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Fatal occupational injuries in eastern Turkey between 2000 and 2016

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Abstract

Fatal occupational injuries are a preventable social problem seen all around the world. This study aimed to determine the data of unintentional fatal injuries in the workplace and to discuss the findings in the light of the literature. Occupational fatalities, which had undergone external examination and autopsy between 2000-2016 in Elazig province in Eastern Turkey, were analyzed retrospectively. There were 130 fatalities; 128 (98.5 %) were males and the most common age group was 25-44 (42.3%) years. The average age of fatalities in the agricultural sector was higher than in other sectors. Occupational fatalities most frequently occurred in construction (30%) followed by agriculture (24.6%). Fatal injuries mostly occurred as a result of a fall from a height (34.6%). The head (50.8%) and the thorax (47.7%) were the most common injured body parts. For occupational health and safety, it is necessary to take safety measures at workplaces, provide protective equipment, and increase the quality of inspections.

Keywords: Forensic medicine, work-related, postmortem, agriculture

Introduction

The importance of production and competition in the economic development of countries brings risks in terms of employee health [1]. At the beginning of these risks are occupational injuries that occur all over the world. It is estimated that 318.000 people worldwide die from occupational injuries each year [2]. Most fatal occupational injuries occur in developing countries [3,4]. While there were 9.4 fatal occupational accidents per 100,000 employees in 2014 in Turkey, which is a developing country, this rate was 7.5 in 2016 [5].

In Turkey, it is legally obligatory for workers registered with the social security institution to report occupational injuries. However, fatal injuries occur in areas such as agriculture where family and voluntary workers are common and cannot be included in official records. This study aimed to determine the sociodemographic characteristics and injury types of fatal

occupational accidents, including agricultural areas, and to discuss the findings in light of the literature.

Materials and Methods

This retrospective study was conducted with the approval of the Izmir Katip Celebi University Non-Interventional Research Ethics Committee on 05.07.2017 and the protocol number is 2017/141.

In this study, the external examination and forensic autopsy reports of the forensic medicine department of the tertiary care Hospital in Elazig, located in the eastern Anatolia region of Turkey, with a population of 587.960 and serving in the nearby cities were analyzed.

Between January 1, 2000, and December 31, 2016, 3,536 death case reports from Elazig and surrounding provinces, whose forensic autopsy and postmortem external examination was performed, were reviewed retrospectively. Unintentional fatal injuries occurring in the workplace were included in the study.

These cases were evaluated with regard to factors such as age, gender, type and time of the event, cause of death, and the sector where the deaths occurred.

The data were transferred to the IBM 21 SPSS program. When the Kolmogorov Smirnov test was applied, the data were normally distributed. The data was performed using Student's t-test and

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One-way Variance Analysis followed by Scheffe's post-hoc test.

Results

Of the 3.536 death reports analyzed, 130 (3.7%) were due to occupational injuries. Of all cases, 128 (98.5%) were males, and two (1.5%) were females. Both of the female cases were working in the agricultural sector.

The most common age group was 25-44 (42.3%) years, while the least common age group was under 18(1.5%) years [Table 1].

The average age was 44.9 ± 15.6 years (range: 16-85 years). When the average age was compared based on the sectors, the average age in the agricultural sector was 58.9 ± 16.7 years old and significantly higher than in the other sectors [F (6,123): 8,174, $p < 0.001$, $r: 0.533$].

Fatal occupational injuries were the most common in the construction sector with 30% (n=39), followed by agriculture with 24.6% (n=32) and mining with 10.8% (n=14).

Fatal injuries mostly occurred by falling from a height with 34.6% (n=45) followed by electric shock with 17.7% (n=23), traffic accident deaths with 16.9% (n=22), and subsidence with 11.6% (n=15) [Table 1]. In the distribution of injuries according to causes of death, 101 deaths were caused by mechanical trauma; 18 deaths from electric shock; three deaths were due to traumatic asphyxia; two cases of heat shock; one case of drowning; while five deaths were due to electric shock and mechanical trauma.

The more frequently injured body parts were the head (50.8%) and the thorax (47.7%) [Table 1].

Fatal injuries in the agricultural sector occurred by falls from a height with 59.4% (n=19), followed by farm vehicle-related accidents with 25% (n=8). In the agricultural sector, 89.5% (n=17) of injured by falls from a height were due to tree pruning or shaking fruit trees.

Fatal work injuries most frequently occurred between 08:01 and 16:00 with 56.9%. Nineteen fatal occupational injuries (14.6%) occurred on Monday, 18 (13.8%) on Tuesday, 31(23.8%) on Wednesday, 14 (10.8%) on Thursday, 14 (10.8%) on Friday, 19 (14.6%) on Saturday, and 15 (11.6 %) on Sunday.

Fatal occupational injuries mostly occurred in July with 15.4% (n=20) and in October with 13.8% (n=18) [Figure 1].

