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Demographic Evaluation of Forensic Cases Presented to the Emergency Medicine Clinic of a Tertiary Care Hospital

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ABSTRACT

Objective: This study aims to examine the demographic and epidemiological characteristics of forensic cases arriving at the emergency department of a tertiary-care hospital in Turkey. The objectives include profiling the demographics of the cases, documenting the types of injuries, understanding the circumstances surrounding these incidents, and identifying any potential seasonal or temporal trends.

Material and Methods: We conducted a retrospective cross-sectional study, utilizing data from 9,427 forensic cases that were presented to the emergency department from January 1 to December 31, 2008. Data were extracted from the hospital's electronic medical records after obtaining the necessary ethical approvals. The inclusion criteria encompassed all age groups for trauma-related cases, while medical forensic cases were limited to subjects aged 16 and above. Cases with incomplete data were excluded from the analysis. The cases were categorized into nine subgroups based on the type of incident, following the classification system of the International Classification of Diseases, 10th Revision (ICD-10).

Results: Forensic cases accounted for 3.107% of all emergency department admissions. The majority of these cases were males (68.83%), and they were primarily associated with trauma (86.80%). A significant gender disparity was observed in the types of cases, with males being more prevalent in traumatic cases, while females were more commonly seen in non-traumatic cases. Seasonal patterns revealed a higher incidence of forensic cases during the summer months. Interestingly, there was an uptick in female suicide attempts during the summer, whereas male suicide attempts saw an increase during the winter.

Conclusion: This study provides valuable insights into the demographic and seasonal distribution of forensic cases in emergency settings. The findings underscore the importance of implementing targeted preventive measures and specialized healthcare protocols, especially in light of the high occurrence of trauma-related cases and seasonal trends. Future research endeavors should delve deeper into understanding the sociocultural and behavioral factors that contribute to these observed patterns.

Keywords: Forensic cases, Emergency Department, Trauma, Non-Trauma, Seasonal Trends, Demographics, Gender Differences, Retrospective Study, Turkey

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INTRODUCTION

Globally, traumatic incidents, including but not limited to traffic accidents, interpersonal violence, self-harm, and occupational mishaps, pose a significant public health burden (1, 2). This phenomenon is not confined to particular geographical locations; indeed, it is a pressing issue in our nation as well. When individuals legally implicated these traumatic incidents through intentionality, negligence, or imprudence, they assume the designation of forensic cases (3, 4). These cases, frequently first encountered in Emergency Departments (EDs), demand urgent medical and legal attention.

Forensic cases encompass a myriad of medical exigencies, such as motor vehicle accidents, toxicological emergencies, violent physical assaults, injuries induced by sharp or blunt objects, gunshot injuries, and exposure to hazardous materials. Moreover, they can include other critical incidents such as unanticipated falls, thermal injuries, asphyxiation, unexplained or sudden deaths, and occupational and sexual assaults (5, 6). These medically and legally complex cases constitute significant presentations to emergency medical facilities (7).

Physicians in emergency departments face a unique set of challenges in forensic cases. Beyond the immediate clinical management, they bear the added responsibility of meticulously documenting traumatic lesions, injuries, and other pertinent clinical findings. This documentation serves as a clinical record and potentially a legal document, crucial for subsequent judicial processes (7,8).

Given the aforementioned complexities and the limited extant literature, particularly within the context of the Turkish healthcare system, there exists an imperative to investigate the demographic and epidemiological landscape of forensic cases. Thus, this study aims to provide an in-depth analysis of forensic cases presented to a tertiary-care Education and research hospital. Specifically, we seek to delineate the demographic profiles, types of injuries, circumstances of occurrence, and any potential seasonal or temporal trends. By doing so, we aim to contribute a robust data set to the existing healthcare records of our country.

MATERIAL and METHODs

Study Design

This study was designed as a descriptive, retrospective cross-sectional study. The research aimed to investigate forensic cases (FCs) that presented to the emergency department over a one-year period at a tertiary care hospital.

Data Collection

Data for this study were extracted from hospital forensic case records. The patient's data included emergency admissions from January 1 and December 31, 2008. The permissions for the local retrospective patients' data evaluations were obtained from the department chief and the hospital management. These cases were retrospectively reviewed to obtain information relevant to the study objectives. The FCs were further divided into nine subgroups to facilitate the analysis. In total, 9,432 forensic cases were presented to the emergency department during the study period.

