

## ORIGINAL RESEARCH

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### Evaluation of the admitted forensic cases to the emergency department

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#### Abstract

Forensic cases, whereas non-natural factors cause physical or behavioral damages, are mostly seen in the emergency departments (ED) of the hospitals. In this study, we aimed to contribute to the forensic records of our country by examining the demographic characteristics of the forensic cases who were admitted to our ED. Hospital records and forensic reports of the patients who were admitted to ED and accepted as forensic cases between 2014-2017 were retrospectively scanned, and evaluated. Age, gender, the reason for admission and results of the patients were examined. Data were recorded, and statistical analyzes were performed via SPSS v.16.0. A total of 824 forensic cases were admitted to the ED during the study period, and 61% (n = 503) were male. The mean age of the patients was  $32,73 \pm 15,65$  years. Traffic accidents (n = 289; 35%) and occupational accidents (n = 208; 25.2%) were the most common causes of forensic case admissions. While 79.5% (n = 655) of the patients were discharged from the ED, 14.7% (n = 121) were hospitalized while 0.7% (n = 6) of the cases could not be saved despite all interventions. Traffic accidents and occupational accidents are among the most frequent forensic cases in our country, and it should be highlighted that these causes are preventable injuries. At the same time, while the rate of violence and sexual assault has been high all over the world, the reason that our study has no case admissions due to sexual assault and violence should be investigated.

**Keywords:** Emergency department, forensic cases, occupational accident, sexual assault, traffic accident

#### Introduction

As in all over the world, traffic accidents, violence, fighting, suicide, and related injuries are a significant health problem in our country. It is called a forensic case when a person, becomes physically or mentally ill by another person or peoples' intent, negligence, imprudence or carelessness, and emergency departments (ED) are one of the most frequent places where the first occurrences of these physical or behavioral damages caused by unnatural factors on humans are seen [1,2].

Forensic cases include traffic accidents; intoxication; assault; cutting-penetrating-crushing tool injuries; gunshot wounds; exposure to corrosive substances; falls or falls on hard bodies; burns; asphyxia; suspicious, sudden and unexpected deaths; occupational accidents and sexual assault [3]. These cases constitute an essential part of emergency applications.

In addition to the responsibility of treating the patient, the physicians working in the emergency department have important

duties such as the reporting of traumatic lesions detected in the patient in forensic cases and reporting the case to the judicial authorities.

This study aims to analyze the demographic and epidemiological characteristics of the cases evaluated as forensic cases in the Emergency Department of Medical Faculty Education and Research Hospital and to contribute to the records of our country.

#### Material and Methods

This research was carried out with the permission of Maltepe University, Clinical Research Ethics Committee, and numbered 2018/900/79.

While all patients who were evaluated as forensic cases in ED between 01/01/2014 and 31/01/2017 were included in the study, cases of poisoning who were admitted to the pediatric emergency department were not included in the study.

Patient information was obtained from ED patient records, forensic reports, and hospital information management systems (MediPro Software + Compass System) retrospectively. Patients' gender, age, reasons of admission (traffic accidents, intoxications, blunt force injuries, cutting and drilling injuries, gunshot wounds, exposure

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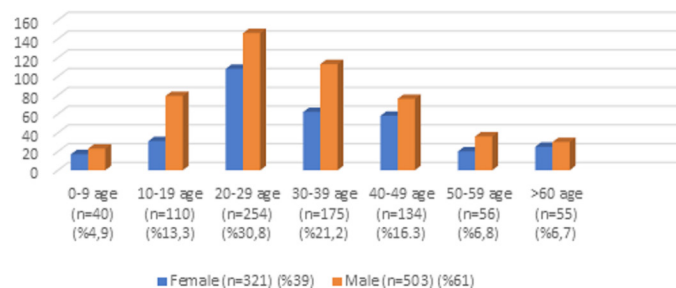
to corrosive substances, falls or falls on hard bodies, burns, suspicious, sudden and unexpected deaths, occupational accidents and sexual assault) and their results (discharge, hospitalization, refusal of treatment, referral and death) were evaluated.

