

# ACIL SERVİSTE DEĞERLENDİRİLEN ADLİ OLGULARIN DEMOGRAFİK İNCELENMESİ

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## ÖZET

### Amaç:

Acil pratiğinde, adli olgular önemli bir yer tutmaktadır. Bu çalışmada, acil serviste karşılaşılan adli nitelikteki olguların sosyo-demografik özelliklerinin incelenmesi, konu ile ilgili aksaklıklar ve çözüm önerilerinin ortaya konması amaçlanmıştır.

### Yöntemler:

Isparta Devlet Hastanesi Acil Servisi'ne 2011 yılında başvuran sisteme kayıtlı adli olgular çalışmaya alındı. Hasta dosyaları bilgisayar tabanlı hasta kayıt sistemlerinden toplandı.

### Bulgular:

Çalışma süresince acil servise başvuran toplam 115.185 has-

tanın 2.094'ü (%1,82) adli olgu olarak tespit edildi. Olguların erkek-kadın oranı 2,0 bulundu. Adli olguların en fazla Eylül (%9,9) ayında (p<0,05) başvurduğu tespit edildi. Olay türlerine göre en fazla darp (874; %41,7), trafik kazası (746; %35,6) ve zehirlenmeler (285; %13,7) ilk sıralardaydı. En fazla konsültasyon beyin cerrahisi, ortopedi ve genel cerrahi bölümünden istenmiş olup, yatışlarda ise en fazla yatışın dahiliye bölümüne olduğu tespit edildi.

### Sonuç:

Hekim güvenliği ve hasta mağduriyetinin önlenmesi açısından mezuniyet sonrası adli tıp eğitime önem verilmesi ve adli tıp uzmanları ile koordineli çalışılması gerekmektedir. Adli olguların yoğun olarak başvurdukları dönemlerde, acil servislerde insan gücü planlamasının buna

göre yapılması ve gerekli önlemlerin alınması, hasta akışını ve acil işleyişini kolaylaştıracaktır. Acil olmayan adli olgular için acil servis dışında çözüm yolları araştırılmalıdır.

**Anahtar kelimeler:** acil servis, adli olgular, demografik analiz

# DEMOGRAPHIC EVALUATION OF FORENSIC INVESTIGATION IN EMERGENCY SERVICE

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## ABSTRACT

### Objective:

Forensic cases have an important place in emergency practice. The purpose of this study is to review the sociodemographic characteristics of forensic cases in an emergency service and to present solution suggestions.

### Methods:

Forensic cases of patients admitted to the emergency service in 2011 and recorded in the system were included in the study. Patient files were collected from computer-based patient recording systems.

### Results:

Of the 115.185 patients who were admitted to the emergency service

during the study, 2.094 (1.82%) were determined to be forensic cases. The male-to-female ratio of the cases was 2.0. Most of the forensic cases were admitted to the hospital in September (9.9%; p<0.05). The incidents that took place most frequently were assaults (874; 41.7%), traffic accidents (746; 35.6%), and poisoning (285; 13.7%). The departments requested for consultation most frequently were neurosurgery, orthopedics, and general surgery, while the highest number of hospitalizations were to the internal medicine department.

### Conclusion:

In the interest of physician safety, and to prevent patients from being mistreated, emphasis should be placed on forensic medicine training after graduation, and physicians should work in coordination with forensic specialists. Human

resources planning in emergency services should be conducted in accordance with the periods when forensic cases are seen most often. Taking the necessary precautions will ease patient flow and the functioning of the emergency service. Furthermore, solutions other than the emergency service should be sought for forensic cases that are not emergencies.

**Key words:** emergency service, forensic cases, demographic analysis

## INTRODUCTION

Every unnatural incident caused by external factors resulting in the deterioration of physical and/or mental health or death can be considered a forensic case (1). The task of making a diagnosis, providing treatment, and organizing a forensic report for these cases coming to emergency services is the responsibility of emergency service physicians (2). Because there are not enough forensic specialists within the process of the development of forensic science, the fact that police forces want forensic examinations to be performed at emergency services, even in non-emergency cases, increases the burden of responsibility of emergency service physicians even further (3). In addition, we are of the opinion that forensic science is not addressed enough in medicine education. Therefore, in order to prevent unfortunate outcomes such as misleading law enforcement or causing incorrect verdicts due to the misapplication of forensic practices, emergency service physicians should be trained in forensic science.