Inclusion and Exclusion Criteria

In cases involving carbon monoxide exposure, poisoning, and suicide attempts, only subjects aged 16 and above were included. However, all age groups were considered for other types of FCs, such as traffic accidents, falls from height, and weapon-related injuries. Cases with insufficient data were excluded from the study.

Age Distribution

No age restriction was applied for accidents and traumatic injuries (traffic accidents, falls from heights, sharp and firearm injuries), and all age groups were included in the study. For other types of cases- the medical forensic cases- only subjects 16 years or older were considered.

Data Classification

Forensic cases were classified according to the International Classification of Diseases, 10th Revision (ICD-10), as the World Health Organization recommended. Diagnostic codes related to accidents were entered to identify the patients, after which their files were thoroughly examined.

Statistical Analysis

Data analysis was performed using SPSS version 20. Chi-square tests were used for hypothesis testing, and the significance of the difference between two percentages in independent groups was assessed using the independent samples t-test. A p-value of less than 0.05 was considered statistically significant.

RESULTs

Overall Demographics and Case Distribution

A comprehensive review of the 303,403 cases that were presented to the emergency department of Dışkapı Yıldırım Beyazıt Research and Training Hospital between January 1, 2008, and December 31, 2008, revealed that 3.107% (9,450 cases) were forensic cases (FCs). After eliminating 23 cases due to insufficient data, 9,427 cases were analyzed. Among these, 6,489 were males (68.83%), and 2,938 were females (31.17%).

Reason for Emergency Department Admissions

Of the forensic cases, 8,183 (86.80%) were related to trauma, whereas 1,244 (13.19%) were non-traumatic (Table 1). When broken down by gender, 74.51% of traumatic FCs were male (6,105 cases), and 25.48% were female (2,088 cases). For non-traumatic cases, 30.78% were male (304 cases), and 68.40% were female (851 cases). A significant gender difference was found in the trauma cases ($p<0.05$) (Table 2).

Seasonal and Monthly Distribution of The Forensic Cases

The summer months had the highest frequency of FC presentation, with 2,948 cases (31.27%). August had the highest number of presentations (1,027 cases, 10.9%). A statistically significant difference was noted between months and seasons in terms of patient visits ($p<0.05$) (Table 3). Secondary evaluations showed that gender-season interactions existed for specific cases: Notably, an increase in female suicide attempts was observed during the summer, and male suicide attempts increased during the winter ($p<0.01$).

A significant increase in female suicide attempts was observed during the summer months ($p<0.001$), whereas male suicide attempts significantly increased during winter ($p<0.001$).

Outcomes and the Distributions of the Forensic Cases

Of the observed forensic cases, 8,060 were discharged after the initial examination. Hospitalization was recommended for 1,367 patients (14.5%), of whom 889 (65.0%) were trauma cases and 478 (34.9%) were non-trauma cases. During the one-year study period, 49 forensic case deaths were reported, accounting for 0.52% of the total forensic cases. Of these, 11 were declared dead on arrival and received a hospital death certificate (one due to carbon monoxide intoxication, and the rest due to traffic accidents). Traffic accidents accounted for 71.16% (35 cases) of the deaths, with a mortality rate of 0.81% (Table 4).

Table 1: Classification and Distribution of Forensic Cases in the Emergency Department

Case Type	N	%
Traumatic Cases (Total)	8,183	86.80%
- Traffic Accidents	4,299	45.60%
- Physical Assault (Darp)	1,68	17.82%
- Workplace Accidents	1,012	10.73%
- Sharp/Pointed Object Injuries	491	5.21%
- Falls from Heights	434	4.60%
- Firearm Injuries	127	1.35%
Non-traumatic Cases (Total)	1,244	13.19%
- Suicide Attempts	1,078	11.44%
- CO Poisonings	92	0.98%
- Drug Intoxications	44	0.47%
- Others	30	0.32%
Total Cases	9,427	100.00%

Table 2: Distribution of Cases by Reason and Gender

	Total Cases (n)	Total Cases (%)	Male (n)	Male (%)	Female (n)	Female (%)
Traumatic	8,183	86.80%	6,105	74.51%	2,088	25.48%
Non-Traumatic	1,244	13.19%	304	30.78%	851	68.40%
Total	9,427	100.00%	6,409	67.97%	2,939	31.18%

