December 1993 were reviewed. The estimated annual incidence was 18 per million population. The majority were predominantly males (85.4%) the male/female ratio was 5.8:1. The mean age at the time of injury was 33 being 30.9 years for males and 34.8 years for females. There were 68% (n=103) with paraplegia and 32% (n=48) with tetraplegia (Frankel A–D). The commonest aetiology was motor vehicle accidents (44.4% n=67), next came bullet injuries (25.8% n=39), followed by accidental falls (21.2% n=32). Other causes of SCI, and also the importance of preventive measures are discussed.

**Keywords:** spinal cord injury; Jordan; epidemiology; incidence; prevention

## Introduction

Spinal paralysis is probably the most devastating of all the illnesses that can befall man<sup>1</sup>. Traumatic SCI is a serious condition which can result in significant morbidity and mortality, therefore prevention is of paramount importance.

To obtain basic data about the extent of this serious condition, we have attempted to present the first epidemiological data on Jordanian patients with SCI who were admitted to the spinal unit at KHMC which is the largest medical centre in the country, serving 1.4 million people, and to estimate the incidence of traumatic SCI in Jordan.

## Materials and methods

A retrospective review of hospital records of 151 SCI patients was conducted from January 1988 to December 1993 at the RJRC, KHMC in Amman which is the only specialized centre in Jordan that has the capability to provide the appropriate care for SCI patients with a capacity of 30 beds. A detailed chart review was done, recording the age at the time of injury, sex, cause of trauma, and the site and extent of injury.

The definition of traumatic SCI is taken from that identified by Kraus *et al*<sup>2</sup> as an acute traumatic lesion of spinal cord which resulted in varying degrees of

motor and/or sensory deficit or paralysis. The neurological deficits were classified according to the Frankel classification<sup>3</sup>.

Only those who were injured between 1st of January 1988 and the 31st of December 1993 were accepted for the study.

Patients who died before hospitalisation or patients with nontraumatic SCI were excluded from this study. There were seven known patients who died before hospitalisation, but the actual number of those who died could not be estimated due to the unavailability of a SCI register. Furthermore autopsy in Jordan is done mainly in relation to medico-legal conditions. Tribal and community influence based on wrong beliefs make it difficult to perform an autopsy in all patients, and the families of victims will not give a consent for an autopsy.

## Results

### *Incidence*

In this study 151 SCI patients were identified from 1st January to 31st December 1993. With a population of 1.4 million in the KHMC, the estimated annual incidence of traumatic SCI was 18 per million population. All had neurological deficits of varying degree (Table 1).

### *Gender and age*

There were 129 males and 22 females with SCI, the male/female ratio being 5.8:1. The mean age at the

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time of injury was 33, being 30.9 years for males and 34.8 years for females. The rate of occurrence for each age group was as follows: Less than 20 years = 37 patients (24.5%); 21-30 years = 54 patients (35.8%); 31-40 years = 24 patients (15.9%) and more than 40 years = 36 patients (23.8%). SCI was most prevalent between 21 and 30 years (Figure 1).

*Causes of SCI*

The leading cause of SCI was road traffic accident, accounting for 44.4% of all causes; bullet injuries 25.8% and accidental falls 21.2%. Other causes included sport injuries 2.6%, stab injury 2%, being struck by an object 3.3%, and suicidal attempts 0.7% (Table 2).

*Site and extent of injury*

Forty eight patients (31.8%) had cervical cord injuries, and 103 (68.2%) a thoraco-lumbar injury (Table 3). Paraplegia was the commonest neurological disability. Complete neurological lesions were more frequent with thoracic injuries.

