Anatolian Journal of Emergency Medicine 2024;7(4):141-147

ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Distribution of Forensic Cases in Admitted to the Emergency Department of a University Hospital in the Year of the Pandemic Onset and One Year Before

Tekirdağ Namık Kemal Üniversitesi Acil Servisine COVID-19 Pandemisi Öncesi ve Pandemi Dönemi Başvuran Hastalarda Adli Vaka Dağılımı

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ABSTRACT

Aim: In light of the societal shifts brought about by the pandemic, alterations were noted in both the distribution and characteristics of forensic cases presenting at the emergency department. This study aimed to assess the changes in the features of forensic cases admitted to the emergency department before and during the COVID-19 pandemic.

Material and Methods: An observational cross-sectional study was conducted at the Department of Emergency Medicine, Tekirdag Namik Kemal University, spanning from April 1, 2019, to March 31, 2021. The timeframe from April 1, 2019, to March 31, 2020, was designated as the "COVID-19 pre-pandemic period" (n = 1101), while the period from April 1, 2020, to March 31, 2021, was termed the "COVID-19 pandemic period" (n = 685). Patient records from the emergency department were retrospectively examined.

Results: Among the 1786 forensic cases analyzed, 71.6% were male, with a mean age of 32.68 ± 15.67 years. Predominant case types included assault/battery (28.7%), road traffic accidents (25.1%), and occupational accidents (20.9%). While 61.6% of cases occurred during the pre-pandemic period, 38.4% were recorded during the pandemic. A significant increase was observed in the frequency of forensic cases among emergency department admissions during the pandemic compared to the pre-pandemic period (1.5% vs. 1.7%, p = 0.001). Moreover, during the pandemic period, there was a notable rise in the age of forensic cases, frequency of hospitalized cases, duration of hospitalization, and occurrences of occupational and motorcycle accidents, whereas incidents of assault/battery and traffic accidents decreased significantly (p < 0.05). Additionally, there was a statistically significant difference in the distribution of cases across different months during the pandemic compared to the pre-pandemic period (p < 0.001).

Conclusion: Despite an overall decrease in the number of forensic cases during the pandemic, a heightened intensity of such cases was observed among hospital admissions. Notably, individuals admitted during the pandemic were older, experienced more frequent and prolonged hospitalizations, and were involved in fewer assault/battery and traffic accident cases but more occupational and motorcycle accidents.

Keywords: COVID-19, emergency department, forensic case, pandemic.

ÖZ

Amaç: Pandeminin getirdiği toplumsal değişimler ışığında, acil servise başvuran adli vakaların dağılımında ve özelliklerinde değişiklikler gözlemlenmiştir. Bu çalışma, COVID-19 pandemisi öncesi ve sırasında acil servise kabul edilen adli vakaların özelliklerindeki değişiklikleri değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntemler: Tekirdağ Namık Kemal Üniversitesi Acil Tıp Anabilim Dalı'nda 1 Nisan 2019 - 31 Mart 2021 tarihleri arasında yürütülen gözlemsel kesitsel bir çalışma yapılmıştır. 1 Nisan 2019 - 31 Mart 2020 dönemi "COVID-19 pandemi öncesi dönem" (n = 1101), 1 Nisan 2020 - 31 Mart 2021 dönemi ise "COVID-19 pandemi dönemi" (n = 685) olarak tanımlanmıştır. Acil servisteki hasta kayıtları retrospektif olarak incelenmiştir.

Bulgular: Analiz edilen 1786 adli vakanın %71,6'sı erkek olup, yaş ortalaması 32,68 ± 15,67 yıl olarak bulunmuştur. En sık karşılaşılan vaka türleri arasında darp/şiddet (%28,7), trafik kazaları (%25,1) ve iş kazaları (%20,9) yer almıştır. Vakaların %61,6'sı pandemi öncesi dönemde, %38,4'ü ise pandemi döneminde kaydedilmiştir. Pandemi döneminde acil servis başvuruları arasında adli vaka oranında pandemi öncesine göre anlamlı bir artış görülmüştür (%1,5'e karşı %1,7, p = 0,001). Ayrıca pandemi döneminde adli vakaların yaş ortalaması, hastaneye yatış sıklığı, yatış süresi ve iş kazaları ile motosiklet kazalarının sıklığında anlamlı bir artış görülürken, darp/şiddet ve trafik kazası oranlarında belirgin bir azalma tespit edilmiştir (p < 0,05). Pandemi döneminde vaka dağılımının aylara göre farklılık göstermesi de istatistiksel olarak anlamlı bulunmuştur (p < 0,001).

