



# Distribution of Occupational Accident Cases Presenting to the Emergency Department by Time, Age and Injury Region

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## Abstract

**Aim:** Occupational accidents cause many deaths, injuries, loss of labour force and a serious financial burden for the health system. The aim of this study was to investigate the demographic information and injury characteristics of occupational accident cases admitted to the emergency department.

**Material and Method:** Data were obtained by retrospectively reviewing the files of 1868 occupational accident cases admitted to the emergency department.

**Results:** Of the 1868 patients included in the study, 91.9% were male. Most admissions were made in August ( $p<0.05$ ), on Mondays (17% and  $p<0.05$ ) and between 10.00-12.00 am ( $p<0.05$ ). Most of the cases came from the organized industrial zone ( $p<0.05$ ). The most common type of injury was penetrating ( $p<0.05$ ) and the most common injury sites were upper extremities and face ( $p<0.05$ ).

**Conclusion:** It was determined that most of the occupational accidents occurred in the summer season, on Mondays in August and in the morning hours. Upper extremities and face were most commonly affected. Penetrating type injuries are most common. Precautions and trainings on this subject will reduce these deaths and injuries.

**Keywords:** Occupational accident, emergency service, injury

## INTRODUCTION

According to the World Health Organisation (WHO), occupational accidents are defined as unplanned, unknown and uncontrolled events that cause injury to people, damage to machines and equipment, and halt production for a period of time (1). The International Labour Organization (ILO), on the other hand, defines it as 'an unplanned, unexpected event that leads to a specific damage or injury' (2). According to the Social Security Institution of the Republic of Türkiye, it is defined as "an event that occurs in one of the cases listed in the Law No. 5510 in the working life of the person and makes the insured physically or mentally disabled" (3). Every year, 270 million occupational accidents occur worldwide and result in 1,1 million deaths (4). Occupational accidents cause many deaths, injuries, loss of workforce

and a serious financial burden for the health system. Although technological advances, mechanisation and occupational health and safety studies have provided great improvements in the prevention of occupational accidents, it is observed that large industrial enterprises and mining accidents are still at high levels due to the huge increase in the proportion of working people in the last century (5). The first evaluation and intervention of the victims after occupational accidents are performed in emergency services, an occupational accident report is prepared and notification is mandatory.

Occupational accidents affect the young adult male population in the society. It has been reported that they occur mostly in the summer season and between 08:00-12:00 hours during the day. Victims are most frequently admitted from the construction sector and heavy industry

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and the upper extremities are most commonly affected. Blunt traumas and glass cuts are reported as the most common mechanism of injury.

Occupational accidents are classified in different ways such as blunt, penetrating etc. depending on the severity of the injury, type of injury and type of accident (3). In our country, occupational accidents are always evaluated primarily in emergency departments because of their forensic aspects and necessary interventions are performed and an occupational accident report is kept. For this reason, occupational accidents constitute an important part of traumatised patients presenting to the emergency department. In a study, it was reported that approximately 20% of all adult patients admitted to the emergency department due to injury were admitted due to occupational accidents (6).

Occupational accidents are an important cause of mortality and morbidity all over the world. Many studies have been conducted in the world in the last 50 years to reduce these accidents. Work Health and Safety Services (WHS) was established to solve problems related to occupational accidents, to provide safe and healthy environments in all work-related processes and to ensure the health and safety of employees (1).

According to the 2012-2021 data of the Turkish Social Security Institution (SSI), it is reported that the rate of increase in occupational accidents in Türkiye has decreased, but there has not been a significant decrease in mortality rates (7). Türkiye ranks 8th with a high number of accidents compared to EU countries within the scope of occupational accidents with a loss of 4 or more working days, unfortunately, it is by far ahead in terms of fatal occupational accidents. According to 2014 data, while 1.626 fatal occupational accidents occurred in Türkiye, only 589 fatal occupational accidents occurred in France, which follows Türkiye (8).

The aim of this study was to determine the frequency of occupational accidents admitted to the emergency department of Kırşehir Training and Research Hospital, the distribution according to age, season, day and hour, and the types of injuries and the distribution of injury sites.

## MATERIAL AND METHOD

This study was conducted by retrospectively examining the patient files that were applied to the Emergency Department of Kırşehir Ahi Evran University Training and Research Hospital due to occupational accidents between 01.10.2020 and 01.10.2022 and for which a occupational accident report was opened. The study was carried out with the permission of Kırşehir Ahi Evran University Faculty of Medicine Ethics Committee (Ethic number: 2022-02/20, Date: 25.01.2022). The demographic data of the patients, types of injuries, injury sites, whether there were bone fractures, whether treatment or consultation

was required and how they ended were recorded in the previously prepared case report forms. The statistical analyses of the study were performed using Statistical Package for Social Sciences version 28.0 software for Windows (IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp., USA). The frequencies of the variables are given as n (%). Chi-square test was used to compare the distributions of categorical variables.