We found that recent studies in the literature were conducted in third-grade hospitals such as medicine faculty hospitals and general research and training hospitals. As such, we believe that data from second-grade hospitals, which perform 90% of all hospital services in the country annually, may be valuable. The purpose of this study is to contribute to the database by determining the sociodemographic characteristics, ra-

tes, and incident types of forensic cases in emergency service and to present the flaws and solution suggestions regarding the subject.

## METHODS

The records of forensic cases admitted to Isparta State Hospital Emergency Service between January and December 2011 were examined retrospectively. Ethics committee approval was obtained from Suleyman Demirel University Faculty of Medicine, Directorate of Clinical Research Ethics Committee, with the approval number of 3 and approval date of January 2, 2013. Our facility is a second-grade state hospital that serves all patients, including pediatric traumas. The patient's demographic data, day, month, and hour of admission, diagnoses, complaints, departments from which consultations were requested, services referred to, and intensive care hospitalization rates, as well as the data of patients who died at the emergency service were examined. International Classification of Diseases 10 codes were used in the diagnosis of illnesses and the six most frequent diagnosis groups were determined. Patients taken to the emergency service for non-work-related burns or electric shock or simply for drinking too much were not included in these groups; they were grouped as "others." Patient ages were grouped by decade, and to group times of admission, the day was divided into quarters.

The statistical analysis was performed using SPSS 15.0. Continuous data were expressed as mean  $\pm$  standard deviation and categorical variables were expressed as numbers and percentages. Independent group t-tests were used to compare independent variables and the chi-square test was used to examine intergroup consistency.

## RESULTS

Of the 115.185 patients admitted to the emergency service during the study, 2094 (1.82%) were found to be forensic cases. Of those patients, 1396 (66.7%) were male and 698 (33.3%) were female; their mean age was  $30.97 \pm 15.50$  years. No statistically significant difference was found between the men's average age ( $30.72 \pm 15.36$ ) and the women's average age ( $31.46 \pm 15.77$ ) ( $p > 0.05$ ). The largest age group was found to be 21–30 years, with 654 (31.2%) patients. The patient's age group distribution is summarized in table 1.

When the cases were reviewed by type of incident, the most frequent categories were found to be assault (846; 40.4%) and traffic accidents (708; 33.8%), followed by poisoning (285; 13.6%), falling from a height (82; 3.9%), sharp object injuries (56; 2.7%), and occupational accidents (14; 0.7%). One hundred and three (4.9%) patients were unclassified "other" forensic cases. With the exception of poisoning, most of the forensic patients were in the 21–30 age group. The age group with the

**Table 1:** The distribution of patients according to age groups

Age groups	Gender		Total n (%)
	Male n (%)	Female n (%)	
0-10	62 (3.0%)	31 (1.5%)	93 (4.5%)
11-20	313 (14.9%)	157 (7.5%)	470 (22.4%)
21-30	445 (21.2%)	209 (10.0%)	654 (31.2%)
31-40	263 (12.6%)	126 (6.0%)	389 (18.6%)
41-50	148 (7.1%)	78 (3.7%)	226 (10.8%)
51-60	87 (4.2%)	53 (2.5%)	140 (6.7%)
61-70	46 (2.2%)	28 (1.3%)	74 (3.5%)
71-80	24 (1.1%)	16 (0.8%)	40 (1.9%)
81-90	8 (0.4%)	-	8 (0.4%)
<b>Total</b>	<b>1396 (66.7%)</b>	<b>698 (33.3%)</b>	<b>2094 (100%)</b>

most poisoning cases was the 11–20 group. No statistically significant differences in gender were found among the incident types ( $p > 0.05$ ). Distribution by type of incident is summarized in Table 2.

