

Original Article

Epidemiological Study of Patients with Workplace Accidents Referred In Isfahan

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Abstract

Background and Purpose: Work-related accidents are those events that occur while on duty in the workplace. Due to the lack of accurate information about the epidemiological status of occupational injuries in Isfahan, the present study was conducted to investigate the epidemiology of workplace accidents.

Materials and Methods: This was a retrospective cross-sectional study assessing the medical records of all patients injured in the workplace in 2018. The list of all work accident patients was collected from the Hospital archives that accounted for 836 cases. The information about age, sex, the season in which the accident has occurred; type of insurance, nationality, marital status, occupation, and the type of injury were extracted. Afterward, they were statistically analyzed using qualitative variables as well as Chi-square or independent t-test. A P-value of less than 0.05 was considered significant.

Results: Based on the findings, the 836 assessed cases had the mean age of 34.43 ± 12.73 years old and were predominantly males ($n=812$, 97.2%). They were mostly bachelor ($n=462$, 55.26%) and aged less than 40 years old (57.4%). Soft tissue injuries (53.94%), amputation (13.63%), upper (13.27%) and lower (7.77%) extremities fractures ranked the highest types of injuries. 342 (40.9%) of the cases did not have any insurance, while Social security insurance (48.3%) was the most common one among the supported workers with insurances.

Conclusion: According to the present study, the highest number of hospitalizations due to workplace injuries were related to less than 40 years old young adults who were mostly bachelor, experienced soft tissue injuries. Most of the patients were under Social security insurance coverage, while the significant rate of 40% without any insurance surprised us. The results are consistent with the previous studies. Further investigations with more precise assessments are strongly recommended.

Keywords: Workplace Injuries; Work Accidents; Epidemiology

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1. Introduction

Occupational accidents are the events occurring on duty in the workplace and result in fatal or non-fatal injuries (1). These accidents are currently the third leading cause of death globally and have been introduced as one of the most critical health, social, and economic burdens in industrial and developing societies (2). The World Health Organization (WHO) has classified work-related accidents as an epidemic in public health. Most work-related accidents are preventable, while they are the leading cause of disability, reduced incomes, and change of the life quality in workers and their families. They also have significant effects on the production and economy of countries (3). According to the International Labor Organization, about 313 million injuries and about two million work-related deaths occur worldwide each year (4). Because such incidents are potentially avoidable, their occurrence is a sign of negligence, injustice, and disobedience to the laws (5). It also estimates that approximately four percent of the country's gross domestic product is spent on injuries, deaths, and illnesses due to worker absenteeism, treatment, disability benefits, and survivors (6). According to the latest official report of the Social Security Organization in 2014, 19852 people were injured due to accidents at work in Iran, which resulted in 812 deaths and 280 disabilities (6). The incidence rate of workplace accidents has considerably decreased over the years that seem to occur due to the preventive strategies. Besides, our knowledge and data coverage about the accidents has improved presumably because of better accessibility to the detailed information of the events as well as the coverage of insurances which

appreciates the workers to refer to the medical centers. The reports have presented higher rate of accidents in the center of Iran probably due to the presence of heavy industries in these areas, while the fatal events mostly occurred in the west probably because of the culture, lack of adequate experts in occupational health, and the high density of industries. These workplace events impose significant burden due to healthcare costs, absence from the work and the potential psychological adverse effects (6).

Previous studies have shown that the risk of occupational accidents is higher in novices(4). Adolescents and young people are more likely to have occupational injuries than older people. In the United States, workers under the age of 25 have the most occupational injuries (7). In similar situations, men are much more likely than women to be employed in jobs and environments at high risk of injury and death (7). The gender-based differences are probably considered in recruitment, as most of the dangerous situations are filled by men. For instance, a study showed that jobs in heavy industries with high risk of injury are mostly occupied by males (8). Further risk factors associated with workplace accidents include exposure to hazards, workplace and its design process, organization and work environment, economic issues, and other social factors (9). In order to ensure and promote the health of employees in a society, the first step to plan and prevent these accidents is to identify the risk factors in jobs and work environments (10).

As the studies conducted in Isfahan are relatively old and inadequate, the present study aimed to investigate the epidemiology of workplace accidents

regardless of the job referred to the major centers of trauma in Isfahan in 2018.

2. Methods and Material

The present study was a descriptive-analytical cross-sectional study performed on the records of all patients injured in the workplace referred to Kashani, Alzahra, Dr. Gharazi, and Dr. Ali Shariati Hospitals in Isfahan from January to December 2018. The inclusion criteria were: hospitalization due to an accident at work, and referral to the emergency department of one of Kashani, Alzahra, Dr. Gharazi, and Dr. Ali Shariati Hospitals in Isfahan. More than 20% of the defects in the medical records were defined as the exclusion criterion. After obtaining permission to access the data of the archived files in the mentioned medical centers, the list of all patients with work accidents was collected. The data, including age, sex, the season of the accident, type of insurance, nationality, marital status, occupation, and type of injury were extracted.

