International Journal of Research in Medical Sciences
Sridharan N et al. Int J Res Med Sci. 2015 Jan;3(1):220-223
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: 10.5455/2320-6012.ijrms20150139

Research Article

Epidemiologic evidence of spinal cord injury in Tamil Nadu, India

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Received: 26 November 2014
Accepted: 8 December 2014

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ABSTRACT

Background: Spinal cord injury is a fearsome disability leading to increased rate of morbidity and mortality. Information about the incidence of spinal cord injury may provide support for the healthcare advancements. The aim of the present study is to investigate the epidemiology of spinal cord injury.
Methods: The present study was carried out in Rajiv Gandhi government general hospital, Chennai, India. The study design was approved by the institutional human ethical committee. Questionnaire was used to collect the information from the patients in a prospective manner. The American Spinal Injury Association (ASIA) scoring systems was used to evaluate the severity of spinal cord injury.
Results: A total of 245 cases of spinal injury were studied. Among them, 88 % (n=216) were male and 12% (n=29) were female. Spinal cord injuries of falls from height were prominent over the road traffic accident. Cervical level injuries are widespread in males and dorsal level Injuries are common in females.
Conclusion: Hence awareness of the spinal cord injury and availability of healthcare facilities may minimise the consequences of spinal cord injury.

Keywords: Epidemiology, Spinal cord, Injury, Male, Female

INTRODUCTION

The consequences of spinal cord injury are multi-factorial.[1] Spinal cord injury reduces the quality of the life by developing several complications such as decubitus ulcers, chronic pain, spasticity, bowel/bladder dysfunction and compromised sexual function.[2,3] A detailed literature about the etiology of spinal cord injury is available from the developed nationals.[4,5] Whereas in developing countries like India, though the risk factors are high, the availability of region/area wise literature support is lacking.[6] Hence it is necessary to conduct an epidemiological study to provide information about spinal cord injury trauma and its complications at a regional level like Chennai, a metropolitan city in India. Such studies may help to develop the precautionary actions which may decrease the risk of spinal cord injury.

METHODS

The present study is to investigate the epidemiology of spinal cord injury in in-door patients of Rajiv Gandhi Government General Hospital, Chennai, India. Only the traumatic spinal cord injury patients who were admitted to the hospital were included in the study group. The following conditions of spinal cord injured patients were evaluated using the questioner which included the age,

sex, mode of injury, SCI level, associated trauma, other complications, duration of hospital stay, and socio-economic status. The study was conducted from September 2011 to August 2012. The protocol of the study was approved by institutional human ethical committee of Madras Medical College, Tamil Nadu Dr. M.G.R. Medical University, Chennai. The severity of the spinal cord injury were assessed by American Spinal Injury Association scoring systems as (A: complete; B, C and D: incomplete; E: normal).[7]

RESULTS

A total number of 245 cases of spinal cord injury were studied. Among them 88 % (n=216) of the patients were male and 12% (n=29) were female. The ratio between male and female population is 8.8:1.2. ASIA scoring was carried out only on 109 male patients and 16 female patients. Among them 44% of the male and 25 % of the females were scored A of ASIA scale which represents the complete injury whereas 33.9 % of male and 25% of female were scored ASIA scale B, C and D which is incomplete injury (Table 2).

The most common age group at which spinal cord injury occurred in both males (55%) and female (44%) was 20 to 40 years of age (Figure 1). Among them 76% of the male and 82% of the females were married. The most common cause of injury in both sexes was falls from height, which includes falls from tree and fall in to the well. Spinal cord injury due to falls was 63% in male and 62 % in female, whereas injury by road traffic accident in male and female is only 27% and 38% respectively (Table 1). In males, injury occurring at the cervical level segments was high followed by injury at the dorsal level segments and lumbar level segments. On the other hand, in the female population, injury occurring at the lumbar level segments was high, followed by dorsal level segments and then the cervical level segments (Figure 3). Among the individual segments, C5 and C6 are the highest percentage of injured segments of spine in male and L1 is the highest percentage of injured segment in female (Figure 2).

Table 1: Different mode of spinal cord injury in male and female.

Mode of injury	Male	Female
Road traffic accident	58 (27%)	11 (38%)
Falls (height/tree/ well)	136 (63%)	18 (62%)
Falls from height	98 (72%)	16 (89%)
Falls from tree	32 (23.5%)	1 (5.5%)
Falls in to the well	6 (4.5%)	1 (5.5%)
Sports	4 (1.8%)	0
Heavy weight over head or back	11 (5%)	0
Miscellaneous	5 (2.3%)	0

Table 2: ASIA scale details of male and female.

