

## **Long-term analysis of patients admitted to the emergency room as a result of occupational accidents.**

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### **Abstract**

**Objective:** We aimed to describe the demographic and clinical features and healthcare costs associated with occupation related injuries between 2010 and 2015.

**Method:** The patients of occupational accidents were evaluated according to age, gender, accident type, trauma localization, duration of hospitalization in the emergency department, prognosis, imperfection types causing to accidents and outcomes and cost spent.

**Results:** 449 patients diagnosed with occupational accidents from January 2010 to December 2014 were included in the analysis. Of injury referring distribution the most common cause of occupational accidents (type of accidents) was extremities injury 141 (31.4%). About 50.1% of all estimated construction occupational accidents treated in the emergency department affected upper extremities. Remaining injuries primarily affected the head, lower extremities and thorax (45%). The mean cost of an inpatient admission following occupational accidents was \$232, and the overall costs of patient care for the study sample during this time frame exceeded \$26.142 annually.

**Conclusions:** Occupational injuries, illnesses, and fatalities remain a major public health and economic concern around the world. The findings from this study may be beneficial in the development, implementation, and evaluation of injury prevention policies and prevention programs.

**Keywords:** Occupational accident, Trauma, Emergency.

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### **Introduction**

It is known that an employee of any profession or occupation may be subjected to the risk of disease or suffering a trauma related to his or her work [1]. According to International Labour Organization (ILO), "the term 'occupational accident' covers an occurrence arising out of, or in the course of, work which results in fatal or non-fatal injury" [2]. Previous studies were reported that 1 person in 10 employees in the developed industrial countries is exposed to occupational accidents every year [3]. In some businesses, this rate increases to 1 person in 3 employees. In Turkey, 74,181 occupational accidents occurred in 2012; 744 workers died, 2036 workers were injured, and 1,645,431 workdays were lost in these accidents [4]. Occupational injuries affect not only safety and health, but also economics, because of the high costs related to work injuries [5]. Property damage occurring as a result of work-related accidents; It can be divided into two main groups, namely direct and indirect damages. Especially it is very difficult to calculate the indirect damage [6]. However, the ILO, the total cost of the industrialized countries, accidents at work and

occupational diseases, according to the country's Gross Domestic Product of (GDP) is set to vary the rate of 1% to 3%. For developing countries, it is estimated that up to 4 percent of the GDP of these losses. According to these figures in our country, according to the ILO criteria expenses to be incurred in accidents at work and occupational diseases; over 4% per year can be estimated at about 38 billion. So our country has a financial dimension that can be expressed by an average of around 1,000 per year occur outside of the billions of deaths caused by occupational accidents [7]. In this study, we aimed to analyze the demographic and clinical features of the occupational accidents patients admitted to a university hospital. The life-threatening content of the occupational accidents, the use of medical interventions, outcomes and cost spent for the treatment of each patient in the emergency department were evaluated.

### **Material and Methods**

In this study, we retrospectively reviewed the hospital documents of patients admitted to Emergency Service of

Turgut Ozal Medical Center of Inonu University with injuries due to occupational accidents between January 2010 and December 2014. The patients of occupational accidents were respectively evaluated according to age, gender, accident type, trauma localization, duration of hospitalization in the emergency department, prognosis, imperfection types causing to accidents and outcomes and cost spent. In the classification of types of occupational accidents, injuries due to falls from heights, penetrating or perforating injuries, and injuries due to electrocutions were evaluated in each of these types of injuries their own separate class. Injuries due to compressions between two objects, injuries due to remaining below an object, blunt injuries in transport accidents, and injuries with impact of blunt objects or with splashes of blunt objects were evaluated in an "other blunt traumas" class. Finally, injuries due to burns, poisonings, asphyxias, and other causes were described as "other injuries." The statistical analysis was performed with IBM SPSS version 23.0 (SPSS Inc., Chicago, USA). The numerical results were expressed as the mean values with SDs. Categorical results were given as numbers (percentages). In relation to categorical variables, Pearson's chi-square test, Yates' corrected chi-square test, and Fisher's exact test were used for statistical analyses where appropriate. Pearson correlations were also calculated for numerical variables. P values <0.05 were considered statistically significant.

## Results

A total of 449 patients diagnosed with occupational accidents from January 2010 to December 2014 were included in the analysis. Of the 449 patients, 445 (99.8%) were male and 4 (0.2%) were female. Of injury referring distribution the most common cause of occupational accidents (type of accidents) was extremities injury 141 (31.4%). That 21.4% (97 cases) deal with of fall injuries, 15.4% (69 cases) and the objects falling on. The patient characteristics are presented in table 1.

**Table 1.** The distribution of causes of occupational accidents (n=449). Variables are expressed as percentage, n (%).

Causes	Number	%
Fall	97	21.6
Extremity Injury	54	12.0
Extremity Amputation	141	31.4
Electric shock	24	5.3
Burn	21	4.7
Object on drop	69	15.5
Other	43	9.6

About 50.1% of all estimated construction occupational accidents treated in the emergency department affected upper extremities, and these injuries were likely to result in treatment and release. Upper extremity injuries were most commonly lacerations to the hands and fingers (43%) and sprains/strains to the wrist, arm, and shoulder (15%). Remaining injuries

primarily affected the head, lower extremities and thorax (45%). Lower extremity injuries were commonly sprains/strains (39%) and contusions/abrasions (10%), followed by fractures (8%) and lacerations (22%). Over half of the estimated injuries to the head and face affected the eye and were due in large part to exposure to foreign bodies. Orthopedic consultation was conducted in 125 (27,8%) patients, and this has been the most frequent consultation. This is also consistent with extremity injuries. Plastic surgery consultation was performed in 80 (17,8%) patients.