The injuries categorization is presented in the following lines. Soft tissue injury included soft tissue wounds, damage to the skin, tendon rupture and neurovascular injuries. Any fracture from phalanx to clavicles (phalanx, metacarpophalangeal bones, wrist, ulna, radius, humerus and clavicle) were categorized as upper extremity fractures. The fractures of lower extremity included any fracture in toes, ankle, fibula, tibia, femur and hip. Facial injury was defined as any injury or fracture of the facial soft or bony tissues. Vertebral injuries included cervical, thoracic, lumbar, sacral and coccygeal fractures. Brain trauma and skull injuries were also categorized as head injury. Any injury to the lungs or the ribs was defined as chest

injury. Liver, spleen and hepatic injuries were categorized as solid organ injury, and finally visual injury and joint dislocations were the other two groups of workplace injuries.

Labor occupations, administrative services, and educational works, industrial occupation, agriculture, automobile industry, construction, military service, healthcare work were the assessed categories of the occupations. The timeline of the injuries were classified as spring, summer, autumn, and winter.

The patients' insurance coverage was divided into with or without coverage. Besides, the insurances were classified as "Health Services", "Social Security", "Health Insurance", "Rural Insurance", and private insurances.

The studied patients had the nationalities of Iranian, Afghan, and Pakistani.

The obtained data were entered into the Statistical Package for Social Sciences (SPSS) (version 24). Quantitative data were reported as mean± standard deviation and qualitative data as frequency distribution (percentage). P-value< 0.05 was considered as the level of significance. This study was approved by the Research Committee of Isfahan University of Medical Sciences via code number IR.MUI.MED.REC.1399.273.

3. Results

We evaluated 836 records of patients who experienced a work accident during 2018. Based on initial analysis, the study population consisted of 812 males (97.2%) and 24 females (2.8%). Most of the cases were bachelor (n=462, 55.26%). 76% of the injured patients were between 20 and 50 years old. The mean age of the studied population was 34.43±12.73 years. It should be noted that the ages of 21-30

years (29.4%) and 31-40 years (28.1%) were the most common age range for injuries. Another critical point was the

injury rate under 20 years old, which accounted for 11.1% (Table 1).

Table 1. Distribution of the frequency of injuries by age

Age range (years)	Frequency	Percentage
<10	13	1.6
11-20	80	9.6
21-30	246	29.4
31-40	235	28.1
41-50	158	18.9
51-60	77	9.2
61-70	23	2.8
71-80	3	0.4
>80	1	0.1
Total	836	100

Table 2 presents the types of injuries in details. Accordingly, soft tissue injury (53.94%), amputations (13.63%), and

fractures in the upper extremities (13.27%) were the most frequent types of workplace injuries.

Table 2. Frequency distribution of injuries

Type of injury	Frequency	Percentage
Soft tissue injury	451	53.94
Amputations	114	13.63
Upper extremity fractures	111	13.27
Lower extremity fractures	65	7.77
Head injury	29	3.46
Vertebral injury	26	3.11
Facial injury	13	1.55
Chest injury	12	1.43
Dislocations	8	0.95
Solid organ injury	6	0.71
Visual injury	1	0.1
Total	836	100

The most frequent workplace accidents (28.7%) were related to labor occupations, followed by administrative, service, educational jobs (19.3%). Industrial jobs (18.3%) were in the third rank. Health

careers also had the lowest rate of harm (3.9%) (Table 3).

Table 3. Distribution of the frequency of injuries according to the type of job

Type of occupation	Frequency	Percentage
Labor occupations	240	28.7
Administrative, service, educational	161	19.3
Industrial work	153	18.3
Agricultural	50	6
Automobile industry	47	5.6
Construction	46	5.5
Military	41	4.9
Healthcare workers	33	3.9
Others	65	7.8
Total	836	100

The highest number of injured patients (85.2%) were Iranians, 14.7% were Afghans, and 0.1% were Pakistanis. Sixty-three percent of the injuries occurred individually, not in groups. Fewer percent of work-related injuries have been transferred to Gharazi Hospital (5.7%). Al-Zahra (43.5%) and Kashani Hospitals

(38.6%) had the most referrals in this regard.

Most of the patients had the insurance coverage of Social security (48.3%) followed by Rural insurance and private insurances, while those who were not supported with any health insurance accounted for 342 cases (40.9%) (Table 4).