### Statistical analysis

Statistical Package for Social Sciences (SPSS) 16.0 package program was used to analyze the data which were entered with a standard system to the computer. Descriptive numerical variables were reported as mean  $\pm$  standard deviation (SD), frequency (%) and range (minimum-maximum). Independent two samples t-test was used to compare the mean values of two different sample groups for customarily distributed the quantitative variables.

### Results

Eight hundred and twenty-four (2.3%) of 39162 patients admitted to the ED of our hospital were evaluated as forensic cases. The ages of the cases ranged from 1 to 89 years, with a mean of  $32.73 \pm 15.65$  years, of which 61% (n = 503) were male, and 39% (n = 321) were female. When the age ranges were considered, it was found that the cases were between 0-9 years of age with a minimum of 4.9% (n = 40) and 20-29 years of age with a maximum of 30.8% (n = 254) (Figure 1).



**Figure 1.** Distribution of age groups according to gender

When the reasons of admission of forensic cases to ED were evaluated, it was observed that traffic accidents (n = 289, 35%) and occupational accidents (n = 208, 25.2%) were in first ranks. Among other reasons, there was no admission of sexual abuse or sexual assault, while blunt force injury, falling, cutting and drilling injuries, and poisoning had upper ranks. While there was male dominance among all admissions, the number of female poisonings was higher (n = 49) (Table 1).

When the causes of occupational accidents (n = 208) were evaluated, male (74%) dominance was observed, while 112 cases were due to falling or falling on a foreign body and 72 cases had cutting and drilling injuries.

**Table 1.** Distribution of forensic cases according to gender and results

| Gender               | TA (n) | OW (n) | BFI (n) | F (n) | CDI (n) | I (n) | ECS (n) | GW (n) | B (n) | SA (n) | CPA (n) |
|----------------------|--------|--------|---------|-------|---------|-------|---------|--------|-------|--------|---------|
| Female               | 139    | 54     | 54      | 44    | 23      | 49    | 6       | 1      | 2     | 0      | 4       |
| Male                 | 150    | 154    | 106     | 91    | 94      | 39    | 7       | 9      | 1     | 0      | 3       |
| Total                | 289    | 208    | 160     | 135   | 117     | 88    | 13      | 10     | 3     | 0      | 7       |
| <b>Results</b>       |        |        |         |       |         |       |         |        |       |        |         |
| Discharge            | 262    | 167    | 154     | 104   | 95      | 21    | 11      | 2      | 3     | 0      | 0       |
| Refusal of Treatment | 11     | 7      | 2       | 5     | 4       | 15    | 0       | 2      | 0     | 0      | 0       |
| Hospitalization      | 16     | 32     | 3       | 24    | 17      | 51    | 2       | 6      | 0     | 0      | 2       |
| Death                | 0      | 1      | 0       | 5     | 0       | 0     | 0       | 0      | 0     | 0      | 5       |
| Referral             | 0      | 1      | 1       | 0     | 1       | 1     | 0       | 0      | 0     | 0      | 0       |
| Total                | 289    | 208    | 160     | 135   | 117     | 88    | 13      | 10     | 3     | 0      | 7       |

TA: Traffic Accident OA: Occupational Accident SA: Sexual Assault CDI: Cutting and Drilling Injury

I: Intoxication BFI: Blunt Force Injuries F: Falls or Falls on Hard Bodies GW: Gunshot Wounds B: Burn

CPA: Cardio-Respiratory Arrest ECS: Exposure to Corrosive Substances

While 79.5% (n = 655) of patients who were admitted and evaluated in ED were discharged from the ED, 9.7% (n = 80) were hospitalized to internal medicine or surgery clinics and 5% (n = 41) were hospitalized to intensive care unit. 4.7% (n = 39) of the cases refused hospitalization when admission decision was made and signed consent form while 0.4% (n = 3) of the cases were referred to another center, 0.7% (n = 6) died (Table 1).

