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ORIGINAL ARTICLE

PREVALENCE OF SPINAL FRACTURES AND ORTHOPEDIC FRACTURES CAUSED BY ROAD TRAFFIC INJURIES

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ABSTRACT

Background: Road traffic injures (RTIs) are the third leading cause of death in the world after heart diseases and cancer**.** The aim of the present study was to determine the prevalence of spinal cord fractures (SCF) and other general orthopedic fractures (GOF) caused by road traffic injuries.

Materials & Methods: This was a retrospective cross sectional study performed on patients with RTIs-related fractures or SCIs from January 2020 to January 2021.The study population consisted of the medical records of patients admitted to Imam Khomeini Hospital with a diagnosis of GOFs or SCFs. The participants were included in the study by census method. Inclusion criteria included RTIs-related orthopedic fractures or SCIs. The data was analyzed using the SPSS 16 software.

Results: The study result showed, that the prevalence of two types of fracture in patients was 9.33%. Also, the prevalence of spinal cord fractures was in the form of Multiple spinal levels with a rate of 88 (32.6%) and the lowest rate was in the Dorsal spine area with a rate of 38 (14.1%). Regarding general orthopedic fractures, the result showed Multiple Orthopedic regions with a rate of 67 (24.8%) and the lowest rate was in the Pelvis region with a rate of 29 (10.7%).

Conclusions: The prevalence of spinal cord and general orthopedic fractures in the examined patients was high, so it is necessary to take corrective measures to prevent traffic accidents.

KEY WORDS: Spinal cord fractures; Orthopedic fractures; Road traffic injuries.

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INTRODUCTION

Road traffic injures (RTIs) are the third leading cause of death in the world after heart diseases and cancer. RTIs impose many socio-economic problems on society and aggravate existing bottlenecks. The continued trend of RTIs can lead to increased mortality or chronic diseases in individuals and is considered as a potential threat to society.[1-4] When investigating RTIs, it is very important to study the causative factors and their relationship with the factors affecting accidents. Factors contributing to RTIs include both road problems and vehicle quality, as well as demographic factors related to the driver or pedestrians such as low economic and social status, marital status, age, employment status, level of education.[3,5,6]

According to the World Health Organization (WHO), RTIs occur in developing countries in about 93% of cases, and these accidents lead to deaths in young adults and children (5-29 years). In order to identify vulnerable people and problems caused by RTIs, it is necessary to conduct extensive studies in this field.[7] In fact, collecting information on the causes, aggravating factors and complications of these RTIs can help a lot to improve prevention or rehabilitation of injured people.[8] RTIs can lead to complications such as orthopedic fractures or spinal cord fractures (SCFs).[9]

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Orthopedic fractures are one of the complications of RTIs with a high prevalence and include a variety of minor to severe fractures.[9] Men and younger age groups are more affected by orthopedic fractures caused by RTIs and people with lower economic and social status are more prone to spinal or lower limb fractures.[10,11] Depending on the anatomical location of the fracture, the most common bone fractures include fractures of the lower limbs, head, chest, and visceral injury to the pelvis. Also, the most common fractures in the bone site include the tibia/ fibula and femur.[11,12] RTIs also affects children in about 25% of cases and can lead to many short-term and long-term complications.[13]

RTIs can affect the development SCFs, so the most common type of RTIs-related brain injury is head trauma (HT), which may not have serious complications at the time of the accident and lead to diseases such as headache and epilepsy at older ages or lead to hospitalization and death after trauma.[14,15] SCF patients face various challenges that have negative effects on all aspects of their life to the extent that it can lead to reduced physical activity, mental health, pain and care pressure in caregivers and negative effects on health dimensions, which shows the importance of paying attention to these patients.[16,17]

Due to the high prevalence of RTIs and subsequent complications, the aim of the present study was to determine the prevalence of SCFs and GOFs in Ilam.

MATERIALS AND METHODS

This was a retrospective study performed on cases with RTIs-related SCFs and GOFs in Ilam from January 2020 to January 2021.