When the cases were reviewed by distribution of months, it was found that the fewest patients (128; 6.1%) were admitted in February and the most were admitted in September (207; 9.9%) ( $p < 0.05$ ). When the cases were reviewed by distribution of days of the week, it was found that the highest number of patients were admitted on Sunday (346; 16.5%) and the fewest were admitted on Friday (273; 13%) ( $p > 0.05$ ). The time of day when the most cases were admitted was the third quarter (18:00–24:00 hours), with 738 (35.2%) cases ( $p < 0.05$ ). The busiest hours were found to be

18:00–20:00, with 262 (12.5%) cases. The time of day when the fewest patients were admitted was the first quarter (24:00–06:00 hours), with 293 (14%) patients. The least busy hours were found to be 06:00–08:00, with 52 (2.5%) patients ( $p < 0.05$ ).

It was found that 638 (30.5%) of the forensic cases required a total of 930 consultations from different departments. Neurosurgery was the department with the most consultations (189; 20.3%), followed by general surgery (142; 15.3%), internal medicine (128; 13.8%), and orthopedics (127; 13.7%) (Figure 1).

When the cases were reviewed by discharge from the emergency service, it was found that 1785 (85.2%) cases were discharged after the necessary procedure

was completed, 233 (11.1%) cases were hospitalized in the appropriate departments, 75 (3.6%) cases were referred to another center, and only one case died at the emergency service. When the cases were reviewed in terms of hospitalization in the different departments, it was found that the highest number of cases were hospitalized in internal medicine, with 64 (27.2%) cases, followed by anesthesia intensive care (38; 16.2%) and orthopedics (31; 13.2%). Distribution of hospitalized cases by department is summarized in Figure 2.

When the hospitalized cases were reviewed by type of incident, the most frequent reasons for hospitalization were poisoning (37.5%), occupational accidents (35.7%), and sharp object injury (28.6%); the least frequent reason for hospitalization was assault, with a hospitalization rate of 1.4%.

## DISCUSSION

Forensic cases and cases that have forensic characteristics have an important place among the cases admitted to hospital emergency services (4). In similar studies conducted in our country, the rate of forensic cases has been reported as 4.2%–5.3%, whereas this rate was found to be 1.8% in our study. However, the total number of patients admitted to these hospitals annually is lower than the number of patients admitted to our hospital (5,6). The reason for this difference is that ours is a second-grade equipped

**Table 2:** Forensic events distribution to age groups

Forensic incidents	0-10 n (%)	11-20 n (%)	21-30 n (%)	31-40 n (%)	41-50 n (%)	51-60 n (%)	61-70 n (%)	71-80 n (%)	81-90 n (%)	Total n (%)
Assaults	11 (1.3%)	166 (19.6%)	284 (33.6%)	183 (21.6%)	105 (12.4%)	60 (7.1%)	30 (3.5%)	7 (0.8%)	-	846 (100%)
Traffic accidents	58 (8.2%)	152 (21.5%)	193 (27.3%)	119 (16.8%)	66 (9.3%)	63 (8.9%)	31 (4.4%)	21 (3.0%)	5 (0.7%)	708 (100%)
Intoxications	-	100 (35.1%)	96 (33.7%)	46 (16.1%)	23 (8.1%)	7 (2.5%)	4 (1.4%)	7 (2.5%)	2 (0.7%)	285 (100%)
Fall from high	13 (15.9%)	15 (18.3%)	18 (22.0%)	11 (13.4%)	11 (13.4%)	5 (6.1%)	7 (8.5%)	2 (2.4%)	-	82 (100%)
Stab injuries	-	11 (19.6%)	25 (44.6%)	13 (23.2%)	4 (7.1%)	3 (5.4%)	-	-	-	56 (100%)
Occupational accidents	-	1 (7.1%)	8 (57.1%)	2 (14.3%)	2 (14.3%)	1 (7.1%)	-	-	-	14 (100%)
Others	11 (10.7%)	25 (24.3%)	30 (29.1%)	15 (14.6%)	15 (14.6%)	1 (1.0%)	2 (1.9%)	3 (2.9%)	1 (1.0%)	103 (100%)

