



Characteristics of Fatal Occupational Traumatic Injuries; Drama in East Azerbaijan Province of Iran

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Received: October 16, 2014

Revised: November 28, 2014

Accepted: December 10, 2014

ABSTRACT

Objectives: To determine the characteristics and etiologies of occupational trauma associated mortality in Tabriz megacity, Northern Iran.

Methods: In a cross-sectional study, we included all the recorded cases of occupational mortalities referring to Tabriz forensic medicine center, labor institute and Imam Reza and Sina hospitals between March 2011 and March 2012. We recorded the demographic and clinical characteristics including age, gender, type of occupational accident, experience of work and permanent or temporary jobs for all the cases. The death etiology was also recorded according to the forensic medicine report. The data are presented as descriptive analytics.

Results: Overall we included 32 occupational trauma associated mortality out of whom 30 (93.8%) were men and 2 (6.2%) were women. The mean age of the patients was 44.1±16.3 years old with most of them (31.3%) being younger than 30 years old. The occupation was recorded to be structural in 13 (40.6%), industrial in 5 (15.6%), agricultural in 5 (15.6%) and office work in 6 (18.8%). In 20 (62.5%) patients the occupation was seasonal and in 12 (37.5%) was permanent. Summer was the most common season in which occupational trauma associated mortality was recorded (40.6%) followed by fall by 34.4% of all mortalities. Most frequent causes of occupational traumas were the result of nonuse of safety wares (71.9%), inattention during work time (84.4%) and inappropriate instructions (18.8%).

Conclusion: Most of the fatalities occurred in young and less-experienced workers, not having enough attention while working. Regarding this fact we conclude that with continuous education and supervision especially in young workers, most of the occupational accidents are preventable.

Keywords: Occupational trauma; Mortality; Epidemiology; Etiology.

Please cite this paper as:

Gholipour C, Shams Vahdati S, Ghaffarzade E, Kashi Zonouzy K. Characteristics of Fatal Occupational Traumatic Injuries; Drama in East Azerbaijan Province of Iran. *Bull Emerg Trauma*. 2015;3(1):27-31.

Introduction

Occupational trauma is one of the frequently considered issues in health system. In the last

decade there were 4.1 million occupational traumas in private sector, based on survey of occupational injuries and illnesses (SOII). SOII shows that the occupational traumas are decreasing systematically

in United States since 1990 [1]. In a recent review, the incidence of fatal occupational injury was reported to be 4.1 to 4.9/100 (injury/illness rate) [2]. They also reported that the rate was dependent on occupation type [3,4]; the injury/illness rates were above normal rate in beer/wine/liquor (8.4/100); building materials/supplies (7.6/100); and grocery-related products (7.0/100) [2]. The rate of mortality following occupational trauma was reported to be 9.8/100,000 in gasoline stations, 6.1/100,000 in convenience stores, and 5.5/100,000 in used car dealers [2,3]. In Jordan, it was reported that the incidence of occupational trauma mortality was 2/100,000 workers during 2008-2012 with construction (44%) being the most common occupation [5]. The social and economic burden of fatal traumatic occupational injuries has been estimated to exceed \$8.6 billion according to the 1993 USA database [2]. Several other studies have reported the characteristics of fatal occupational injuries in different countries [6-8].

Unfortunately in Iran, there are no reliable resources on the matter of occupational injuries and fatalities to be judged and only limited reported are available on the issue [9]. Iran being a developing country is encountering an industrial progress and Tabriz being a megacity plays an essential role in this progress which leads to an increasing level of occupational accidents. According to emergency physicians in diurnal observations, these occupational traumas are accelerating day by day while most of them seem avoidable. Therefore there is a demand for a basic demographic study in order to decrease the workers' ranges of injuries and preserving economical resources and community progression. It also should be mentioned that there is no trauma registry and data base for traumatic patients. In this study we attempt to evaluate the characteristics of fatal traumatic occupational injuries in Tabriz megacity.

Materials and Methods

Study Population

In a cross-sectional study, all the mortalities caused by occupational accidents, referring to Tabriz forensic medicine center, labor department and Imam Reza and Sina hospitals, both tertiary healthcare centers affiliated with Tabriz University of Medical Sciences between March 2011 and March 2012 were studied. We included those who were expired due to occupational trauma according to the forensic medicine report. Those who were reported to be expired due to non-traumatic causes and those with trauma in other places (not during the occupation) were further excluded from the study. The study protocol was approved by institutional review board (IRB) and medical ethics committee of Tabriz University of Medical Sciences. The guardians of the victims provided their informed written consents before inclusion in the study. The regarding the patients was kept confidential and was just used in

order to achieve the objectives of the study.