The study population comprised the medical records of patients admitted to Imam Khomeini Hospital in Ilam with a diagnosis of general orthopedic fractures or SCFs. The participants were included in the study after giving informed consent. Inclusion criteria included RTIs-related GOFs or SCFs. Also, patients with incomplete medical records, patients who were discharged voluntarily or temporarily admitted patients were excluded from the study.

Demographic profiles and checklists were used to collect data and assess the status of RTIs-related GOFs or SCFs. This checklist assesses the status of orthopedic fractures in the anatomical locations of multiple regions, including the clavicle / shoulder, upper limbs, lower limbs, pelvis and SCFs in the cervical spine, dorsal spine, lumbar spine, sacral spine and multiple levels.[18]

Researchers identified patients with RTIs-related general orthopedic fractures or SCFs by referring to the medical record archives of Imam Khomeini Hospital in Ilam and study them to extract the necessary information in accordance with the checklist. The patient information was also kept confidential. The data was analyzed using the SPSS 16 software.

RESULTS

Table 1 showed the state of all types of fractures according to demographic characteristics. According to the findings, Cervical spine and Pelvis fractures were more common among men than women, and this difference was statistically significant ($P<0.05$). Also, the M(Sd) age of the patients was 41.75(9.21) years.

In this study, 270 patients with both orthopedic and spinal fractures were investigated in 2892 cases because of accidents. Also, the prevalence of these two types of fractures in patients was 9.33%.

Result table 2 showed, the highest prevalence of spinal cord fractures was at Multiple levels of spinal with a rate of 88 (32.6%) and the lowest rate was in the Dorsal spine area with a rate of 38 (14.1%).

Table2- Investigating the prevalence of spinal fractures in the examined patients

Type of trauma	N	Percentage
Cervical spine	39	14.4
Dorsal spine	38	14.1
Lumbar spine	62	23
Sacral spine	43	15.9
Multiple levels Spinal	88	32.6

Result table 3 showed, the highest prevalence of general orthopedic fractures was at Multiple Orthopedic regions with a rate of 67 (24.8%) and the lowest rate was in the Pelvis region with a rate of 29 (10.7%).

Table3- Investigating the prevalence of orthopedic fractures in the patients under investigation

Type of trauma	N	Percentage
Clavicle shoulder	64	23.7
Upper limbs	38	14.1
Lower limbs	72	26.7
Pelvis	29	10.7
Multiple regions Orthopedic	67	24.8

Table1. Investigating the condition of orthopedic and spinal fractures of patients according to demographic characteristics

