



# Evaluation of Forensic Medical Cases During COVID-19 Pandemic

Gulsah Cikrikci Isik<sup>ID</sup>, Resul Cinpolat<sup>ID</sup>, Ersin Kiris<sup>ID</sup>, Yunsur Cevik<sup>ID</sup>

Emergency Medicine, University of Health Sciences Keçioren Training and Research Hospital, Department of Emergency Medicine, Ankara, Türkiye.

**Correspondence Author:** Gulsah Cikrikci Isik

**E-mail:** gulsah8676@gmail.com

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## ABSTRACT

**Objective:** Investigating the effects of the coronavirus disease pandemic on forensic medical cases admitted to emergency department (ED).

**Methods:** This was a retrospective study conducted between March and August 2019 (prepandemic period), and March and August 2020 (pandemic period). All the patients admitted to the ED that required a forensic medical examination were investigated.

**Results:** A total of 4527 forensic cases were investigated (prepandemic period: 2937, pandemic period: 1590). There was a male predominance among the patients (prepandemic period: 62.1%, pandemic period: 67.7%). During both periods, the most common forensic complaints were the same, and assaults, motor vehicle accidents, and penetrating injuries were in the top three, respectively. During pandemic number of motor vehicle accidents decreased significantly ( $p < 0.001$ ); on the other hand number of suicide attempts did not change ( $p = 0.83$ ).

**Conclusion:** When compared to the prepandemic period, the number of forensic cases decreased by half during the pandemic period. Number of motor vehicle accidents significantly decreased during the pandemic, which might have been a consequence of the stay-at-home orders. There was no increase in the in the number of suicide attempts; however, the psychological effects of the pandemic can be long-lasting and might lead to increases in rate of suicide attempts in the long-run.

**Keywords:** Forensic, Pandemic, COVID-19, Motor vehicle collision, Suicide

## 1. INTRODUCTION

With the declaration of the coronavirus disease 2019 (COVID-19) outbreak as a pandemic by the World Health Organization (WHO) to prevent the rapid spread of the disease, officials advised people to stay at home and governments imposed a series of lockdowns, wherein social gatherings were limited, travel became difficult and non-essential businesses closed for several weeks (1). All of these life-style modifications have caused significant psychological and social effects on society.

Studies have indicated that the pandemic led to the exacerbation or development of psychiatric disorders and an increased rate of suicide attempts that thought to be the result of anxiety, uncertainty, social isolation, chronic stress, economic difficulties and fear of contagion (2). On the other hand, as a consequence of stay-at-home orders and social distancing, the overall trauma admissions, especially for motor vehicle collisions, have decreased significantly (3). Pandemic-related modifications in the social structure have also affected criminal activity (4). Miyar et al. demonstrated

a decrease in crimes related to violence, and assault and battery; however organized crimes remained steady (5).

This study aimed to investigate the effects of the pandemic on forensic medical events. The distribution of forensic patients admitted to the emergency department (ED) during the pandemic and pre-pandemic periods, and their differences were analyzed.

## 2. METHODS

The study was conducted with the approval of Keçiören Training and Research Hospital Clinical Studies Ethical Committee with file number 2012-KAEK-15/2214 at 12.01.2021 in a third degree hospital caring for pandemic patient. Files of the patients who had forensic medical examination records in the hospital data registration system between March and August 2020 (pandemic period), and March and August 2019 (pre-pandemic period) were

retrospectively investigated. All of the patients who required a forensic examination for any reason admitted to the adult ED were included in this study.

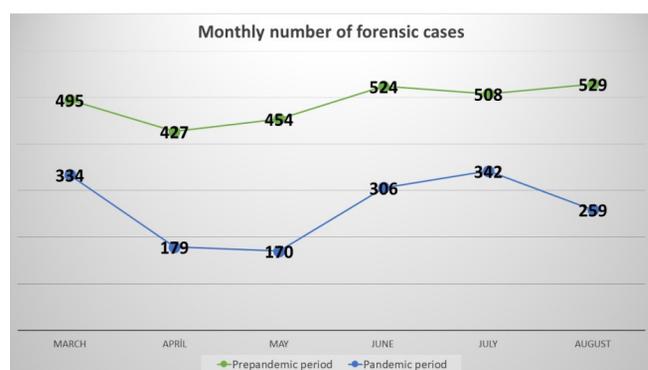
Files with forensic records in the hospital system could be accessed independently of the diagnosis. After the forensic files were determined, ICD codes were checked and there were records with different ICD codes for similar clinical conditions. In order to make the analysis of the data more accurate, the ICD codes describing similar clinical conditions were re-coded according to the forensic complaint. Files with missing data were excluded. Variables such as demographic findings, forensic complaints at admission and ED outcomes of the patients were examined.

