

RESEARCH ARTICLE

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Change in Forensic Cases Admitted to Emergency Department during COVID-19 Pandemic

ABSTRACT

Objective: This study aimed to determine the change in forensic cases admitted to an emergency department after the COVID-19 pandemic, due to its adverse effect on all people around the world in various ways.

Methods: This study was conducted retrospectively in a single center. The sample size included 1645 forensic cases over the age of 18 years admitted to an emergency department between 1 January 2019 and 31 December 2020. Ethical approval before the study was obtained from a Local Clinical Research Ethics Committee. The period between 11 March 2020 and 31 December 2020 was considered the COVID-19 pandemic (DP), while the pre-DP period was named as BP. The distribution rates of forensic cases in BP versus DP were compared.

Results: Both traffic and work accidents were higher in males than females, whereas suicide attempts were higher in females than males ($p<0.001$). Suicide attempts by both women (BP: 14.9%, DP: 17.4%) and men (BP: 3.7%, DP: 4.9%) showed an increase for DP ($p<0.01$). Work accidents were lower in women (BP: 22.3%, DP: 13.4%) and men (BP: 22.5%, DP: 21.1%) in DP than BP ($p<0.01$).

Conclusions: The COVID-19 pandemic has increased suicide rates in both women and men but reduced work accident rates. Suicide rates were higher in women than men. The COVID-19 pandemic has negatively affected people in many ways, including forensic, employment, economic, and psychological aspects.

Keywords: COVID-19, Forensic Case, Suicide Rates, Work Accident, Traffic Accident

Acil Servise Başvuran Adli Vakaların COVID-19 Pandemisindeki Değişimi

ÖZET

Amaç: Bu çalışmada, tüm dünyada insanların tamamını birçok yönden olumsuz etkileyen COVID-19 pandemisinin acil servise başvuran adli vakaların pandemi öncesine göre gösterdiği değişimi saptamak amaçlanmıştır.

Gereç ve Yöntem: Bu çalışma tek merkezli retrospektif olarak yapıldı. Çalışmaya 01 Ocak 2019- 31 Aralık 2020 acil servise başvuran 18 yaş üzerindeki 1645 adli vaka dâhil edildi. Çalışma için öncesinde Lokal Klinik Araştırmalar Etik Kurulu'ndan etik onay alındı. 11 Mart 2020- 31 Aralık 2020 tarihleri arası COVID-19 pandemisi (DP), önceki tarihler ise pandemi öncesi (BP) olarak kabul edildi. BP ve DP dönemlerinde adli vakaların dağılım oranları karşılaştırılmıştır.

Bulgular: Trafik kazaları ve iş kazaları erkek cinsiyette kadınlara göre yüksek saptandı, buna karşılık kadınlarda intihar girişimleri erkeklerden yüksek saptandı ($p<0,001$). Hem kadınlarda (BP: %14,9, DP: %17,4) hem de erkeklerde (BP: %3,7, DP: %4,9) intihar girişimlerinin artış gösterdiği saptandı ($p<0,01$). Pandemi sırasında, pandemi öncesine karşılaştırıldığında kadınlarda (BP: %22,3, DP: %13,4) ve erkeklerde (BP: %22,5, DP: %21,1) iş kazaları düşük saptandı ($p<0,01$).

Sonuç: COVID-19 pandemisi hem kadınlarda hem de erkeklerde intihar oranlarını arttırmış, iş kazası oranlarını ise azaltmıştır. Kadınlardaki intihar oranları erkeklerden yüksek bulunmuştur. COVID-19 pandemisi insanları adli, istihdam, ekonomik ve psikolojik birçok yönden olumsuz etkilemiştir.

Anahtar Kelimeler: COVID-19, Adli Vaka, İntihar Oranları, İş Kazası, Trafik Kazası

INTRODUCTION

Forensic cases are usually first evaluated in emergency departments and constitute a significant part of emergency department admissions. As the first evaluation place of forensic cases, emergency departments have an important place in the detection, diagnosis, and treatment (1). The recognition of forensic cases, the preparation of complete forensic reports for these cases and reporting to forensic institutions are among the responsibilities of emergency physicians. For this reason, not only forensic cases but also their tendencies and epidemiology should be well known and managed by emergency department physicians (2).

The forensic cases evaluated with the emergency departments result from many reasons such as assaults (e.g., blunt injury, sharp object injuries, and gunshot wounds), traffic accidents (e.g., vehicle accident and pedestrian injury), suicide attempts (e.g., drug use, hanging, and falling from height), poisoning (e.g., drugs, alcohol or narcotic, carbon monoxide, snake bites, and scorpion stings), electric shocks, sharp object injuries, severe burns, and work accidents. Their distributions, admission times, and frequencies of these cases in emergency departments may differ in age and gender (3). The social, economic, psychological, physical, and mental states of people can affect the circumstances of a forensic case. Moreover, the frequencies, admission times and epidemiological distributions of forensic cases may differ in events (e.g., disaster, pandemic, and crisis) that concern a large portion of the society (4).

COVID-19 which emerged in Wuhan, Hubei, China in December 2019 (5) and spread all over the world, was declared as a pandemic by the World Health Organization (WHO) in March 2020. The COVID-19 pandemic has caused multidimensional (health, lifestyle, employment, economic, psychological, sociological) negative effects on people in the whole world (6). We think that these negative effects changed the type and distribution of forensic cases admitted to the emergency department. This study aimed to determine the change in forensic cases admitted to the emergency department before and during the COVID-19 pandemic.

MATERIAL AND METHODS

Study Population: This study included 1645 patients over the age of 18 years diagnosed as

forensic cases between 1 January 2019 and 31 December 2020 in Ordu University Hospital Emergency Department with an annual emergency admission of approximately 150,000. No additional sample was selected for the study, and the entire population was included as a sample.