Variable		Gender		ICU admission		Discharge Status		Death	
		Male	Female	Yes	No	Yes	No	Yes	No
Spinal fractures	Cervical spine	25(64.1)	14(35.9)	12(30.8)	27(69.2)	24(61.5)	15(38.5)	0(0)	39(100)
	P, F	0.045, 4.05		0.004, 8.16		0.023, 5.21		0.003, 8.85	
	Dorsal spine	28(73.7)	10(26.3)	4(10.5)	34(89.5)	25(65.8)	13(34.2)	1(2.6)	37(97.4)
	P, F	0.64, 0.28		0.000, 34.52		0.005, 8.04		0.016, 5.92	
	Lumbar spine	51(82.3)	11(17.7)	25(40.3)	37(59.7)	24(38.7)	38(61.3)	9(14.5)	53(85.5)
	P, F	0.21, 1.58		0.023, 5.24		0.222, 1.49		0.68, 0.16	
	Sacral spine	35(81.4)	8(18.6)	34(79.1)	9(20.9)	18(41.9)	25(58.1)	3(7)	40(93)
	P, F	0.42, 0.63		0.000, 15.15		0.67, 0.17		0.081, 3.07	
	Multiple levels Spinal	68(77.3)	20(22.7)	66(75)	22(25)	30(34.1)	58(65.9)	30(34.1)	58(65.9)
	P, F	0.87, 0.026		0.000, 20.28		0.002, 10.27		0.000, 20.02	
Orthopedic fractures	Multiple regions Orthopedic	57(85.1)	10(14.9)	47(70.1)	20(29.9)	27(40.3)	40(59.7)	17(25.4)	50(74.6)
	P, F	0.001, 9.34		0.02, 8.45		0.002, 5.3		0.003, 12.7	
	Clavicle shoulder	46(71.9)	18(28.1)	23(35.9)	41(64.1)	28(43.8)	36(56.3)	3(4.7)	61(95.3)
	P, F	0.30, 1.07		0.003, 9.15		0.84, 0.038		0.005, 8.09	
	Upper limbs	29(76.3)	9(23.7)	17(44.7)	21(55.3)	24(63.2)	14(36.8)	0(0)	38(100)
	P, F	0.95. 0.003		0.32, 0.98		0.014, 6.10		0.004, 8.58	
	Lower limbs	58(80.6)	14(19.4)	45(62.5)	27(37.5)	24(33.3)	48(66.7)	18(25)	54(75)
	P, F	0.36, 0.82		0.042, 4.19		0.022, 5.29		0.014, 6.13	
	Pelvis	17(58.6)	12(41.4)	9(31)	20(69)	18(62.1)	11(37.9)	5(17.2)	24(82.8)
	P, F	0.015, 6.00		0.016, 5.93		0.048, 3.93		0.83, 0.042	

DISCUSSION

According to the results of the present study, the most frequent injuries included lumbar spine injuries (23%) and multiple levels (32.6%), respectively. In a study in Arabia, Algahtany et al. referred to lumbar spine (25%) as the most frequent injuries.[18] Regarding orthopedic fractures, the highest fracture rates were related to multiple levels (24.8%) and lower limbs (26.7%), respectively. Algahtany et al. also stated that the highest fracture rate was related to multiple levels (27.2%) and Pelvis (25.5%), respectively.[8] In a study of 520183 SCI American patients between 2011 and 2015, Anandasivam et al. found lumbar spine fractures in 71% of patients.[19]

Regarding the relationship between demographic variables with general orthopedic fractures (GOF), results showed higher GOF prevalence in men than women and the mean age of patients was 41.75(9.21). In a study of Iranian GOF patients (Isfahan), Motififard et al. stated that 98 (62.4%) of participants were men and 59 (37.6) were female and mean ± SD of their age was 43.22 ± 5.81 years.[20] In a study in Ethiopia, Zuriyash et al. showed that 311 (74.4%) of the patients were male and 109 (25.6%) were female. With regard to, patients' age, 30.2% of patients were in the 25-34-year age group .[21] In a

study of 1014 Indian patients, Agrawal et al. reported that 781 (77.025%) of the patients were male, 233 (22.98%) were female, and also 34.91% of the patients were in the 20-30-year age group.[22] The results of other studies confirmed the high RTIs-related OFs in men compared to women and also its high prevalence at younger ages.

Regarding the relationship between demographic variables and SCFs, results showed that the SCF prevalence was higher in men than women and the mean age of patients was 41.75(9.21). Barbiellini et al. also investigated 1303 SCF patients from 2011 to 2020, and reported that 890 (68.3%) of the patients were male and 413 (31.7%) were female, and the mean ± SD of their age was 59.2 ±21.4 years.[23] Similarly, in a study of 135 SCF patients in Tanzania, Rashid et al. reported that 107 (85.6%) of patients were male and the mean ± SD of their age was 39.9± 16 years,[24] which is consistent with the results of the present study that showed the prevalence of SCFs was higher in men and younger ages.

CONCLUSIONS

The prevalence of spinal cord and general orthopedic fractures in the examined patients was high, so it is necessary to take corrective measures to prevent traffic accidents.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	HK, AF
Acquisition, Analysis or Interpretation of Data:	HK, AF, NK, KK
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All the 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.