**Table 1** Neurological status of patients on admission

|                 |     |         |
|-----------------|-----|---------|
| Frankel grade A | 81  | (53.6%) |
| Frankel grade B | 15  | (10%)   |
| Frankel grade C | 34  | (22.5%) |
| Frankel grade D | 21  | (13.9%) |
| Total           | 151 | (100%)  |

**Table 2** Aetiology of SCI

| Cause                                   | Male | Female | Total No. | %    |
|---|------|--------|-----------|------|
| Traffic accident                        | 57   | 10     | 67        | 44.4 |
| Gunshot injuries                        | 33   | 6      | 39        | 25.8 |
| Accidental falls                        | 27   | 5      | 32        | 21.2 |
| Struck by object                        | 4    | 1      | 5         | 3.3  |
| Sport injury (all shallow water diving) | 4    | 0      | 4         | 2.6  |
| Stab injury                             | 3    | 0      | 3         | 2    |
| Attempted suicide                       | 1    | 0      | 1         | 0.7  |

**Table 3** Causes of SCI related to site of injury

| Causes of SCI     | Thoraco-Lumbar injuries | Cervical injuries | Total No. |
|-------------------|-------------------------|-------------------|-----------|
| Traffic accident  | 45                      | 22                | 67        |
| Gunshot injury    | 28                      | 11                | 39        |
| Falls             | 25                      | 07                | 32        |
| Struck by object  | 03                      | 02                | 05        |
| Sport injury      | 00                      | 04                | 04        |
| Stab injury       | 01                      | 02                | 03        |
| Attempted suicide | 01                      | 00                | 01        |

**Discussion**

Such epidemiological data have not previously been available in Jordan. Furthermore, there is no national SCI registry system which makes it difficult to know the exact number of SCI patients who do not reach our centre.

The estimated incidence of traumatic SCI in Jordan is 18 per million per year, which may be an underestimate due to the relatively small population (1.4 million) and the number of patients analysed.

The incidence of SCI in the literature varies between different countries (Figure 1).

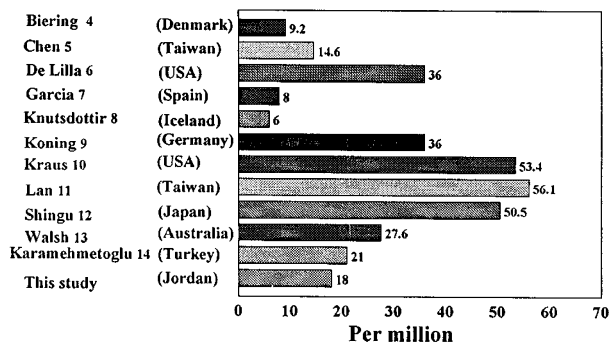
The male to female ratio was 5.8:1 which is higher than in other studies<sup>14</sup> but is to be expected in a country like Jordan where more than half of the women are housewives, and men are the bread winners, and are therefore more likely to be exposed to accidents. This was pointed out by Kuhn *et al*<sup>15</sup> when he concluded that the sex ratio reflects the socioeconomic and cultural status of the society.

As in most of the studies, the peak incidence of SCI is within the age group of 21-30 years comprising 35.8%. In Jordan as is the case in most developing countries, the population is very young. Almost two thirds of the population are under the age of thirty and this means that the figure of the peak incidence of SCI goes with the demographic composition of the society.

Regarding the causes of SCI, road traffic accidents comprised the highest percentage (44.4%), and this is consistent with other reports. The high number of car accidents in Jordan has led the authorities to enforce the traffic regulations especially the speed limit and the use of seat belts.

In Jordan drinking and driving is not a common occurrence because of adherence to religious beliefs, unlike other reported studies incriminating drinking and driving as a major cause in traffic accidents<sup>16</sup>.

The second largest group of patients were those involved in accidental gunfire. The majority of these accidents happened during the celebrations of wedding parties in rural areas. where firing random shots in the air is a common cultural habit. A few casualties were



**Figure 1** Incidence of SCI in literature

victims of mishandling of guns during repair or maintenance and ignoring safety standards. There were two instances resulting from revenge in family feuds. No cases resulted from war injury, as Jordan is enjoying a peaceful climate for more than 20 years.

In comparison with other studies, sport injuries and suicide were rather uncommon in Jordan because of the unavailability of risky sports such as motor racing and skiing, and the low incidence of suicide in general.

The number of SCI patients is constantly growing and the epidemiological data are becoming much more important, thus we are now carrying out a more comprehensive study.

This study showed that road traffic accidents and bullet injuries are responsible for more than 70% of SCI in Jordan, and clearly points to the importance of prevention programmes.

To this effect our spinal unit in collaboration with Jordanian TV has made short films which were shown on national JTV to bring awareness of the major causes of SCI, and to make recommendations both to the general population and also the authorities.

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