Sonuç: Pandemi süresince toplam adli vaka sayısında azalma görülmesine rağmen, bu vakaların hastane başvuruları içerisindeki yoğunluğunda artış gözlemlenmiştir. Özellikle, pandemi döneminde başvuran bireylerin daha ileri yaşta olduğu, daha sık ve uzun süreli hastaneye yatış gerektirdiği, daha az darp/şiddet ve trafik kazası, ancak daha fazla iş ve motosiklet kazası geçirdiği belirlenmiştir.

Anahtar Kelimeler: COVID-19, acil servis, adli vaka, pandemi

Received: 12 June 2024 Accepted: 24 August 2024

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Atıf için/Cited as: Peköz MB, Usluer HO, Şahin H, Yeşidaş C. Distribution of Forensic Cases in Admitted to the Emergency Department of a University Hospital in the Year of the Pandemic Onset and One Year Before. Anatolian J Emerg Med 2024;7(4):141-147. https://doi.org/10.54996/anatolianjem.1496058.

Introduction

Emergency departments play an important role in diagnosis and treatment, as they are the first place of evaluation for forensic cases (1). Recognition of forensic cases and preparation of complete forensic reports are among the responsibilities of emergency physicians. For this reason, the epidemiology and periodical changes of forensic cases should be well known and managed by emergency physicians (2).

Forensic cases evaluated in emergency departments include a wide range of cases, including traffic accidents, suicide attempts, poisonings (substance abuse, alcohol or narcotics, carbon monoxide, snake bites, and scorpion bites), electric shocks, severe burns, and occupational accidents. The social, economic, psychological, physical, and mental conditions of individuals can influence the circumstances of forensic cases. In addition, the frequency, duration of presentation, and epidemiological distribution of forensic cases may differ in events involving a large part of society, such as disasters, pandemics, and crises (3).

It has been reported that the number of traumas and injuries decreased during the pandemic period due to reasons such as the self-isolation of patients at home, the closure of some workplaces and schools, and transport restrictions (4,5).

It is thought that the negative effects of the pandemic period have changed the type and distribution of forensic cases admitted to the emergency department. In this study, we aimed to determine the changes in the characteristics of forensic cases admitted to the emergency department before and during the COVID-19 pandemic.

Material and Methods

Type, place, and time of the research

This single-center, retrospective, observational, cross-sectional study was conducted on all forensic cases admitted to the Tekirdag Namık Kemal University Department of Emergency Medicine between April 1, 2019 and March 31, 2021. The 1786 forensic cases included in the study consisted of patients aged 18 years and over admitted to the triage, yellow-red-green area, observation service of the emergency department, and patients of all age groups admitted to the trauma area (including trauma patients under 18 years of age). All forensic cases between the relevant dates were included in the study, and no exclusion criteria were applied.

The data for the study were collected retrospectively through the hospital registration system.

The first COVID-19 case in Türkiye was detected in March 2020. Therefore, the period between April 1, 2019 and March 31, 2020 was defined as the COVID-19 pre-pandemic period in our study. The period between April 1, 2020, and March 31, 2021, was defined as the COVID-19 pandemic period. Between these two periods, age, gender, month of presentation, type of presentation (motor vehicle accidents, firearm injuries, penetrating and cutting injuries, work accidents, suicide attempts, falls, and other injuries), type of outcome (discharge, hospitalization, death, refusal of treatment), and other recorded characteristics of the cases were compared. Ethical approval was obtained from the Tekirdag Namık Kemal University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee before the study (Decision No. 2023.14.01.14).