The most common examination results of occupational accidents was extremities pathology 260 (57.9%). 15.1% (68 cases) more than one pathologies, 12.5% (56 cases) and head pathology. Radiologic signs for injuries were most commonly fractures 55.5% (249 cases) and 20.3% (91 cases). The most common duration of emergency service is 6 to 8 hours 24.1% then 4 to 6 hours 21.8% and over 8 hours 21.6%. Outcomes were that 242 (53.9%) patients lying for services, 203 (45.2%) discharged from the emergency service without sequelae and 4 (9%) deaths. The mean LOS across all injury-related hospitalizations was 4.8 ( $\pm 2.3$ ) days, although 3.5% of hospitalizations exceeded 9 days in length. The mean cost of an inpatient admission following occupational accidents from 2010 to 2014 was \$232 ( $\pm 65$ ), and the overall costs of patient care for the study sample during this time frame exceeded \$26.142 ( $\pm 8258$ ) annually. Outcomes are presented in table 2.

**Table 2.** Outcomes of Occupational Accident. Variables are expressed as mean  $\pm$  SD and percentage, n (%). LOS: length of stay.

Variables	Number	%
Lying for Services	242	53.9
Discharged	203	45.2
Deaths	4	9.0
LOS (day)	4.4 $\pm$ 2.3	-
Cost (\$/patient)	232 $\pm$ 65	-
Cost (\$/year)	26.142 $\pm$ 8258	-

## Discussion

In this study, representative sample of inpatient emergency service discharge records was analyzed to describe the characteristics, and outcomes associated with occupational accidents. According to the Social Security Institution, in 2013, occurred from 5553 as a result of occupational accidents in which 780 people lost their lives, in 2014, occurred from 7691 as a result of occupational accidents in which 843 people lost their lives [8]. These data showed that the number of occupational accidents and deaths has increased steadily. As expected, and consistent with findings in similar studies, the majority of patients in this analysis were primarily male (99.8%). Turkish Statistical Institute (TSI) in 2009, male rate of occupational accidents, according to data from was discovered 94.46% [8]. Our work ratio 96.6% detected high at the same rate for similar work respectively. In this case, men

are more working life and women are more careful and meticulous. The large share of males in the patient pool could be due to the distribution of tasks in most industrial settings being influenced by sex, with men more likely to be involved in physically demanding and risky tasks than women. Additional research is needed to define sex differences in rates of occupational injuries that do not require hospitalization. In this study the majority of patients were admitted with injuries to the extremities. TSI in 2009 data, according to data on occupational accidents the site of injury extremities first place with 76.56% followed by head injuries 8.09% [9]. According to our study, the distribution of injuries the most common was viewed extremities injury 31.4%. About 50.1% of all estimated construction occupational injuries treated in the emergency department affected upper extremities. The reason for this attention is due to the greater use of upper extremities and in works that require skills. Turkish Statistical Institute (TSI) in 2009 data, occupational injuries mortality rate was 1.82% [9]. Mortality rate in our study 2.1%. When the case is viewed, it is discharged of 99.05%, 0.95% died of it is seen that. Mortality rate in our study of the literature rates were similar. These rates of occupational accidents will be sufficient to highlight the economic importance.

Occupational accidents are the biggest damage to loss of manpower the national economy. In addition, costs of occupational accidents, the cost of production plays a negative role. The mean cost of an inpatient admission following occupational accidents from 2010 to 2014 was \$232, and the overall costs of patient care for the study sample during this time frame exceeded \$26.142 annually. This was expected given the urgent need for care when most occupational injuries take place. Nevertheless, it was the goal of this study to focus on serious injuries that require inpatient hospitalization, which are less studied but important contributors to short- and long-term morbidity and direct and indirect costs of care. As anticipated, head and multiple-site injuries represented the most severe cases therefore, had the highest mean costs prolonged stays. On the contrary, most extremity injuries had the lowest mean cost per discharge (\$58 per admission) and consequently the shortest average hospital stay (2.4 days). This lower cost and shorter stay can be attributed to the lower lethality associated with these injuries. Typically, injuries to the extremities do not impact vital organs and are easily detectable, accessible to prompt management, and non-life threatening [10]. This cost difference could be due to several reasons. First, our methodology and span of years covered in this study may not necessarily allow for cost comparability with previous studies. In addition, one limitation of using secondary data is that some of the necessary variables may be absent for in-depth evaluation of trends and costs. Our data set does not collect data on indirect or intangible costs (reduced productivity, disability, premature mortality, and absenteeism). Thus, this study underestimates the overall prevalence of these injuries as well as the total societal costs that can be attributed to lethal and major and minor non-lethal injuries that occur in the

industrial setting. Finally, results of prevalence, and cost analyses for any exposure or outcome should be interpreted with caution because some states do not report data in the discharges. In conclusion, this study suggested that variations in the rates and types of injuries exist. The findings may be a reflection of the recent rise in occupational injuries although efforts led by the TC Department of Labor entities to enforce workplace safety rules and injury prevention programs. Despite these efforts, occupational injuries, illnesses, and fatalities remain a major public health and economic concern around the world. This creates a need for more research to understand the individual, social, and environmental-level risk factors associated with occupational injuries and illnesses. The findings from this study may be beneficial in the development, implementation, and evaluation of injury prevention policies and prevention programs.

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