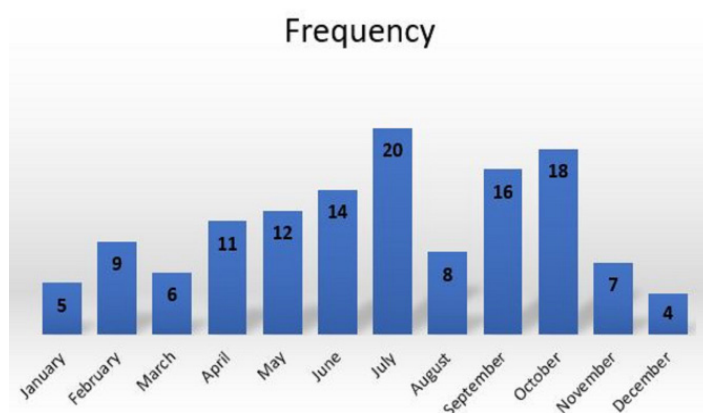


Figure 1. Distribution of occupational fatalities by month

Table 1. Characteristic of occupational fatalities

Age group	N (%)
<18	2 (1.5)
18-24	10 (7.7)
25-44	55 (42.3)
45-64	48 (36.9)
≥65	15 (11.6)
Total	130 (100)
Type of sector	
Construction	39 (30)
Agriculture	32 (24.6)
Mining	14 (10.8)
Electricity Company	14 (10.8)
Factory	12 (9.2)
Self-owned Business	11 (8.5)
Other	8 (6.1)
Total	130 (100)
Type of event	
Falling from a height	45 (34.6)
Electrocution	23 (17.7)
Traffic accident	22 (16.9)
Subsidence	15 (11.6)
Falling object directly of victim	14 (10.8)
Caught between objects	8 (6.1)
Explosion	3 (2.3)
Total	130 (100)
Body part injured	
Head	66 (50.8)
Thorax	62 (47.7)
Abdomen	35 (26.9)
Lower limbs	28 (21.5)
Vertebral column	22 (16.9)
Upper limbs	18 (13.8)
Pelvis	13 (10)
Time of day	
00:01 -04:00	3 (2.3)
04:01 -08:00	15 (11.6)
08:01 -12:00	36 (27.7)
12:01 -16:00	38 (29.2)
16:01 -20:00	17 (13.1)
20:01 -00:00	7 (5.3)
Missing	14 (10.8)
Total	130 (100)

Discussion

While occupational fatalities accounted for %7.7 of forensic deaths in the study of Maeda et al., [6], this rate was %1.7 in the study of Turkmen et al. [7], %4 in the study of Perotti et al [8] and it was 3.4% in the study of Tai et al [9]. In this study, occupational fatalities among forensic deaths were 3.7%. Factors such as the intensity of industrial activities in the cities where the studies were

conducted and the differences in forensic death notifications may have been effective in the differences in fatal work-related injuries rates.

Consistent with studies in the literature, the majority of injuries in this study occurred in males [6-11]. This can be explained by the fact that males are more active in heavy and risky jobs. In addition, considering that family members participate in the workforce, it is an expected finding that the two female cases identified are in the agricultural sector.

In this study, the 25-44 age range was the most common age group in fatal occupational injuries, which is consistent with the studies [10,12,13]. This was evaluated as a reflection of the age range with the highest employment rate in workplaces.

The death rate in the agricultural sector is higher in the elderly [14-16]. The fact that people who retired from different sectors consider agriculture as a field of occupation may have been effective in finding the average age of deaths in the agricultural sector higher than in other sectors in this study.

It has been reported that the agriculture and construction sectors are risky areas for workers [17-20]. In this study, which supports this information, fatal occupational injuries were the most common in the construction and agriculture sectors.

Fatal injuries in the mining sector were more common in this study, unlike some studies in the literature [11,21,22]. This situation may be a reflection of the fact that Elazığ and its surroundings are an important place in chrome mines in Turkey [23] and chrome mining activities are carried out intensively in this region.

The most common fatal occupational injuries occurred by falling from a height, followed by electric shock in this study, consistent with some studies [7,11]. Contrary to studies stating that fatal injuries in agriculture are most frequently caused by tractor accidents, falling from a height was the most common in this study [16,17,19,24,25]. The inconsistency of the results with the literature can be explained by the fact that human labor is preferred instead of agricultural machinery due to the small size of the agricultural lands owned and the inability to meet the cost in the region where this study was conducted.

Consistent with the studies of Al-Abdallat et al. [11] and Perotti et al. [8], the most frequently injured body part in this study was the head, followed by the thorax.

Similar to the study by Macedo et al. [12], fatal accidents mostly occurred between 08:01 and 16:00. In a study conducted in Spain [13], fatal occupational injuries most frequently occurred on Friday and Monday, and in a study conducted in Jordan [11], fatal injuries mostly occurred on Thursday. In a study conducted in Russia [21], fatal occupational injuries most frequently occurred on Wednesdays as in this study. The fact that employees in some sectors do not work on certain days of the week and that such non-business days differ according to countries and regions may have affected the difference in results.

Deaths due to occupational accidents are mandatory to be reported in Turkey, and obtaining these data constitutes an essential step

in reducing deaths. It is important to raise awareness of the workforce about occupational health and safety to prevent deaths due to occupational accidents. In addition, it is necessary to take safety measures, use protective equipment and increase the quality of inspections to reduce the most common deaths caused by falling from a height. It should be aimed to develop low-cost and reliable agricultural tools that can be used in works that cause falls from a height in the field of agriculture and to expand the usage of these tools.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Ethical approval

This retrospective study was conducted with the approval of the Izmir Katip Celebi University Non-Interventional Research Ethics Committee on 05.07.2017 and the protocol number is 2017/141.

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