Statistical Analysis

The data were analyzed using IBM SPSS 25.0 software. The suitability of continuous variables for normal distribution was evaluated by the Kolmogorov-Smirnov test, and it was found that the data were not normally distributed, so non-parametric tests were used. The categorical variables in the study were summarized as number (n) and percentage (%) values, and continuous variables were summarized as mean ± standard deviation (SD) and median values. The Pearson chi-square test was used for comparisons between categorical variables. The Mann-Whitney U test was used for numerical comparisons between two independent groups. The statistical significance level was accepted as 0.05 in the study.

Results

Of the 1786 forensic cases included in the study, 71.6% were male, and the mean age was 32.68 ± 15.67 years. Compared to the pre-pandemic period, the age of forensic cases admitted during the pandemic period was statistically significantly higher (31.81 vs. 34.07) ($p<0.001$).

While 61.6% of the cases were admitted in the pre-pandemic period, 38.4% were admitted during the pandemic period. In the pre-pandemic period, 1.5% of the total 74,433 emergency department admissions were forensic cases, while 1.7% of the 39,299 emergency department admissions during the pandemic period were forensic cases. Compared to the pre-pandemic period, the frequency of forensic cases among emergency department visits increased statistically significantly during the pandemic period ($p=0.001$).

The most common types of forensic cases in our study were 28.7% assault and battery, 25.1% vehicular traffic accident (VTA), 20.9% workplace accident, 6.9% motorbike accident, 5.5% suspicious fall, and 4.6% suicide attempt. Before the pandemic period, 30.5% of forensic cases were of the type of battery or assault, while this frequency was 25.7% during the pandemic period. Compared to the pre-pandemic period, it was observed that the frequency of forensic cases arising from assault, battery, and vehicle accidents decreased statistically significantly during the pandemic period, while the frequency of workplace accidents and motorcycle accidents increased ($p=0.001$) (Figure 1).

When the cases included in our study were evaluated, the most frequently admitted months were June (13.3%), July (12.6%), and August (13.0%). Compared to the pre-pandemic period, there was a statistically significant difference in the months in which cases were admitted to the hospital during the pandemic period ($p<0.001$) (Figure 2).

18.7% of the patients were hospitalized in any department of the hospital. The most common departments were orthopaedics and traumatology, with a rate of 26.6%, and neurosurgery, with a rate of 20.7%. 12.6% of the cases were hospitalized in the intensive care unit, and 0.3% died. Compared to the pre-pandemic period, the frequency of hospitalization was statistically significantly higher during the pandemic period (11.2% vs. 30.8%) ($p<0.001$). In both periods, orthopedics and traumatology were the departments with the highest number of hospitalizations.