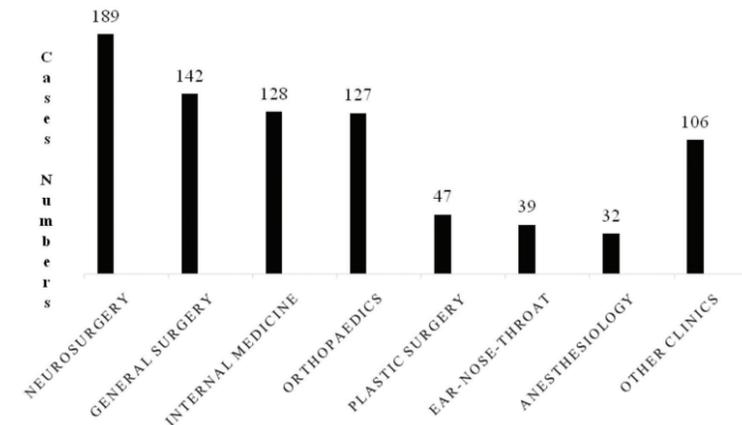
regional hospital and the facilities in the other studies are university hospitals.

The majority of the forensic cases admitted to hospitals are young males (6,7). Türkçüer et al. reported that the male-to-female ratio was approximately 2.18 and the average age was 30 years, while Bozkurt et al. reported that male-to-female ratio of approximately 1.94 and an average age of 24 years in their study (5). In line with the literature, the male-to-female ratio in our study was 2:1 and the average age was 31 years. The reason forensic cases include more males than females, and young people in general, can be explained by the fact that young males have a more active social life. We are of the opinion that the most important reason for the difference in aver-

ge ages among studies is caused by pediatric age groups. In addition to the graded hospital system in our country, the fact that pediatric trauma and internal emergencies are admitted to certain hospitals regardless of the forensic status of the patient and the fact that the same standards do not apply to all hospitals might be the biggest reasons for this situation.

While different studies have reported varying rates of types of forensic cases, traffic accidents rank at the top of the list in almost all of them (4-6). In the study by Sunay et al., the types of forensic cases encountered most frequently were traffic accidents (53.8%), poisoning (19.9%), and falling from a height (10.5%); in the study by Güven et al., the most frequent types were traf-

fic accidents (30.9%), assaults (26.4%), and sharp object injuries (18.0%) (6,8). Contrary to the literature, the types of forensic cases encountered most frequently in our study were assaults (40.4%), traffic accidents (33.8%), and poisoning (13.6%). These differences can be explained by the sociocultural structure of the region and by the closeness of the geographical location to roadways. However, the study by Sunay et al. was conducted in the same region as our study, and their rankings were different, with assault being the fourth most frequent type of forensic case. This difference might be associated with the structure of our hospital. Because it is located in the city center and it is a second-grade hospital, all forensic cases that involve the police are brought there, even in



**Figure 1:** Consultation clinics distribution

non-emergency situations, which we believe accounts for assault ranking as the most frequent type of forensic case in our study. Similarly, the rate of poisoning was found to be higher in our study when compared with other studies, which might be due to the fact that a great number of people in the region work in agriculture.

Studies have shown that forensic cases generally increase during the summer months (6,8-10). Our study results are in line with those of other studies, which have reported that the number of forensic cases reaches its peak in July, August, and September. The reasons for this finding might be the fact that people spend more time outside in these months, workload increases with the temperature, and there is more activity during holidays.

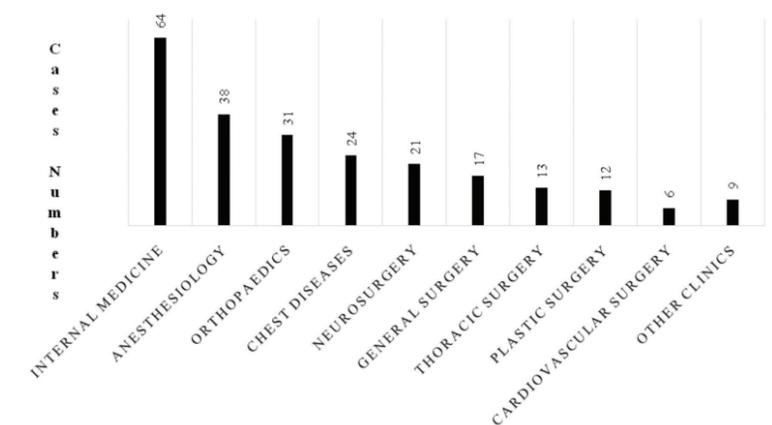
Different studies have reported varying results regarding the admission rate of forensic cases by day of the week (5,11,12). Türkçü-

er et al. stated that more patients were admitted on Mondays and Saturdays, while Arslanoğlu et al. found that more people were admitted on Fridays (5,12). In our study, Sunday was found to be the day when the most patients were admitted, while the fewest patients were admitted on Fridays; however, this difference was not found to be statistically significant. In addition, we found that there were more traffic acci-

dents on Saturdays and Sundays when the distribution of forensic cases was examined in terms of days. The socioeconomic diversity of the region and the presence of university and military institutions might also affect distribution by day of the week.