## RESULTS

A total of 1868 patients who met the criteria were included in the study. Of these patients, 1716 (91.9%) were male and 152 (8.1%) were female. When the distribution of patients included in the study by age was examined, the number of patients in the 15-24 age range was 391 (20.9%), the number of patients in the 24-35 age range was 704 (37.7%), the number of patients in the 35-54 age range was 726 (38.9%) and the number of patients in the 55 and over age range was 47 (2.5%) (Table 1).

**Table 1. Distribution of patients admitted to the emergency department due to occupational accidents by age group**

Age groups	%	n
15-24	20.9	391
24-35	37.7	704
35-54	38.9	726
55+	2.5	47

\*: Chi-square test

When the distribution of occupational accident cases by season was examined, it was found that the highest number of cases occurred during the summer months, with 524 patients (28.1%). The second highest number of cases occurred in the autumn, with 469 patients (25.2%). The number of patients presenting in the spring was 464 (24.9%), and the number of patients presenting in the winter was 411 (23.4%). When the distributions were examined separately by summer months, it was understood that the highest number of applications was made in August (10.1%). When the distributions of cases by month were examined, a statistically significant relationship was determined ( $p=0.009$ ) (Table 2).

**Table 2. Distribution of patients admitted to the emergency department due to occupational accidents according to seasons**

Months	n	%
Summer (June, July, August)	524	28.1
Autumn (September, October, November)	469	25.2
Spring (March, April, May)	464	24.9
Winter (December, January, February)	411	23.4
p*	0.009	

\*: Chi-square test

When we look at the time of day when patients apply, we see that the cases are concentrated between 10:00-12:00 and this distribution was found to be significant as a result of the statistical analysis ( $p<0.001$ ), (Table 3).

**Table 3. Distribution of the application times of patients who applied to the emergency department due to occupational accidents**

Hours	n	%
08:00-10:00	229	12.3
10:00-12:00	300	16.1
12:00-14:00	229	12.3
14:00-16:00	249	13.3
16:00-18:00	212	11.3
18:00-20:00	140	7.5
20:00-22:00	132	7.1
22:00-24:00	100	5.4
24:00-02:00	103	5.5
02:00-04:00	73	3.9
04:00-06:00	54	2.9
06:00-08:00	47	2.5
p*	0.000	
*: Chi-square test		

When the distribution of applications by day of the week was examined, it was found that the most frequent application was made on Monday and this distribution was found to be statistically significant ( $p<0.001$ ), (Table 4).

**Table 4. Distribution of days for patients who presented to the emergency department due to occupational accidents**

Application days	n	%
Monday	317	17.0
Tuesday	294	15.7
Wednesday	305	16.3
Thursday	274	14.7
Friday	282	15.1
Saturday	220	11.8
Sunday	176	9.4
p*	0.000	
*: Chi-square test		

When the distribution of patients according to their work field was examined, it was seen that the most applications came from the organized industrial zone, and this distribution was found to be statistically significant ( $p<0.001$ ) (Table 5).

**Table 5. Distribution of work fields among patients who presented to the Emergency Department due to occupational accidents**

Field of study	n	%
Agriculture	11	0.6
Small tradesmen	81	4.3
Small industry	9	0.5
Organized industry	1211	64.8
Government office	203	10.9
Other	353	18.9
p*	0.000	
*: Chi-square test		

When the types of injuries of the patients were examined, it was found that penetrating injuries were significantly more common than other types of injuries among the injury mechanisms ( $p<0.001$ ). When the distribution of the patients according to the injury sites was examined, it was found that 816 patients (43.5%) had injuries in the upper extremities, 556 patients (28.8%) in the lower extremities, 296 patients (15.8%) in the head and neck region and 79 patients (4.3%) in the thorax. In line with this information, the types of injuries suffered by the patients and the distribution of the injury sites are statistically significant ( $p<0.001$ ). While 1808 of the patients were discharged from the emergency room, 57 patients were hospitalized and treated, and 3 patients died.