Table 3: Monthly and Seasonal Distribution of the Cases

Metric	N	%	p
Total Forensic Cases	9,427	100%	
By Season			
Summer	**2,948**	**31.27%**	p < 0.032
Autumn	2,16	22.9%	
Winter	2,16	22.9%	
By Month			
January	827	8.70%	
February	829	8.68%	
March	514	5.45%	
April	819	8.68%	
May	819	8.68%	
June	564	5.55%	p < 0.041
July	719	7.68%	
August	**1,027**	**10.9%**	
September	869	9.18%	
October	819	8.68%	
November	827	8.70%	
December	829	8.68%	

Table 4. Overview of Outcomes of Forensic Cases

Metric	Total Numbers	Percentage (%)	
Total Forensic Cases Observed	9,427	100%	
Discharged After Initial Exam	8,06	85.5%	Of Total Forensic Cases
Recommended for Hospitalization	1,367	14.5%	Of Total Forensic Cases
- Of which are Trauma Cases	889	65.0%	Of Hospitalized Cases
- Of which are Non-Trauma Cases	478	34.9%	Of Hospitalized Cases
Forensic Case Deaths Reported	49	0.52%	Of Total Forensic Cases
- Declared Dead on Arrival	11	22.4%	Of Forensic Case Deaths
- Due to Carbon Monoxide Intoxication	1	9.1%	Of Dead-on Arrival
- Due to Traffic Accidents	10	90.9%	Of Dead-on Arrival
Deaths from Traffic Accidents	35	71.4%	Of Forensic Case Deaths
Mortality Rate from Traffic Accidents		0.81%	Of Traffic-related Forensic Cases

DISCUSSION

The study, conducted at a tertiary-care Research and Training Hospital over one year, presents a comprehensive assessment of forensic cases presented to the emergency department. In the subsequent sections, we elaborate on these findings in the context of the existing literature and suggest implications for clinical practice and future research.

With 9,427 forensic cases representing 3.107% of the 303,403 total emergency department cases, the data corroborate findings in the literature that suggest forensic cases are a significant but small subset of all emergency presentations (3, 6, 8). The male-to-female ratio was notably skewed, with 68.83% of the cases being male. This gender disparity is consistent with numerous studies highlighting the overrepresentation of males in trauma-related emergency admissions (5, 9).

A significant proportion of forensic cases (86.80%) were related to trauma, which aligns with findings from previous research that indicated trauma as a prevalent reason for forensic cases in emergency departments (3, 10). The gender difference in trauma cases is statistically significant ($p<0.05$), with a substantially higher proportion of males (74.51%) than females (25.48%), confirming the patterns noted in the literature (11).

For non-traumatic cases, females were predominant (68.40%), which raises questions about the potential gender-specific factors contributing to these types of cases, warranting further investigation.

Interestingly, a seasonal effect was observed, most significantly during the summer months, which accounted for 31.27% of the forensic cases. This seasonal trend has been identified in prior research, but often with different underlying factors such as increased outdoor activities or alcohol consumption (7, 12, 13). Gender-season interactions for specific cases also suggest a more complex relationship between these variables, potentially influenced by sociocultural factors.

Hospitalization and mortality rates are other areas of clinical significance. A relatively small proportion of patients were hospitalized (14.5%), which is consistent with the observation that many trauma cases may not require prolonged hospital stay (14, 15). The low mortality rate of 0.52% emphasizes the critical nature of forensic cases in emergency settings, with traffic accidents accounting for most of these mortalities (16, 17).

The data indicated an increase in female suicide attempts during summer and male suicide attempts during winter, contrary to some findings in the literature suggesting that suicide attempts do not have a seasonal pattern (17, 18). This observation calls for targeted preventive measures, based on seasonal and sex-specific trends.

CONCLUSION

This study sheds light on the crucial aspects of demographic, seasonal, and gender-related variations in forensic cases presented in emergency settings. While aligning with existing research, the study introduces novel insights, such as fluctuating patterns based on gender and season. These insights have immediate relevance for healthcare planning and delivery. Given the high incidence of trauma, especially among males, targeted prevention initiatives are urgently needed. An improved understanding of trauma epidemiology can further optimize these efforts. To improve patient outcomes and enhance the quality of healthcare services, we recommend the modernization of emergency facilities, the acquisition of updated medical equipment, and the establishment of specialized trauma teams. Future research should focus on identifying the cultural, behavioral, and social determinants behind the trends observed in forensic cases.

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