Table 4. Frequency distribution of insurance coverage

Type of insurance	Frequency	Percentage
None	342	40.9
Health services	6	0.71
Social security	404	48.3
Health insurance	20	2.4
Rural insurance	36	4.3
Private insurances	28	3.3
Total	836	100

The frequencies of injuries in different seasons accounted for 240 (28.6%) in summer, 208 (24.9%) in autumn, 194 (23.2 %) in spring, and 194 (23.2%) in winter.

4. Discussion

The current study was an attempt to study workplace injuries occurred in a period of a year in Isfahan city, one of the major metropolitan industrial cities located in the center of Iran. Our investigation revealed that most of the injured cases were male

young adults (under 40 years old), and bachelor.

According to the evidence published by the International Labor Organization, approximately 313 million occupational accidents take place in the world annually; among which two million cases are fatal (4). The recent assessments in Iran presented by the legal organization of the Iranian Social Security Organization (ISSO) have presented a declining trend of workplace accidents in Iran from 2.95 per 1000 workers to 1.46 per 1000 ones from 2007 to 2016 with the mortality rate

accounting for 0.4-0.6%. However, the trend of change in these events and the In agreement with the studies in the literature in Iran or other communities, most of the occupational injuries occurred in males as the majority of labor populations are men (11-13). Alongside the fact that males are the major population of labor, industrial and agricultural occupations, the employment of females differs in different communities considering diverse variables, such as economical, religious, industrial and cultural status(6, 14).

The other part of our study that was in line with the literature referred to the age distribution of the injured cases that were mostly under 40 years old (11, 15). This may have primarily occurred due to the preferences of the industries to employ younger people, and secondarily, to the bravery and determination of the younger workers who dare to perform more dangerous duties and participate in risky occupations (16).

Soft tissue injuries and amputations were found to be the most common injuries occurred at work, while fractures in the upper and lower limbs dedicated a significant number of the referrals to the hospitals. In contrast to our study, Asady et al. presented lower limb injuries as the major wounded site of the body, while they similarly included all occupations in their research (17). The other study by Izadi and colleagues in Iran confirmed our findings, as most of the injuries were detected in the upper extremity (11). However, the highest rate in the current study was dedicated to soft tissue injuries that can occur in any part of the body. In confirmation, Ngajilo et al. published a review article in which soft tissue injuries rated the first rank injuries in reviewed

fatality of the injuries have not been evaluated in a period of time (11).

patients whose data were gathered from 1960 to 2018(18). This finding was presented in other studies, as well (10, 19). Insurance coverage due to the economic support for the healthcare plays crucial role in the injured patients' referral to the hospitals. Unfortunately, over 40% of the workers did not have any insurance that can probably impose significant burden on them. According to Iran rules, the employers are responsible for the insurance coverage of the workers in high risk industries and occupations(11). The rate of covered cases in our study was similar to the previous ones conducted in different areas of Iran accounting for 40-60% of the workers (11, 16).

According to our findings, conspicuously high rate of the workers were not supported by the insurances that may have affected the tendency to refer to the hospital. Therefore, it is probable that the number of injured people without any insurance who refused to be hospitalized might be considerably higher due to financial matters. In this regard, it has been well-elucidated that by better insurance coverage of the workers, the rate of fatal occupational accidents have remarkably decreased, a fact that indirectly refers to the willingness of the injured cases to be visited by a physician after an event (20, 21).

Expectedly, Social security insurance was the most common type of insurance followed by Rural insurance that was consistent with the previous studies in Iran (6, 11).

Another point in our study was the proximity of the number of emergency room visits and workplace accidents in different seasons of the year. We found

negligible differences in the incidence of workplace injuries in the seasonal assessments, the finding that was in line with the presentations of other studies (11, 17). Nevertheless, Parish et al. presented higher risk of events in summer than the other times due to the migration of workers to the industrial areas (22). We assume that the rate of migrant workers in the evaluated population of our study was not that high to influence seasonal assessments, as most of the occupations in Isfahan are not temporary or time-dependent.

Limitations

The descriptive cross-sectional design of the study was the most notifying limitation of this study. Therefore, further studies with larger populations and long-term design are strongly recommended to assess the trend of changes in demographic and clinical patterns of workplace injuries in Isfahan as one of the major industrial centers in Iran.

5. Conclusion

According to the results of the present study, the highest number of hospitalizations due to workplace injuries was related to less than 40-year-old young adults who were mostly bachelor, experienced soft tissue injuries. Most of the patients were under Social security insurance coverage, while the significant rate of 40% without any insurance surprised us. The results were also consistent with the previous studies. Further investigations with more precise assessments are strongly recommended.

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Conflicts of Interest

None declared

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