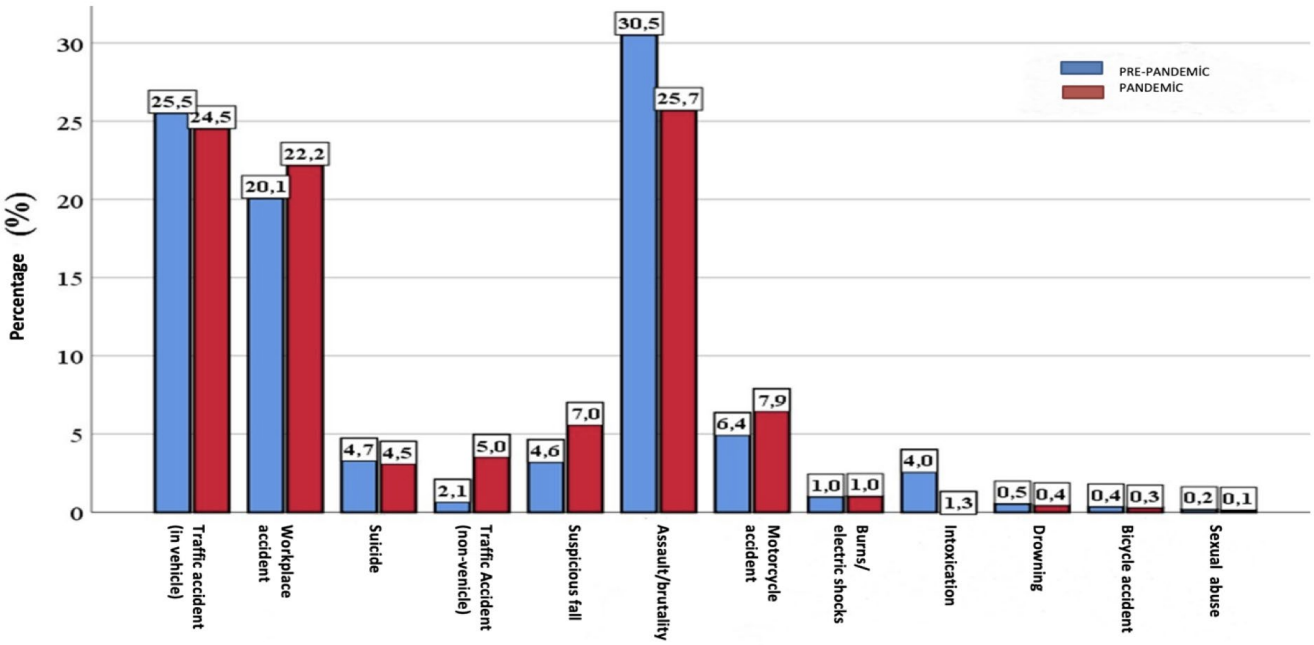

Figure 1. Graphical representation of forensic case type distribution according to the pandemic period.

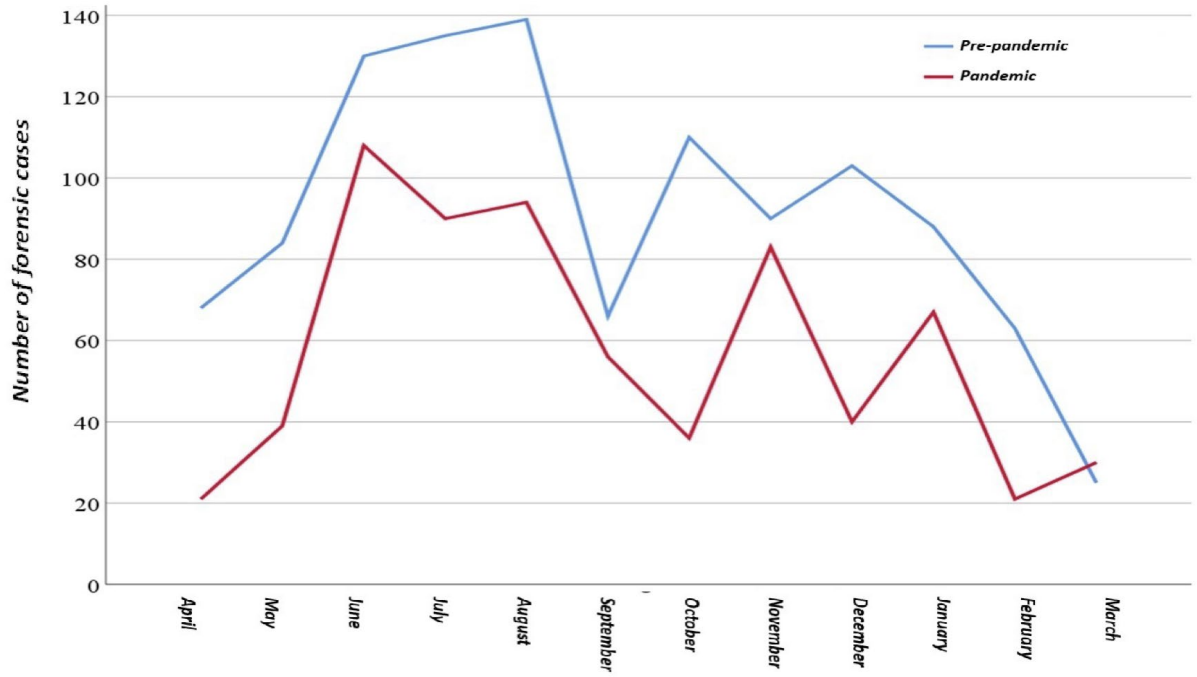

Figure 2. Graphical representation of the distribution of the month of presentation of the cases according to the pandemic period

Compared to the pre-pandemic period, the duration of hospitalization of the patients hospitalized during the pandemic period was statistically significantly increased (7.99 vs. 10.82). (p=0.012) The mean duration of hospitalization was 9.81 ± 17.56 days.

