



Injuries Caused by Occupational Accidents in Patients Admitted to Teaching Hospitals of Lorestan University of Medical Sciences, Iran (2016-2021)

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Abstract

Background: Occupational accidents are one of the main factors destroying the present potentials among employees. This study was conducted to investigate the epidemiology of occupational accidents in the patients admitted to Khorramabad hospitals.

Materials and Methods: This is a descriptive study. A researcher-made checklist was used for data collection, and related information, including demographic indicators, type of job, work experience, cause of accident, time of accident based on morning, evening and night work shifts and seasons, type Injury, area and injured limb were collected from the records of hospitalized patients. Data were analyzed using SPSS statistical software, and chi-square test.

Results: A total of 2833 people were studied. The mean age of the subjects was 33.64 ± 31 with a minimum age of 12 years and a maximum of 83 years. 2276 people (80.3%) were men. Upper extremity ulcer was the most common kind of occupational damage, affecting 766 patients (or 27%), while upper and lower extremity ulcer was the least common, affecting 9 patients (or 0.3%). There was a statistically significant difference between the respondents' sex, age, season of injury, and time of injury ($P < 0.05$) and the cause of their occupational injury.

Conclusion: Considering the increasing trend of occupational accidents, and its high prevalence in construction jobs, the need to take serious and preventive measures to reduce the incidence of such accidents, and its adverse consequences should be considered.

Keywords: Epidemiology, Occupational Accidents, Injury

Introduction

The necessity of human life from the beginning of creation has been continuous work and effort, which has faced many difficulties in this way. Although with the advent of Industrial Revolution and the advancement of technology, and the mechanization of various elements of life has created more welfare and comfort for human beings, but, this tremendous development caused man to be exposed to the danger and threat of

factors that he created and created with his own hands. Consequently, it has unfortunate consequences, such as occupational accidents, which are considered a serious threat to work and life [1]. According to geographic, climatic, economic, social, cultural, historical, and even geopolitical variables, the rate of occupational accidents differs between cultures. The prevalence of occupational accidents is influenced by a wide range of variables, including age, sex, job type,

marital status, level of education, work experience, time, length of employment, lifestyle, and workplace safety culture. In the United States, for example, most occupational accidents are recorded in occupational groups of agriculture, fishing, mining and service workers, and the construction industry [2-4]. In studies conducted in Iran, the construction workers were the most vulnerable group in occupational accidents [5]. Currently, occupational accidents are the third cause of death in the world, and the second cause of death in Iran after accidents, and are considered one of the important health, social and economic risk factors in industrialized and developing societies [6,7]. Based on National Occupational Safety and Health Administration(NIOSH), about seven million occupational accidents occur in the United States every year, three million of which are severe and lead to the death of about 6,500 people [8]. In Iran, based on the report of the Social Security Organization in 2009, 21,740 people were injured due to accidents at work in Iran, which resulted in 110 deaths and 234 disabilities [1]. In a 2005 global study, the number of work-related accidents that resulted in death was estimated at approximately 312,000. The incidence of occupational accidents in the Middle East was 9 per thousand [9].

The most common causes of accidents were non-use of personal protective equipment (25.2%) and lack of accuracy in performing work duties (19.3%). Cuts and injuries (56.7%) and eye injuries (14.9%) were the most frequent aftereffects of the event, according to Khoshakhlagh et al.'s research in Yazd. Additionally, the age group of 20 to 29 years and those with a work experience of 4 to 6 years were shown to have the greatest incidence of accidents in this study [10]. Epidemiological investigation of occupational accidents in Marodasht, Iran showed that the highest number of accidents (29.75%), in the age group of 25-29 years, the most important cause of falls from a height (36.82%), the highest number of accidents in the construction group (38.6%) %, The most common time of the accident was reported between 7-10 am (31.7%) and the most common member of the hand accident (29.26%) was reported [11]. In a study conducted by Vazirinejad et al. in Iran for two years, the causes of occupational accidents were studied, the results showed that the average age of the victims was 37.4 ± 7.3 years and carelessness was the most common cause of accidents. [12].