ASIA scale	A	B	C	D	E
Male	49 (44.9%)	12 (11%)	12 (11%)	13 (11.9%)	23 (21%)
Female	4 (25%)	1 (6%)	1 (6%)	2 (12.5%)	8 (50%)

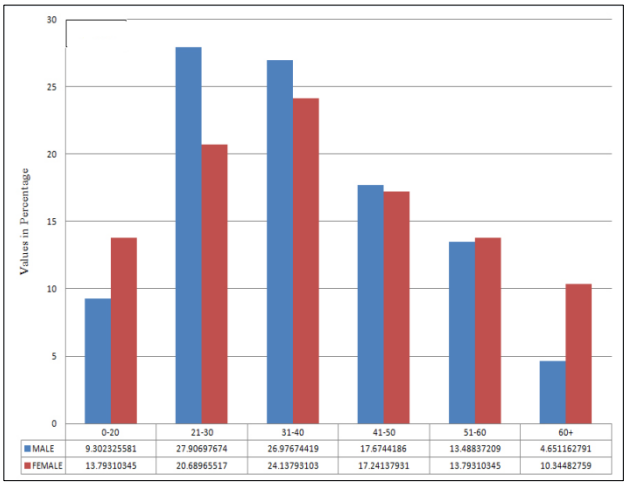

Figure 1: Shows the graphical representation of spinal cord injury incidence at different age groups in male and female.

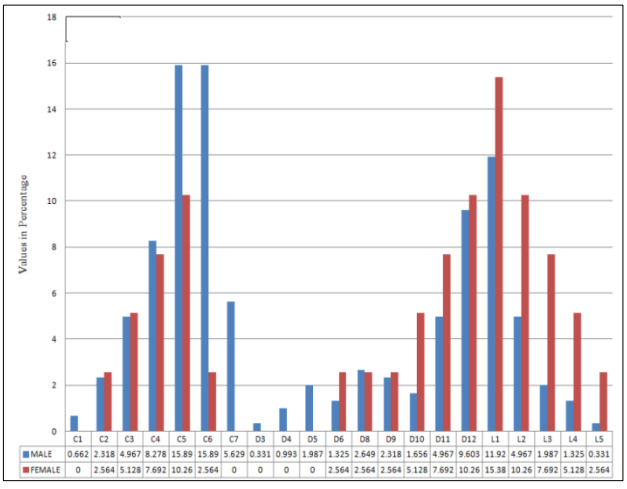

Figure 2: Shows the graphical representation of injury at various segmental levels of spine.

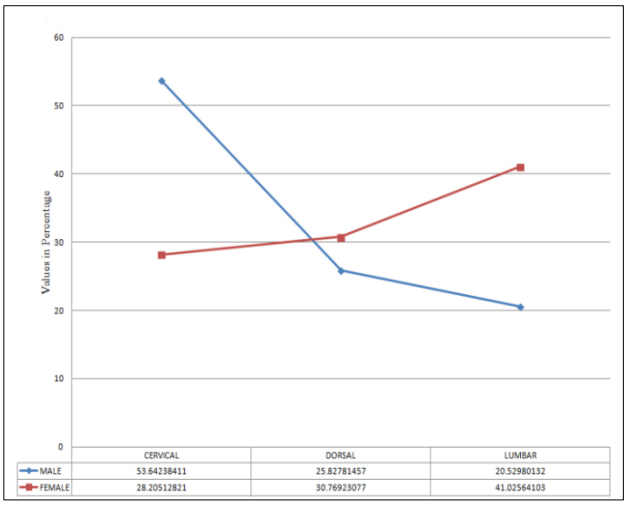

Figure 3: Shows the graphical representation of spinal cord injury at various spinal levels.

The transfer of patients from one hospital to another hospital for treatment purpose plays a critical role. Multiple transfers may cause further damage to the already injured spinal cord. We observed that maximum number of up to four transfers was done. Majority of male and female patients were involved in at-least two transfers before coming to our centre. For the transportation of patients, 52% of the males and 54% of the females utilised ambulance service, whereas the rest used their own mode of transport (Figure 4). 37% of the male patients and 34% of the female patients were transported to our centre within 24 hours. But 22% of the male patients and 34% of the female patients were delayed up to 48 hours to reach the hospital (Figure 5). In a developing country like India, necessity of socio-economical growth leads to the advancement of industries, expansion of new buildings, increasing number of vehicles on road and change of life style activities. These may lead to more number of work and traffic related accidents. From our observation, though the majority of spinal cord injury occurred within the limit of metropolitan city, the incidence was widespread in the state level (Figure 6). All the above mentioned data were analysed using Microsoft office excel 2007.