Discussion

Lifestyle changes during the pandemic period have caused significant psychological and social impacts on the community. Studies have shown that the pandemic has led to increased suicide attempts and the exacerbation of psychiatric disorders as a result of anxiety, uncertainty, social isolation, chronic stress, economic difficulties, and

fear of contagion (6). On the other hand, as a result of obligations to stay at home and social distancing, general trauma applications, especially motor vehicle accidents, decreased significantly (7). Pandemic-related changes in social structure also affected criminal activities (8). It was reported that there was a decrease in crimes related to violence, assault, and battery, but there was no change in other types of crimes (9). According to the findings of our study, which analyzed the alterations in forensic cases presented at our emergency department before and during the pandemic, it was noted that there was a surge in forensic cases during the pandemic compared to the period preceding it. Notably, there was an increase in the age of the cases, along with higher frequencies and durations of hospital stays. Moreover, significant changes were observed in the types of cases and the months during which forensic cases were admitted. Specifically, our research revealed a marked rise in the proportion of forensic cases among emergency department admissions during the pandemic period compared to the pre-pandemic era (1.5% vs. 1.7%). After the announcement of the pandemic, emergency department admissions also showed a sharp decrease with the effect of many factors, such as curfews and fear of viral transmission (10). Şan et al. also showed a significant decrease in the number of forensic events such as suicide attempts and traffic accidents during the pandemic compared to the pre-pandemic period (3). Similarly, in this study, the number of forensic medical applications during the pandemic was almost half that of the previous period. Although there seems to be a proportional increase in forensic cases during the pandemic, this may be due to the fact that while admissions due to other medical events decreased, in forensic medical events, the cases had to first apply to the emergency department. When the effect of the pandemic on forensic cases was investigated, it was shown that although a numerical decrease was observed in general, there was no change in the number of homicides, and the incidence of domestic violence increased (8).

Many studies conducted in our country have reported the mean age of forensic cases between 27 and 33 years (11, 12). In our study, the mean age was 32.68 ± 15.67 years, which is compatible with the literature. However, in our study, while the mean age of the cases admitted before the pandemic was 31.81 ± 16.13, the mean age was 34.07 ± 14.82 during the pandemic period and was found to be significantly higher. There were similar results in previous studies. In a similar study in which Cikrikci Isik et al. evaluated the effect of the pandemic on the general characteristics of forensic cases, it was shown that the median age of the cases was 28 before the pandemic and 30 during the pandemic period and increased significantly (13). Some explanations have been offered for the older age of the cases admitted during the pandemic period. During the pandemic period, people were generally encouraged not to go out, and collective organizations were restricted. This situation led to a decrease in the tendency towards risky behaviors and the limitation of environments where young people are mostly involved, such as sports competitions and entertainment venues. It is known that street fights, traffic accidents, or similar incidents are generally more common among young people. The decrease in social interaction due to the pandemic may have led to a decrease in young cases and, thus, an increase in the average age of forensic cases admitted to the emergency department. In addition, elderly people are admitted to hospitals as a result of the worsening of their illnesses, despite restrictions due to underlying health problems. For these reasons, there may have been an increase in the average age of forensic cases admitted to the emergency department during the pandemic period.

In our study, it was observed that the incidents of assault and battery decreased significantly from 30.5% to 25.7% during the pandemic period. In many previous studies, it has been shown that assault and battery incidents decreased with the pandemic period (14, 15). There was also a significant decrease in crimes related to violence, assault, and battery during the pandemic (9). The decrease in social interaction during the pandemic period may have contributed to the decrease in assault and battery incidents. In addition, the intensification of police and security measures may have led to a decrease in incidents of assault and battery.