Study Protocol

All the included victims were examined by the forensic medicine specialists and the cause of death was identified. We recorded the demographic and occupational information including age, gender, type of work, time of accident (day/night) and experience of working and permanent or temporary jobs.

Statistical Analysis

All the data were further analyzed using statistical package for social sciences (SPSS Inc., Chicago, USA) version 15.0. The descriptive statistics such as frequency, minimum, and maximum, mean, median and ratio for some variable, were presented. Data are presented as mean±SD and proportions as appropriate.

Results

Overall we included 32 fatal traumatic occupational injuries during 1-year-period of the study. Among these 32 patients, 30 (93.8%) were men and 2 (6.2%) were women. The mean age of cases was 44.1±16.3 years old and the frequencies of different age groups are shown in the Figure 1.

The characteristics of the patients is summarized in Table 1. The type of occupation in 13 (40.6%) was construction followed by office works in 6 (18.6%). In 20 (62.5%) patients the job was seasonal and in 12 (37.5%) was permanent. Summer was the most common season in which occupational trauma associated mortality was recorded (40.6%) followed by fall by 34.4% of all mortalities. Daytime was the most common time for fatal traumatic occupational injuries (87.5%). Most frequent causes of occupational trauma were inattention during work time (84.4 %), not using the safety wares (71.9%), and using inappropriate instructions (18.8%). Also in some cases two or more factors were involved (Table 1). In 9 (28.1%) patients the work experience was about 10 years, in 9 (28.1%) was between 11 and 20 years, and in 2 (6.3%) was between 21 and 30 years, 8 (25%) between 31 and 40 years, 3 (9.4%) between 41 and 50 years and 1 (3.1%) more than 50 years. Multiple trauma was the most common cause of mortality responsible for 12 (37.5%) deaths followed by chest trauma in 7 (21.9%), traumatic brain injury in 6 (18.7%), hollow viscus injury in 5 (15.6%) and internal bleeding in 2 (6.2%).

Discussion

Although the advancement of science in recent decades has brought human beings higher levels of welfare, but it has also caused occupational accidents which is becoming one of the significant public health problems in both developed and developing countries [10]. According to national institute for

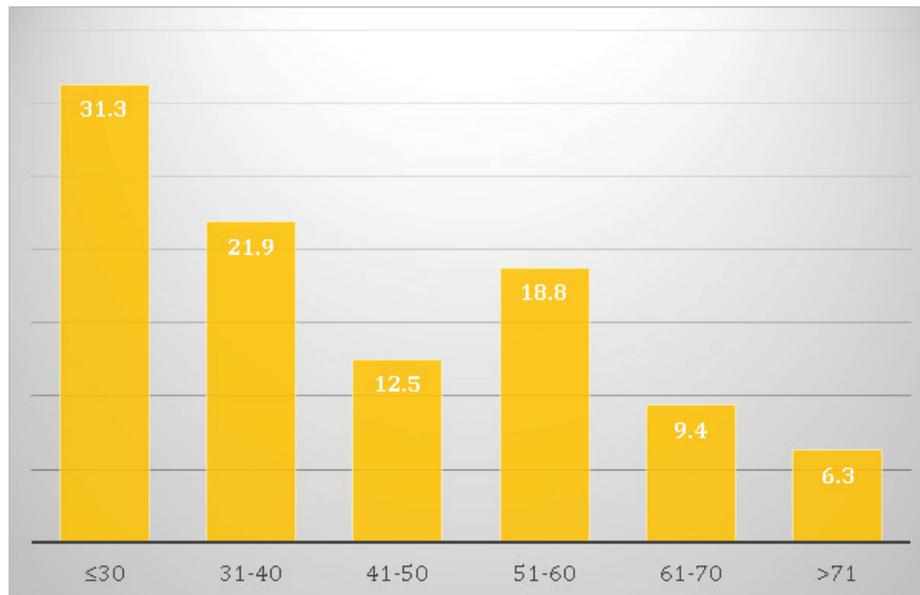


Fig. 1. Age distribution of the 32 patients with fatal traumatic occupational injuries referring to our centers between 2011 and 2012.