The admission rate of forensic cases by hour of the day also differs in terms of the structure of the hospital and the region (5,11,12). Türkçüer et al. found that the hours during which forensic case admission was the most frequent were 22:00-23:59, while Arslanoğlu et al. found that 08:00-15:59 were the hours during which forensic case admission was the most frequent (5,12). This difference might be due to the fact that the hospital in the Arslanoğlu et al. study was a military hospital. In our study, forensic case admission was the highest during the evening hours.

When the outcomes of forensic cases in emergencies were consi-



**Figure 2:** Distribution of hospitalized patients

dered, discharge from emergency service was the general outcome, and the rates differ among studies. In the study by Güven et al, approximately 30% of the forensic cases were discharged after the necessary intervention, while this rate was 58% in the Sunay et al. study (6,8). This rate was found to be high in our study; in fact, it was much higher than the rates reported in the literature (85%). The most important reason for this difference might be the fact that our hospital is a second-grade hospital, and assault/violence, alcoholometry, and custody cases are brought to us first.

Forensic cases who require hospitalization are frequently hospitalized in surgical units (6,8,13,14). In the study by Güven et al., 47% of the patients were hospitalized in surgical departments, including orthopedics and neurosurgery, while 53% of the patients in the study by Sunay et al. were hospitalized in those departments (6,8). In our study, although the most frequently requested consultations were with surgical departments, such as neurosurgery and general surgery, the patients were hospitalized most frequently in the internal medicine, anesthesia, and orthopedics departments. The reason for this finding is that although the number of patients with trauma is high in forensic cases, they can be discharged from the emergency service after diagnosis and treatment, while patients admitted for poisoning in particular have a longer follow up period and need to be treated in the hospital. If poisoning patients

do not require intensive care, they are treated in the internal medicine department, thus accounting for its top ranking in our study.

The age and gender characteristics of the forensic cases in our study similar those of other studies on this subject; however, the rates of forensic cases, reasons for coming to hospital, and the clinics where the patients were hospitalized differed. By considering the distribution of forensic cases in terms of seasons, days of the week, and hours of the day, it can be predicted that forensic cases will increase during holidays, on weekends, and in the evening hours; thus, necessary precautions should be taken.

In terms of physician safety, preventing patients from being mistreated, and reporting forensic cases more efficiently, physicians should have forensic science training after graduation and they should work in coordination with forensic specialists. In a study by Bozkurt et al., it was found that names and surnames were recorded in 99.1% of the reports, father's name was recorded in 64.1%, and date of birth or age was recorded in 66.2%. In addition, it was found that data regarding the date of the incident was missing in 37.1% of the cases, the hour of the incident was missing in 49.3%, the date of examination was missing in 30.1%, the hour of examination was missing in 37.9%, the date of the report was missing in 56%, and the hour of the report was missing in 78.4% (9).

Another important point brought out by our study is that there may be differences resulting from the graded structure of hospitals in our country. In particular, many studies in the literature are conducted in university hospitals; the quantity of data and statistics regarding this topic in second-grade hospitals is much lower. Although emergency medicine goes back only twenty years in our country, it has progressed quickly. This rapid progression is occurring once again with the increasing number of emergency specialists working in state hospitals. It is particularly important to take necessary precautions and to make necessary arrangements in the emergency services of state hospitals, which operate far from the discipline of a real emergency service. As such, we are of the opinion that forensic cases in which non-emergency cases are taken to the emergency room in connection with police activities, such as alcoholometry, signs of assault, and other examinations, place a great burden on the forensic workload, and that responsibility should be removed from emergency services.

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