During the COVID-19 pandemic, overall trauma admissions, especially motor vehicle accidents, decreased significantly (7). The closure of nightclubs to maintain social distancing encouraged people to consume alcohol at home, and thus the incidence of alcohol-related vehicle accidents decreased (16). Consistent with the literature, in our study, it was found that the frequency of in-vehicle traffic accidents decreased during the pandemic period, whereas motorcycle accidents increased. The number of pedestrians and vehicles on the road decreased with the effect of the restrictions imposed during the pandemic period. Due to the decrease in traffic, there was a decrease in traffic and vehicle-related accidents during the pandemic period. In some countries, such as the USA, Australia, England, Spain, and Denmark, it was observed that traffic accidents decreased in accordance with this expectation (17). On the other hand, Hakkenbrak et al. reported that traffic-related accidents increased in the Netherlands; this may be because quarantine measures such as the obligation to stay at home or curfew were not implemented in the Netherlands (18). Similar to our study, Yasin et al. reported that the number of pedestrian and motor vehicle accidents decreased and the number of motorcycle accidents increased in the United Arab Emirates (19). These results are compatible with our study and support the expectation that vehicle accidents will decrease with the decrease in traffic. Quarantine, transition to distance education, working from home in the public and private sectors, and the restriction of people's social lives due to the fear of COVID-19 disease may also have been effective in reducing the number of traffic accidents. In addition, curfew and working from home during the pandemic period in our country increased online shopping. Therefore, the expansion of the motorbike courier sector may have led to an increase in the percentage of motorbike accidents among forensic cases. Two studies conducted in Türkiye on this subject also support our study. In the study by Sarı Doğan et al. it was observed that motorcycle accidents increased during the pandemic period, while in the study by Demir et al. a general analysis of motorcycle accidents during the pandemic period was made and it was observed that motorcycle courier accidents increased significantly (20,21).

In our study, occupational accidents increased from 20.1% to 22.2% during the pandemic period. Studies on the effect of the pandemic on occupational health are limited. While a study conducted in Austria revealed a decrease in occupational accidents during the pandemic (22), another study conducted in Korea showed that accidents decreased in some occupational sectors during 2020 (partly due to working from home), while accidents increased in other sectors where the workplace remained active and/or working from home was not possible (for example, occupational accidents increased in workers in the transport sector) (23). Other studies have shown that the COVID-19 pandemic has caused psychological distress, insomnia, alcohol and substance abuse, and suicidal thoughts in healthcare workers. However, in most cases, these effects were not considered work-related illnesses (24). Finally, some authors have shown that the psychological effects of the pandemic increase the risk of occupational accidents (25). Changing working conditions during the pandemic period may have increased the incidence of occupational accidents. While employees in some sectors switched to remote working, changes were made in working processes and work arrangements in other sectors. These changes may have led to an increase in occupational accidents due to factors such as ignoring or inadequately implementing safety measures in the workplace. For example, there has been an increase in intensity in the health sector or an increase in demand for delivery services in the retail sector. Under these new conditions, employees may be assigned to different or more risky or intensive tasks than they normally do. At the same time, there may have been a shortage of staff at workplaces due to the pandemic, which may have caused existing employees to work harder and increased occupational accidents due to fatigue. Especially in busy working environments such as the health sector or emergency services, lack of attention due to fatigue and stress may contribute to an increase in occupational accidents. In addition, the use of masks and other protective equipment by employees during the pandemic period may have increased the risk of accidents by making it difficult for them to focus on their work. During the pandemic, some workplaces may have suspended training programs or occupational health and safety inspections. In addition, resource constraints experienced by businesses due to the pandemic may have led to insufficient occupational health and safety measures. The cumulative effect of these situations may have contributed to the increase in occupational accidents.

Another important situation evaluated within the scope of forensic cases is suicide. In our study, it was observed that the frequency of suicide attempts did not change during the pandemic period. Studies on this subject have suggested that suicide attempts may increase by emphasizing the psychological burden of the pandemic. In another study conducted in Türkiye, it was found that suicide cases increased significantly during the pandemic period (9.2%) compared to the pre-pandemic period (7.8%) (26). In a study evaluating suicides during the pandemic period in Japan, it was found that the number of suicides increased significantly in 2020 (27). Buschmann and Tsokos evaluated the suicide cases that developed following the restrictions due to the COVID-19 pandemic, stated that the COVID-19 tests of the included cases were negative and that they had high anxiety levels according to the anamnesis taken from the relatives of the patients, and ultimately suggested that pandemic conditions may increase suicidal tendency (28). Existing psychiatric disorders may worsen with social isolation, and depression and suicidal tendencies may increase when social support disappears (6, 28).