### 2.1. Statistical Analyses

The statistical analysis was performed using IBM SPSS Statistics for Windows 22.0 (IBM Corp. Armonk, NY, USA). Continuous variables were described in terms of the median and interquartile range (IQR) (25%–75%) after assessing distribution of normality. The categorical variables were defined as numbers and frequencies. To determine the differences between the groups Mann-Whitney U test and chi square tests were used. The results were also represented in a graph. Statistically, p level less than 0.05 was considered as significant.

## 3. RESULTS

The number of patients with forensic complaints investigated was 4527. Applications made during the pre-pandemic period was nearly two times more than the applications at the pandemic period (n = 2937 and n = 1590, respectively). Total number of patients admitted to ED during pre-pandemic were 155381 and forensic cases were 1,89 percent of all; during pandemic number of total ED admissions were just 61054 but forensic cases were 2,6 percent of total (Table 1). During both periods, the number of forensic cases had the tendency to increase during summer. The number of cases were significantly decreased during the early pandemic period (Figure 1).



**Figure 1.** Monthly number of forensic cases at prepandemic period (2019) and pandemic period (2020)

The median age of the forensic patients admitted to the ED during the pre-pandemic period was 28 (IQR: 20–40) which was 30 during pandemic (IQR: 22–41,  $P < 0.001$ ). When gender distribution was investigated, it was shown that the number of female forensic patients decreased significantly during the pandemic period ( $P < 0.001$ ). The majority of the patients were Turkish citizens during all study periods ( $P = 0.09$ ; Table 1).

**Table 1.** Characteristics of forensic cases admitted to emergency department.

	Prepandemic period (n=2937)	Pandemic period (n=1590)	P value
<b>Total number of emergency department admission</b>	155381	61054	
<b>Percentage of forensic cases</b>	%1,89	%2,6	
<b>Age</b>	28 (IQR 20 – 40)	30 (IQR 22 – 41)	<b>&lt;0.001</b>
<b>Gender</b>			<b>&lt;0.001</b>
Female	1113 (37.9%)	513 (32.3%)	
Male	1824 (62.1%)	1077 (67.7%)	
<b>Nationalities</b>			0.09
Turkish Republic	2860 (97.4%)	1534 (96.5%)	
Others	77 (2.6%)	56 (3.5%)	

\*Variables were defined as median (inter quartile range 25-75) and number (percentages in column).

The complaints that requires forensic medical examination were suicide attempts, motor vehicle accidents, assaults, intoxications, penetrating injuries, gunshot wounds, falling from heights, drug abuse, burnings, animal bites, and electrical shocks. During both periods, the most common forensic complaints were the same. Assaults, motor vehicle accidents, and penetrating injuries were in the top three, respectively. When the subgroups were analyzed, it was shown that there was a significant decrease in the number of motor vehicle accidents during the pandemic period ( $P < 0.001$ ). While comparing the severity of the clinical situations of the forensic cases, it was shown that both the percentage of life threatening conditions and the percentage of patients who could not be treated with simple medical interventions were increased at the pandemic period ( $P = 0.003$  and  $P < 0.001$ , respectively). Correlated with this data, the number of patients who transferred to another center because of intensive care unit necessity increased during the pandemic period. However, in general, more than 90% of the patients were discharged from the ED during both periods. (Table 2).

When patients with suicide attempt were examined further, there was not a significant increase in the number of suicide attempts during pandemic period. Although there was a general male predominance among the forensic patients, the number of female patients who had attempted suicide was nearly two times higher. The majority of the suicide

attempts were drug-related and the most commonly used drugs for suicidal intervention were paracetamol, non-steroid antiinflammatory drugs, antibiotics, antipsychotics, and multi-drug combinations (Table 3).

**Table 2.** Distribution of forensic complaints upon admission, severity of the clinical situation and outcomes at emergency department.

	Prepandemic period (n=2937)	Pandemic period (n=1590)	P value
<b>Complaints</b>			<0.008
Assault	1135 (38.6%)	635 (39.9%)	0.39
Motor vehicle accident	834 (28.4%) 285 (9.7%)	380 (23.9%) 150 (9.4%)	<0.001 0.76
Penetrating injuries	228 (7.8%)	133 (8.4)	0.83
Suicide attempt	455 (15.5%)	292 (18.4%)	
Others			
<b>Life-threatening situation</b>			<b>=0.003</b>
Yes	84 (2.9%)	72 (4.5%)	
No	2853 (97.1%)	1518 (95.5%)	
<b>Be cured with simple medical intervention</b>			<b>&lt;0.001</b>
Yes	2577 (87.7%)	1297 (81.6%)	
No	360 (12.3%)	293 (18.4%)	
<b>Outcome at ED</b>			
Discharged at ED	2708 (92.2%)	1459 (91.8%)	
Hospital admission	72 (2.5%)	14 (0.9%)	
ICU admission	21 (0.7%)	7 (0.4)	
Transferred to other centers	42 (1.4%) 6 (0.2%)	85 (5.3%) 1 (0.1%)	
Death at ED	88 (3%)	24 (1.5%)	
Unauthorized leave			