Table 1. Characteristics of 32 patients with fatal traumatic occupational injuries referring to our centers between 2011 and 2012

Variable	Value
Age	
Gender	
Men (%)	30 (93.8%)
Women (%)	2 (6.2%)
Occupation	
Construction (%)	13 (40.6%)
Office work (%)	6 (18.6%)
Industrial (%)	5 (15.7%)
Agriculture (%)	5 (15.7%)
Other (%)	3 (9.4%)
Occupation duration	
Seasonal (%)	20 (62.5%)
Permanent (%)	12 (37.5%)
Season	
Spring (%)	5 (15.6%)
Summer (%)	31 (40.6%)
Autumn (%)	11 (34.4%)
Winter (%)	3 (9.4%)
Working shift	
Daytime (%)	28 (87.5%)
Night (%)	4 (12.5%)
Cause of occupational trauma	
Inattention during work time (%)	27 (84.4%)
Nonuse of safety wares (%)	23 (71.9%)
Inappropriate instructions (%)	6 (18.6%)
Work experience	
10 years	9 (28.1%)
11-20 years	9 (28.1%)
21-30 years	2 (6.3%)
31-40 years	8 (25.0%)
41-50 years	3 (9.4%)
>50 years	1 (3.1%)

occupational safety and health (NIOSH) about 7 million occupational accidents happen annually in this country which 3 million of them are severe and lead to death of 6500 people [11]. In spite of enormous

efforts done to reduce occupational accidents, the traumatic occupational statistics are still catastrophic so that world health organization (WHO) has placed it as an epidemic issue in scope of health and also has

assigned it as one of the important economic, social and health related factors [12]. In 2002 international labor organization announced, annually 2 million people in the world die from occupational accidents and illnesses or in other words, every 15 seconds 1 person dies from these problems, while the reported statistics for the past two years show 1.2 million people with the same conditions. Nowadays the range of occupational fatalities is 3 times more than number of people killed in wars. According to international labor organization occupational accidents inflict the most severe pressure and economic detriment on human societies [10]. In this study we attempt to evaluate the occupational accidents in Tabriz megacity in 2011 which leads to the following results. Among 32 studied cases 30 (93.8%) were males and 2 (6.2%) were females and by respect, constructional, industrial, and agricultural works had the most fatalities. Most of the accidents happen to workers younger than 30 years old and they suffer more than other age groups. Inattention during work was the reason of injuries in most cases. In a study by Ghods *et al.* the epidemiology of occupational accidents in Semnan city has been surveyed which demonstrates that the majority of workers who had accident during work were those younger and married workers. The accidents frequently happened about 7 to 10 Am and common causes were tiredness, having side jobs, family problems and using medicine. Most of the accidents happen during summer and in the day shifts which is consistent with Ghods's study [13].

A recent study in Jordan revealed that construction was the most common job associated with occupational mortality. Falling from height was the most common mechanism of injury. They reported the head injuries to be the most common cause of occupational mortality. The mean occupational fatality rate was reported to be 2 per 100.000 workers in Jordan during 2008-2012 [6]. The results are similar to ours regarding to the most common occupation and the age of the participants. In an epidemiological study performed by Shafieeian *et al.*, [14], 184 deaths caused by occupational accidents in Tehran from 2002 to 2003 were reported to forensic medical center. All the reported cases were males and most of them were constructional workers which included 38% of the deaths. The most common cause

was falling from height; other causes were hitting blunt objects and burning with frequency of 27.2% and 13.6%. From the frequent causes of deaths, 28.8% were head traumas and 19.5% were multiple traumas [14].

In this study it is indicated that most of the accidents during work happened for constructional workers which is also consistent with the results of this study. As mentioned before most of the occupational accidents and injuries happen to seasonal workers which are probably resulted from lack of experience and conversancy. It is also mentioned that most of the victims were males because most of the constructional issues are done by men. Additionally women are more observant to the safety rules than men. Most of the accidents happen in the day shifts and since the starting of the work time is in the same hours of day, these results are justified. The results of this study are consistent with outcomes of Ghods's study which demonstrated that most of the occupational accidents happen about 7-10 AM [13].

Also in Mohammadfam's study the most frequent time of occupational accidents was reported at 10 AM, which is again consistent with this study's outcomes [15]. In our study most of these accidents happen during summer which may be the result of increasing number of building constructions in this season. The obtained outcomes of this study are consistent with results of Samadi's study which reported the most occupational accidents at May and June [16]. In the study being performed by Mohammadfam and colleagues most of the accidents were reported at June and January, which can be related to different climates in different areas of the country [15]. By increasing the occupational experiences, the occupational accidents decrease and it may be the result of learning adequate skills, gaining experience and also using proper safety devises.

In conclusion, most of the injuries leading to death occurred in young workers with less experience, not paying enough attention while working. According to this fact we conclude that with continuous education, supervision and using safety equipment, especially in young workers, most of the occupational traumas are preventable.

Conflict of interest: None declared.

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