In our study, while 11.2% of forensic cases were hospitalized in the period before the pandemic, this frequency increased significantly during the pandemic period and reached 30.8%. Similarly, in their study evaluating the effect of the pandemic on forensic cases, Kılıç and Özdemir reported that the cases admitted during the pandemic period were hospitalized statistically significantly more (29). Factors such as the capacity of the emergency department, infection control measures, and occupancy rates of the wards and intensive care units may have affected the treatment and hospitalization times for forensic cases. Since more observation may be required in patients hospitalized during the pandemic period and more isolation may be required in cases of PCR positivity, the hospitalization period of hospitalized cases may have been prolonged. In addition, it was thought that the increased hospitalization time may be related to waiting for the PCR test to become negative. Another reason may be that some hospitals were completely transformed into COVID-19 pandemic hospitals, which may have changed the severity and distribution of cases admitted to our hospital. Finally, the quarantine practices introduced may have led to a difference in the severity of forensic cases and, therefore, to more and longer hospitalization.

In our study, when compared with the pre-pandemic period, a statistically significant difference was found in the months when the cases were admitted to the hospital during the pandemic period. It was thought that pandemic-induced isolation measures were the basis of this situation. Since these measures implemented during the pandemic period restricted the mobility and social interactions of people in certain periods, they may have led to changes in the months of admission of forensic cases, especially during the quarantine period. For example, it can be said that forensic cases may decrease due to curfews or intercity transport bans. It is known that some forensic cases may vary depending on seasonal factors. The fact that the normally expected seasonal increase in forensic cases did not occur due to the pandemic may have caused a difference in periodic applications. In addition, the quarantine period caused changes in people's daily routines. For example, spending more time at home during the months when the pandemic was felt intensely may have led to a decrease in theft cases or an increase in crime types such as domestic violence. Finally, during the pandemic period, there may have been problems in reaching and reporting cases to the emergency department. The burden of the pandemic on the health system may have affected the capacity of emergency services and forensic units. This may be the reason for changes in the months of application for forensic cases.

Limitations

This study has some limitations. Since our study had a retrospective design, some variables that may affect the

results could not be retrospectively re-examined. The generalisability of this study conducted in a single center to other forensic cases should be interpreted by considering this situation. Forensic cases may be affected by geographical and cultural factors. Our hospital is located in a large metropolis, and a wide variety of people in terms of culture and belief may be admitted. This study was conducted after the first COVID-19 case was announced in our country. Due to fluctuations in people's moods, the distribution of cases may have changed during the pandemic period. Differences may occur in the results of studies covering different periods. There are studies showing that domestic violence and violence against women increased during the pandemic period due to stress factors, decreased job opportunities and income, decreased social support, alcohol and substance use (12,30,31). However, this issue could not be examined in our study because the number of patients was not sufficient.

Conclusion

In our study, although the number of forensic cases decreased during the pandemic period in accordance with the literature, it was observed that the density of forensic cases increased among the cases admitted to the hospital. The cases admitted during the pandemic period were older, hospitalized more frequently, and for longer periods. In addition, there were fewer cases of assault and battery, traffic accidents, and more cases of work and motorbike accidents. Although there may be differences in the results of studies covering different periods, our study will help to better evaluate the social effects of the pandemic period by examining the changes and causes of forensic cases during the pandemic period.

Conflict of Interest: The authors declare that there is no conflict of interest.

Financial Support: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' Contribution: BP: Conception and design of the work, supervision, data collection, literature review, **HŞ:** Conception and design of the work, supervision providing resources, analysis and interpretation of data, **HOU:** Literature review, analysis and interpretation of the data, drafting the work, critical review of the work **CY:** Literature review, analysis and interpretation of the data, critical review of the work.

Ethical Approval: Ethical approval was obtained from the Tekirdag Namık Kemal University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee before the study (Decision No. 2023.14.01.14).

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