In the epidemiological study of occupational accidents by Jan Mohammadi and colleagues in Babol, the findings showed that 98.2% of the injured were men and the highest share of the

injured (65.2%) was in the age range of 17-36 years. The highest proportion of accidents occurred in the group of construction workers (47.1%). The upper limb had the most injuries (69%), and the most common type of injury was bone injury (32.6%) [13]. The results of a research by Gholamizadeh et al. in Iran The findings showed that falls and slips (18.3%) and physical strikes (14.6%) were the most common causes of accidents, and carelessness (61.9%) and equipment density (21.1%) had the strongest impact on accidents. Accidents had the highest incidence rate from 9 AM to noon (34.77%) [14]. The research by Bakhtiari et al. states that the pattern of occupational accident incidence from many viewpoints, such as age, sex, accident cause, and accident type, is comparable with previous studies carried out in the nation and in the world. [15]. In a previous study of work-related accidents, the results showed that the majority of workers (81.4%) were under 40 years old, and the incidence of accidents in construction workers was higher than other occupations. The most common complication (52.8%) of accidents was workers' injuries [16].

Considering the importance of investigating occupational accidents, and the results of the mentioned studies regarding the life and financial consequences of accidents and since less attention was paid to the analysis of occupational accidents in hospitals, as a result of this study, the epidemiological investigation of occupational accidents in Patients hospitalized in Khorram Abad teaching hospitals during 2016-2021.

Materials and Methods

The present study was performed with the approval of ethics committee of Lorestan University of Medical Sciences (IR.LUMS.REC.1400.261).

In this descriptive study, all patients who were hospitalized in Lorestan University of Medical Sciences teaching hospitals from April 2016 to March 2021 for a period of five years due to occupational accidents, and injuries to their limbs were counted as a census.

All participants in this research who were hospitalized as a result of occupational accidents during the study period and whose files were complete were included, while those whose files were incomplete for any reason were eliminated. To collect data, a researcher-made form was designed based on past studies and experts' opinions. Demographic indicators (Sex and age), type of job, work experience, cause of accident, time of accident based on morning, evening and night shifts and seasons, type of injury, area and

injured limb were collected from patients' files and recorded.

After loading the data into the statistical program SPSS, descriptive statistics were used to determine the number and percentage for qualitative and mean variables as well as the standard deviation for qualitative variables. To compare the frequency of occupational accidents based on desired variables, Chi-square test was used. Significance level of all tests was considered $P < 0.05$.

Results

A total of 2833 people were studied. The mean age of the subjects was 33.64 ± 31 with a minimum

age of 12 years and a maximum of 83 years. In terms of sex distribution, 2276 (80.3%) were male, and 557 (19.7%) were female. The analysis of results showed that the highest type of occupational injury in men was related to upper and lower limb ulcers with 629 patients (27.6%), and the lowest type of occupational injury was related to head fractures with 9 patients (0.4%). However, among women, 143 patients (25.7%) had upper limb fracture-related occupational injuries, whereas only one patient (0.2%) had thoracolumbar spinal injuries. But among all participants, 766 (27%) individuals had upper extremity ulcers, which were the most common injury type (Table 1).

Table 1: Frequency distribution and percentage of type of injury in the subjects

Type of injury and injured limb	Frequency (%)
Thoracolumbar vertebral injury	20(0.7)
Burns of the trunk and limbs	191(6.7)
Lower limb ulcers	307(10.8)
Lower limb fractures	100(3.5)
Gear fracture	19(0.7)
Neck injury	43(1.5)
Nasal injury	18(0.6)
Head fracture	10(0.4)
Finger amputation	66(2.3)
Shoulder dislocation and injury	72(2.5)
Trunk injury	47(1.7)
Wounds on the face and around the mouth	174(6.1)
Pelvic fracture	89(3.1)
Eye injury	31(1.1)
Upper and lower limb ulcers	9(0.3)
Upper limb fracture	619(21.8)
Upper limb ulcers	766(27)
Upper limb burns	43(1.5)
Head and face wounds	183(6.5)
Lower limb burns	15(0.6)
Total	2833(100)

Table 2. Comparison of the frequency of occupational injury in people under study by gender, age group, season and injury time