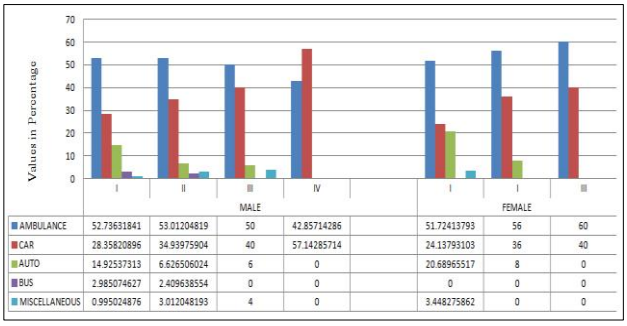

Figure 4: Shows the graphical representation of different mode of transport used for the transportation of patients at various transfers.

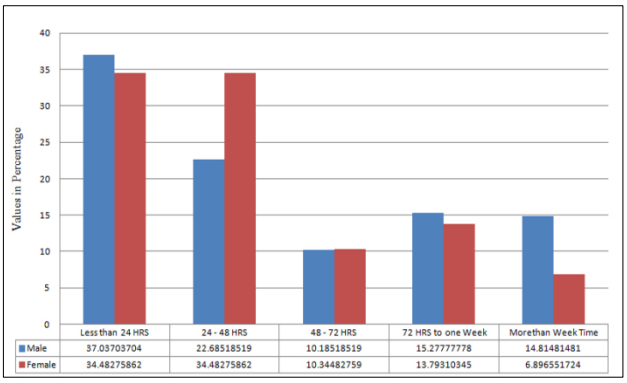

Figure 5: Shows the graphical representation of different time duration of admission after spinal cord injury in Rajiv Gandhi government general hospital.

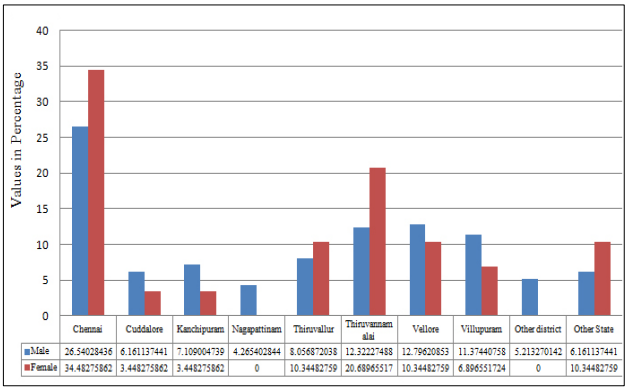

Figure 6: Shows the graphical representation of spinal cord injury at various districts of the state province and other state of South India.

DISCUSSION

The consequences of most crippling disablement of spinal cord injury are not only restricted to the concerned patient and their family but also to their society in a great extent. This happens by means of loss of man power to the society, socio-economical dropdown of the spinal cord injured patient family, and maintenance cost of the patient, where they eventually become a burden.[4,8]

Epidemiological studies about spinal cord injury may provide scientific information as well as awareness to the society. This also facilitates to take bureaucratic decision for the welfare of the spinal cord injured victim family. Statistical details about spinal cord injury from the concerned geographical area are important to develop healthcare facilities in a developing country. However, extrapolation of the existing evidence from advanced countries may lead to erroneous conclusion. Variability of existing reports from different geographical areas was reported by Ning et al.[9]

During the study period of twelve months, a total numbers of 245 patients were observed in this study. All the spinal cord injured patients observed in this study

were from poor socio-economic background. Among them majority were males which confirms the global trend.[2,10,11] Majority of the spinal cord injury are occurring at the age of 20 to 40, which is the most productive period of their lives.[4,5,12] Predominance of spinal cord injury among the males may be due to the involvement of risk factors encountered during their occupational proceedings. Another severity of occupational hazard we observed in this study was, greater number of injury were falls from heights. That may be due to unprotected nature and lack of safety measures in working environment.[13] As mentioned by Pandey et al.[1] second largest type of spinal cord injury in males is road traffic accidents. This may be due to the increasing number of vehicles in metropolitan cities of a developing country like India. Enforcement of strict traffic rules may minimise traffic related accidents.