When the results were evaluated according to causes, patients who were admitted with poisoning had higher rates of hospitalization (n=51, 42,15%) and discharge (n=15, 38,5%) without completing the treatment. Two of the patients who were brought with cardiopulmonary arrest were hospitalized to intensive care unit after interventions in the ED, and five of them could not be saved

despite all interventions. The reason of 5 of the six deaths in ED was falling from high (1 of them was work accident) while the cause of one is unknown.

### Discussion

In this study which examined the forensic cases applying to the ED 2.3% of patients were forensic cases, this rate was 3.66% in Demircan et al's [4] study and 7,01% in Korkmaz et al [5]. In our study, male gender dominance (61%) and young age ( $32.57 \pm 16.2$  years) were consistent with other studies in the literature. The most common range of age was 20-29, which is attributed to the fact that the young population is working in high-risk sectors, more in traffic and social life, and being more involved in judicial events [5,6].

In many studies conducted on the forensic cases applying to EDs in our country, the largest group of cases belong to traffic accidents [2,5,7]. This group covered 35% of our study and was in the first place at a high rate. This situation depends on the city, and the location where our hospital is located, the traffic is dense and complicated, and the traffic rules are not followed. The results of our study were similar to other studies in the literature showing that males are more likely to be admitted due to traffic accidents and blunt force injuries and women due to poisoning [5,8]. In 2006, Celbiş et al reported that women were mostly subjected to blunt force injuries and traffic accidents (n = 699,947; 31.1%; 42.2%). In the same study, 162 women (7.2%) presented with sexual assault due to family violence and were reported to be remarkable [9]. No sexual assault was found in our study. Although this situation is quite common in the world, there is a need for more detailed patient history and sociocultural data to understand why we do not encounter in our region.

Occupational injuries and deaths constitute an important place in forensic medicine applications. The fact that most of the cases of occupational accidents are male is due to the role of men in our society, especially in heavy jobs, inexperienced people being more susceptible to work accidents and increased construction sector due to urban transformation [2, 10]. Similarly, falls are a common cause of injury, especially for the elderly, young and employees of various sectors. Most of the falls are caused by accident [4]. According to our study, 74,1% of those who had occupational accidents were males and 25,9% were females. One of our patients who died was brought to the emergency department due to a work accident. Our study, most of the occupational accidents are caused by falls and/or injuries due to falling objects, while Sayhan et al. [11] found that 40.6% of the cases had injuries due to sharp objects. The fact of high rates of the fall accidents in occupational accidents indicates the necessity of taking preventive cautions in this regard and the importance of occupational safety training and audits of the workplaces.

In a study by Korkmaz et al. [5], 68.5% of patients were discharged from ED, and 25.7% were hospitalized. In 2012, Levent et al. [6] reported that 88.8% of the patients were discharged from the hospital, 2.5% were hospitalized, and 8.7% left the hospital before the completion of treatment. When the results of the patients were evaluated by causes, it was observed that the falls were with a higher number of hospitalizations compared to other causes. The patients who were admitted with suicide were the ones who left the ED without completing their treatment compared with other causes [7]. In our study, 79.5% (n = 655) of the patients were discharged from ED, while 9.7% (n = 80) were hospitalized to the internal medicine or surgery clinics and 5% (n = 41) were admitted to the intensive care unit. 4,7% (n = 39) of the patients refused the examination or treatment, signed a consent form and left the hospital. When the results were evaluated by causes, the patients who were hospitalized to the hospital with the highest number and did not accept the treatment were found to be the patients who were admitted with poisoning.

## Conclusion

The first step of the forensic examination of the patients who are considered as a forensic case is performed in the ED. Another task of the emergency physicians who are responsible for the initial intervention and treatment of all patients admitted to the hospital is to evaluate the forensic cases and to notify them to the relevant authorities. Traffic accidents and occupational accidents are in first ranks amongst the forensic cases in our country, and the important fact is that they are preventable. On the other hand, while it is noteworthy that violence and sexual assault rates have been high all over the world, it is not seen our region, and we think that this subject should be evaluated in more detail and carefully.

## Competing interests

*The authors declare that they have no competing interest.*

## Financial Disclosure

*There is no financial support for this study.*

## Ethical approval

*Maltepe University, Clinical Research Ethics Committee, and numbered 2018/900/79.*

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