		Cause of Occupational Injury					Total No (%)	P-value
		Falling from a height No (%)	Falling from the tree No (%)	Electrocution No (%)	Trapping between machine components and falling heavy objects No (%)	Sharp and winning objects No (%)		
Sex	Men	64(2.8)	114(5.0)	163(7.2)	304(13.4)	1631(71.7)	2276(100)	<0.001
	Women	11(2.0)	8(1.4)	18(3.2)	70(12.6)	450(80.8)	557(100)	
Age	Less than 30	18(1.3)	25(1.8)	54(4.0)	76(5.6)	1181(87.2)	1354(100)	<0.001
	More than 30	57(3.9)	97(6.6)	127(8.6)	298(20.1)	900(60.9)	1479(100)	
Season	Spring	12(2.4)	12(2.4)	39(7.7)	73(14.5)	369(73.1)	505(100)	<0.001
	Summer	21(1.9)	47(4.2)	61(5.5)	116(10.4)	870(78)	1115(100)	
	Autumn	28(3.6)	54(7.0)	52(6.7)	116(15.0)	521(67.6)	771(100)	
	Winter	14(3.2)	9(2.0)	29(6.6)	69(15.6)	321(72.6)	442(100)	
Injury Time	Morning	9(1.8)	11(2.2)	26(5.1)	96(18.9)	365(72.0)	507(100)	<0.001
	Afternoon	44(3.5)	63(5.0)	99(7.9)	168(13.3)	886(70.3)	1260(100)	
	Night	22(2.1)	48(4.5)	56(5.3)	110(10.3)	830(77.9)	1066(100)	

Table 2 analyzes the causes of occupational injuries in the study population by gender, age group, season, and time of injury. As can be seen, there is a significant difference ($p < 0.001$) in the frequency of occupational injuries between women and men. The frequency of occupational injuries in people 30 years and younger, and people over 30 years showed a significant difference ($p < 0.001$). An examination of the relationship between season and type of occupational injury showed that there

was a significant relationship between the season, and the type of occupational injury ($p < 0.001$).

Besides, the results showed that there was a significant relationship between the type of injury, and the time of its occurrence.

The frequency distribution of casualties by the occupational groups in the subjects is shown in Table 3. As the results of the table show, most accidents occurred in construction workers (70.1%).

Table 3. Frequency distribution of occupational injury type by Job group

Job group	Frequency (%)
Construction	1986(70.1)
Agriculture	122(4.3)
Small workshops	544(19.2)
Industrial	181(6.4)
Total	2833(100)

Discussion

In this cross-sectional and retrospective study, the number of 2833 people who were admitted to the teaching hospitals of Lorestan University of Medical Sciences during a 5-year period from the beginning of 2016 to the end of 2021 due to work-related injuries and injuries to organs were examined. The highest type of occupational injury was upper extremity ulcer with 766 patients (27%), and the lowest was related to upper and lower extremity ulcer with 9 patients (0.3%). The most common type of occupational injury in men was upper and lower limb injuries with 629 patients (27.6%), and the lowest type of head fracture with 9 patients (0.4%) and in women, the highest type of occupational injury was fracture of the upper limb with 143 people (25.7%), and the lowest was vertebral injury with 1 person (0.2%).

The findings of this research indicate that the accident patterns in the current study from many aspects, such as age, sex, accident cause, accident type, etc., are essentially compatible with previous studies carried out in the nation and in other areas of the world. In other studies, the statistics of occupational accidents in terms of gender and age are completely consistent with the results of this study [15]. In general, worldwide, women account for about 20% of occupational injuries, which is the same as the number obtained from our study, which was 19.7%. The lower percentage of occupational accidents in women compared to men can be due to the employment or selection of men in high-risk and accident-prone jobs, while women are often employed in less dangerous and safer environments and jobs. Therefore, the type of job for women and men in different societies, in addition to the physical capabilities of these two groups [17], can be

different based on the culture that governs each society, so that in large areas of Iran, women are engaged in gardening and animal husbandry, and as a result, it is possible Incidents such as falling from trees happen to women [18].