## DISCUSSION

Occupational accidents have become a significant public health problem in all societies (9). According to the data of the International Labor Organization worldwide, an average of 50 million people are exposed to occupational accidents every year in industrial production (10). In addition to having negative effects on the health of individuals, occupational accidents also cause loss of workforce, thus posing a serious burden on individuals, the health system, and the national economy. Today, technological developments, increased production, and competition have further increased the risks to the health and occupational safety of employees. Occupational accidents can result in mortality, as well as disabilities that lead to permanent disability. Occupational accidents and the resulting material and moral losses also reach significant dimensions in terms of the national economy (10).

In our study, we determined that the ratio of emergency room visits due to occupational accidents to all emergency room visits was 0.48%. Ulutaşdemir et al., in their study with 133 occupational accident cases, stated that occupational accident applications constituted 0.2% of all applications to the emergency department (11). In a study conducted by Karakurt et al., it was stated that 1.2% of applications to the emergency department were workplace-related accidents (12). The reason why this rate was below 1% in our study may be that our city is not a large industrial center and the number of employment in heavy industry is low.

91.9% of the patients in our study were male. Studies conducted in our country reported that patients applying to the emergency department due to occupational accidents were predominantly male (10,13). This rate was reported as 81.6% in another study (6). When gender distributions were examined, the obtained data were consistent with the literature. This may be due to the fact that male employment is higher than female employment and that men tend to work in heavier and more dangerous jobs than women. When the seasonal distribution of occupational accidents was examined, it was seen that the most frequent applications were in the summer season. In some studies on this subject, it has been reported that occupational accidents increase due to the fact that occupational branches such as construction and agriculture are more

active in the summer months (4,12). In a study conducted by Ulutaşdemir et al. on 133 occupational accident applications, it was stated that occupational accidents occur most frequently in May (12%) (9). In another study, similar to our study, it was stated that the highest number of applications occur in the summer months (13). Karakurt et al. (12) reported that most occupational accidents occur in December, while Dizdar et al. (14) reported that occupational accidents increase in June, July and August. It is likely that occupational accidents increase in May, June and July due to the warming of the weather and the resulting intensification of production and employment in many occupations. According to the data of the Turkish Statistical Institute (TÜİK), occupational accidents are reported to occur more frequently in the first hours of work. According to the occupational accident data of TÜİK between 2003-2005, it has been reported that accidents occur most frequently in the first 3 hours after the start of work (7). In a study conducted by Dağlı and Serinken, the distribution of accidents during the day was examined and it was reported that they occurred most frequently in the morning hours (08:00-10:00) and around noon (14:00-16:00) (10). In our study, we found that occupational accidents occurred most frequently between 10:00-12:00, frequently within the first 4 hours after starting work. When the distribution of occupational accidents among the days of the week was examined, we found that the highest number of applications was on Monday. According to ILO data, the most frequent applications are made on Mondays (7). Ulutaşdemir and his colleagues stated in their study that occupational accidents occur most frequently on Mondays (37.8%) (11).

Approximately one third of occupational accident-related deaths in our country occur in the construction sector, followed by the manufacturing sector. In a study conducted by Çelik and his colleagues covering 654 patients, they reported that the highest number of applications were made by industrial and construction workers (15). In our study, in relation to the current employment situation in the region, the most frequent application was made by workers working in the industrial site. It is very clear that the different data in the literature are related to the industrialization situation of the region where the study was conducted, the widespread economic activities and employment areas.

In our study, it was observed that the most common type of injury was penetrating injuries and the most common injury site was the upper extremities and head-neck region. Similarly, in the study of Dağlı et al., the most frequently injured site was the upper extremities (65.3%) (10). Ulutaşdemir et al. also reported the most upper extremity injuries with a rate of 61.7% (11). Kadioğlu et al. reported that the most injuries were in the upper extremity region with 46% among the injury sites (13). When the mortality rate in occupational accidents was examined in our study, it was found as 0.2%. In various studies, mortality rates in occupational accidents vary between 1% and 4.9% (16,17). The reason for this lower rate (0.2%) in our study may be

the lack of heavy industry facilities in Kırşehir province and the fact that injuries are often mild.

## CONCLUSION

Occupational accidents are an important public health issue both globally and within our country. This study found that occupational accidents were most common during the summer months, particularly in August, and most frequently occurred on Mondays and in the morning. Occupational accidents are most frequently observed as localized penetrating injuries, and anatomically, they are most frequently observed in the upper extremity and head-neck region. In this study, we believe that precautions to be taken and training to be provided regarding occupational accidents will reduce these deaths and injuries. The data of this study was obtained by conducting a 2-year case scan in a small province of Türkiye. However, since all cases were brought to a single hospital, it reflects the sample well.

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