\* Variables were defined as number (percentages in column). \*\* Abb: ED: emergency department, ICU: intensive care unit

**Table 3.** Characteristics of forensic cases admitted due to suicide attempt

	Prepandemic period (n=228)	Pandemic period (n=133)	P value
<b>Age</b>	29.50 (IQR 23 – 37)	27 (IQR 22 – 37)	0.44
<b>Gender</b>			0.92
Female	152 (66.7%)	93 (69.9%)	
Male	76 (33.3%)	40 (30.1%)	
<b>Drug related suicide attempt</b>	200 (87.7% of all)	99 (74.4% of all)	
<b>Commonly used drugs for suicidal interventions</b>			
Paracetamol	24 (12%)	5 (5.1%)	
NSAID	23 (11.5%)	16 (16.2%)	
Antibiotics	16 (8%)	7 (7.1%)	
Antipsychotics	54 (27%)	11 (11.1%)	
Multi-drug combinations	38 (19%)	26 (26.3%)	

\*Abb: NSAID: non-steroid anti-inflammatory drug

#### 4. DISCUSSION

This study demonstrated that comparing with the pre-pandemic period; during the pandemic total number of forensic cases decreased nearly to half; but on the other hand ratio of forensic cases to total ED admissions were increased. Although the top three forensic complaints, which comprised assaults, motor vehicle accidents, and penetrating injuries, were the same during both periods, there was a significant decrease in the number of motor vehicle accidents during the pandemic. On the other hand, there was no increase in the number of suicide attempts, which was contrary to expectations.

After the announcement of the pandemic the number of ED admissions showed a sharp decrease with the impact of many factors, such as curfews and the fear of viral contamination (6). Şan et al. demonstrated that comparing to the pre-pandemic period; additionally to other medical conditions, there has been a significant decrease also in forensic events, such as suicide attempts (25.7%) and traffic accidents (47.7%) during the pandemic (7). Similarly, in the current study, the number of forensic medical admissions during the pandemic were just nearly half that of the previous year. Although there seems to be a proportionally increase in forensic cases during pandemic, this might because of people had to apply to the ED in forensic medical events, on the other hand unnecessary green zone admissions, an important determinant of total ED admissions, had decreased significantly during pandemic (6). For this reason it should be more accurate to analyze the forensic case groups among themselves, rather than ratios.

Current studies have reported a male predominance in forensic medical patients (8, 9). In this study, it was observed that this difference in favor of men became more pronounced during the pandemic period. This might have been a consequence of the behavioral and social factors of the pandemic, which have different impacts between the genders.

When the impact of the pandemic on crime rates was investigated, it was observed that despite a marked decline in general, in the number of homicides remained unchanged and the incidence of domestic violence has increased (10). Assaults and penetrating injuries (stabbing) also constituted an important part of the forensic events in this study. One reason for the lower rate of females in the forensic medical cases might have been that the female victims of domestic violence may not have been able to seek medical help.

During the COVID-19 pandemic, overall trauma admissions, especially motor vehicle collisions were significantly decreased (11). When the subgroups were analyzed, our results also showed a significant decrease in only the number of motor vehicle accidents. Stay-at-home orders and so fewer drivers on the road might be the most important factors contributing this decrease (12). Another important factor might have been the reduction in alcohol-impaired driving. Closure of bars and nightclubs aimed to maintain social distancing, prompted people to consume alcohol at home

instead, and thus reduced the incidence of alcohol-related vehicle collisions (12).

In addition to its effects on physical health, the pandemic has resulted in many psychological disorders. Pandemic caused an increase at the prevalence of anxiety, stress and depression in society (13). At a study from Turkey, authors demonstrated that being female was a risk factor for pandemic-associated psychological disorders (14). Stress-related psychiatric conditions are associated with suicidal behaviors (2). Although suicide attempts were higher among the women in this study, there was no significant increase in the number of suicide attempts when compared to the pre-pandemic period. However, the mental health consequences of the pandemic are likely to present for a long time and a peak in suicide attempts might be seen later than during the actual pandemic (2, 15).

### Limitations

First limitation of this study was, as a consequence of its retrospective design, it could not be possible to obtain the details of the examination findings and so understanding the severity of the patients and the types of injuries clearly. Second, external validity could not be determined because this was a single-centered study.

### 5. CONCLUSION

In conclusion, when compared to the pre-pandemic period, the number of forensic cases decreased by half during the pandemic period. The most common forensic complaints were assaults, motor vehicle collisions, and penetrating injuries, respectively. There was a significant decrease in the number of motor vehicle accidents during the pandemic period, which might have been a consequence of the stay-at-home orders. Contrary to expectations, there was no increase in the in the number of suicide attempts. However, the psychological effects of the pandemic can be long-lasting and might lead to increases in the rate of suicide attempts in the long-run.

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### Conflict of interest

The Authors declare that there is no conflict of interest

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