We observed 33.9% of male and 25% of female scored ASIA scale B, C and D which is incomplete injury. Incomplete injury group observed in ASIA scoring system are the primary target for the treatment strategy. Hence proper attention on incomplete injury group may develop recovery overtime. Time duration involved in transferring the patients to the specialized centres play a crucial role in treatment and recovery of the patients. Time delay of admission after injury was minimal in this centre.[1,5,6] Majority of the patients reached our centre within 24 hours duration which is vital time period for the treatment of spinal cord injury. In our study majority of the patients admitted to our centre were due to second transfer. Second highest numbers of patients admitted were due to the third transfer. More than 52% of male and 54% female patients utilized ambulance service whereas rest of the male and female patients used their own mode of transport. In developed countries availability of rapid transportation has drastically reduce the mortality and morbidity of spinal injured patients. Hence awareness about specialized centres may minimise such transportation annoyance and also such epidemiological studies provide statistical awareness about concerned injury to scientists and clinicians to develop proper treatment strategies.

ACKNOWLEDGEMENTS

Sincere thanks to director & faculty members of institute of anatomy, Madras medical college and to director and faculty members of institute of orthopedics & traumatology, Rajiv Gandhi government general hospital, Chennai, Tamil Nadu, India for their kind support.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional human ethics committee, Madras Medical College, Chennai-3. No. 03072011. Dated: 21.07.2011 and No.36122012 Dated: 11.12.2012.

REFERENCES

1. Pandey V, Nigam V, Goyal T, Chhabra H. Care of posttraumatic spinal cord injury patients in India: an analysis. Indian J Orthop 2007;41:295-9.
2. Scovil CV, Ranabhat MK, Craighead IB, Wee J. Follow-up study of spinal cord injured patients after discharge from inpatient rehabilitation in Nepal in 2007. Spinal Cord. 2012;50:232-7.
3. Chacko V, Joseph B, Mohanty SP, Jacob T. Management of spinal cord injury in a general hospital in rural India. Paraplegia. 1986;24:330-5.
4. Agarwal P, Upadhyay P, Raja K. A demographic profile of traumatic and non-traumatic spinal injury cases: a hospital based study from India. Spinal Cord. 2007;45:597-602.
5. Singh R, Sharma SC, Mittal R, Sharma A. Traumatic spinal cord injuries in Haryana: an epidemiological study. Indian J Community Med. 2003;28:184-6.
6. Hagen EM. How to prevent early mortality due to spinal cord injuries? New evidence & update. Indian J Med Res. 2014;140:5-7.
7. Kirshblum SC, Burns SP, Sorensen FB, Donovan W, Graves DE, Amitabh J, et al. International standards for neurological classification of spinal cord injury. J Spinal Cord Med. 2011;34(6):535-46.
8. Draulans N, Kiekens C, Roels E, Peers K. Etiology of spinal cord injuries in Sub-Saharan Africa. Spinal Cord. 2011;49:1148-54.
9. Ning GZ, Wu Q, Li Y, Feng SQ. Epidemiology of traumatic spinal cord injury in Asia: a systematic review. J Spinal Cord Med. 2012;35:229-39.
10. Chaboks S, Safaee M, Alizadeh A, Dafchahi AA, Taghinnejadi O, Koochakinejad L. Epidemiology of traumatic spinal injury: a descriptive study. Acta Medica Iranica. 2010;48:3.
11. Lee BB, Cripps RA, Fitzharris M, Wing PC. The global map for traumatic spinal cord injury epidemiology: update 2011, global incidence rate. Spinal Cord. 2014;52:110-6.
12. Annamalai K, Chinnathambi R. Spinal cord injuries: the challenges and the achievements. In: Annamalai K, Chinnathambi R, eds. A Book. Chennai: Dept. of Orthopaedic Surgery, Govt. General Hospital, Chennai; 1998: 1-50.
13. Lalwani S, Singh V, Trikha V, Sharma V, Kumar S, Bagla R, et al. Mortality profile of patients with traumatic spinal injuries at a level I trauma care centre in India. Indian J Med Res. 2014;140:40-5.

DOI: 10.5455/2320-6012.ijrms20150139
Cite this article as: Sridharan N, Uvaraj NR, Dhanagopal M, Gopinath NR, Anuswedha A. Epidemiologic evidence of spinal cord injury in Tamil Nadu, India. Int J Res Med Sci 2015;3:220-3.