In a study conducted by Ghods et al. by the aim of epidemiological study of occupational accidents between the years 2002-2006 in Semnan city, it was stated that accidents at work occurred mostly in young workers in the age group of 20-24 years, male and married. Regarding age and gender, this figure is entirely compatible with the findings of the current research. Additionally, these findings contradicted our findings since the majority of accidents occurred in the morning, according to the results of our research. In our study, most accidents were in the evening [19]. The study found that most occupational accidents occurred in people over the age of 30, but researchers found that in the United States, workers under the age of 25 had the most occupational injuries and illnesses [20]. However, in other studies in terms of some specific characteristics of adolescence such as lack of experience and youthful pride that these characteristics prevent them from asking officials or other colleagues about work and duty Jobs, on the other hand, often employers tend to use younger people who have more power and energy in heavy and high-risk jobs, so researchers in these studies, the occurrence of accidents in younger employees and less 30 years more were announced [19-20]. Hence, in addition to the causes already indicated for why accidents happen more often to those under 30 years old, the high proportion of young people employed in the industrial sector may also be cited. Now, the reason why in our study the percentage of occupational accidents has shifted to the

population over 30 years old is that the view of employers and industry owners in recent years due to the high rate of accidents in the younger population and more accurate implementation of issues increased safety and adherence to occupational health rules in the younger age groups who have just arrived, and naturally the neglect of older workers, has led to an increase in the rate of accidents to older people.

The highest occupational injury rate was 39.4% in summer and the lowest occupational injury rate was 15.6% in winter. In the study of previous years, the researcher in Lorestan province showed that summer is the most accident-prone season [16]. However, some studies have reported the highest incidence of occupational accidents in winter and the lowest incidence of these accidents in spring [19]. The results of this study showed that the highest rate of occupational injury occurred in the evening with 1260 people (44.5%), and the lowest in the morning with 507 people (17.9%). The reason for this can be fatigue caused by hours of work during the day and exhaustion of physical and mental strength of people in the last hours of the day. However, in other studies, the highest number of accidents were reported in the morning, which is not consistent with the results of the present study [16,21]. We used the three f noon, evening, and night, working hours during the day. In fact, this type of coding may have caused

According to a survey of incidents in various occupational categories, construction accidents accounted for 70.1% of all accidents, followed by accidents in small workshops. The farming, fishing, mining, and service industries in the US record the majority of occupational accidents [2]. In Jordan, the highest number of occupational accidents was reported in the construction sector [22]. Also in Villanueva study, the most occupational accidents in the construction sector were reported, which is consistent with the results of our study [23]. According to the results of this study and similar results of other construction work studies, it is considered a high-risk job It is essential to this job group. The results of this study showed that the most common types of injuries were upper extremity ulcers with 766 (27%), and upper extremity fractures with 619 (21.8%), respectively. Other studies have reported the most common types of fractures, burns and upper extremity injuries [24-25]. However, the types of jobs, work tools and work environment can determine the nature of the accident and the resulting damage to the body, due to the fact that the upper limbs of the body are the main factor in doing work and human mobility, so it is necessary to consider the

necessary measures in the design of the environment, equipment and tools, as well as training programs [26-28].

The most common cause of occupational injury was sharp objects. But, in other studies, the most common cause of accidents was falling from a height. Regarding the causes of accidents, it can be mentioned that they might vary depending on the kind of employment, the workplace environment, and even the geography and culture of each location [13]. One of the limitations of the present study is that the files of the people under study are incomplete, in which information such as marital status, level of education, etc. were not recorded. Therefore, it is suggested that the relevant authorities of a system provide standard occupational accident records and persuade all work environments that are required to record casualty information.

Conclusion

Considering the life, and financial consequences of occupational accidents for society and family and the human and moral aspects of accidents, and since the results of this study showed that the highest rate of occupational injury occurred in the occupational group of construction workers and the highest type of injury in the upper bouts featured two cutaways, for easier access to the higher frets. Level of literacy, holding safety and health training courses, inspection and cleaning of the work environment and solving their economic and family problems. Necessary measures should be taken to prevent accidents among this group of workers.

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