Data Collection: For the study, age, gender, diagnosis (traffic accident, assault, work accident, suicide attempt, electric shock, carbon monoxide (CO) poisoning, snake bite, scorpion sting), admission date of the patients were retrospectively collected through the computerized database of the hospital. The period between 11 March 2020 and 31 December 2020 was defined as the COVID-19 pandemic period (DP) (7). The period between 1 January 2019 and 11 March 2020 was defined as before the COVID-19 pandemic period (BP).

Ethics Consideration: Ethical approval before the study was obtained from the Local Clinical Research Ethics Committee of Ordu University with the 7 January 2021 dated and 2021/06 numbered decision. Since the study was designed retrospectively, the informed consent forms of the patients were waived. The study was conducted in accordance with the Helsinki Declaration.

Statistical Analysis: All data analyses were conducted using SPSS v26 (IBM Inc., Chicago, IL, USA). Student's t-test was used to assess differences in age between the two groups. Prior to the test, the data were tested for normality using the Kolmogorov-Smirnov test and for homogeneity of variance using Levene's test. Chi-square test was used to compare the frequency of diagnoses between BP and DP. All comparisons were two-tailed, and a p-value less than 5% was considered statistically significant.

RESULTS

Out of the 1645 patients, 59.7% (n = 982) were male, while 40.3% (n = 663) were female. The mean age of the patients was 38.4 ± 15.9 . In addition, 65.6% (n = 1079) and 34.4% (n = 566) of the forensic cases were admitted in BP and DP, respectively. The mean age of the forensic cases admitted in BP and DP were 38.4 ± 16.0 and 38.3 ± 15.7 , respectively (p = 0.868).

The mean age of women was 38.9 ± 15.8 , and the mean age of men was 37.7 ± 16.0 (p=0.141) (Table 1).

Table 1. The mean ages.

Variable		n	%	Age (Mean±SD)	p
COVID-19 Pandemic	Before	1079	65.6	38.4±16.0	0.868
	During	566	34.4	38.3±15.7	
Gender	Female	663	40.3	38.9±15.8	0.141
	Male	982	59.7	37.7±16.0	
Total		1645	100.0	38.4±15.9	

SD: Standard deviation

Student t-test

Considering the diagnosis rates by gender (Table 2), traffic accidents were 41.9% (n = 278) and 57.0% (n = 560) in women and men, respectively, and ranked in the first place for both genders. However, traffic accidents were higher in men than women (p<0.001). Work accidents were 19.6% (n = 130) and 22.0% (n = 216) in women and men, respectively, and ranked in the second place for both genders. Work accidents were higher in men than in women (p<0.001). Suicide attempts

by women and men were estimated at 15.7% (n = 104) and 4.2% (n = 41), respectively. Suicide attempts by women ranked in the third place and were higher than those by men (p<0.001). Assaults were in the 3rd rank for the males and higher in females (14.0%, n = 93) than males (10.7%, n = 105) (p<0.001). Snake bites, scorpion stings and CO poisoning were higher in females than males (p<0.001). Electric shock was higher in men than women (p<0.001) (Table 2).

Table 2. Forensic case diagnoses.

Diagnosis	Gender				Total	
	Female		Male		n	%
	n	%	n	%		
Scorpion sting	8	1.2	4	0.4	12	0.7
Assault	93	14.0	105	10.7	198	12.0
Electric shock	3	0.5	10	1.0	13	0.8
Suicide attempt	104	15.7	41	4.2	145	8.8
Work accident	130	19.6	216	22.0	346	21.0
CO poisoning	38	5.7	33	3.4	71	4.3
Traffic accident	278	41.9	560	57.0	838	50.9
Snake bite	9	1.4	13	1.3	22	1.3
Total	663	100.0	982	100.0	1645	100.0

p **0.000***
Chi-square test with Likelihood ratio *: <0.001

Suicide attempts by both women (BP: 14.9%, DP: 17.4%) and men (BP: 3.7%, DP: 4.9%) showed an increase for DP (p <0.01) (Table 3).

Work accidents were lower in women (BP: 22.3%, DP: 13.4%) and men (BP: 22.5%, DP: 21.1%) in DP than BP (p<0.01).

Table 3. Forensic case diagnoses before and during the COVID-19 pandemic.

Diagnosis		COVID-19 Pandemic						<i>p</i>	
		Before		During		Total			
		n	%	n	%	n	%		
Female	Diagnosis	Scorpion sting	4	0.9	4	2.0	8	1.2	0.002**
	Assault	65	14.1	28	13.9	93	14.0		
	Electric shock	0	0.0	3	1.5	3	0.5		
	Suicide attempt	69	14.9	35	17.4	104	15.7		
	Work accident	103	22.3	27	13.4	130	19.6		
	CO poisoning	32	6.9	6	3.0	38	5.7		
	Traffic accident	185	40.0	93	46.3	278	41.9		
	Snake bite	4	0.9	5	2.5	9	1.4		
	Total	462	100.0	201	100.0	663	100.0		
Male	Diagnosis	Scorpion sting	4	0.6	0	0	4	0.4	0.005**
	Assault	56	9.1	49	13.4	105	10.7		
	Electric shock	10	1.6	0	0	10	1.0		
	Suicide attempt	23	3.7	18	4.9	41	4.2		
	Work accident	139	22.5	77	21.1	216	22.0		
	CO poisoning	23	3.7	10	2.7	33	3.4		
	Traffic accident	356	57.7	204	55.9	560	57.0		
	Snake bite	6	1.0	7	1.9	13	1.3		
	Total	617	100.0	365	100.0	982	100.0		
Total	Diagnosis	Scorpion sting	8	0.7	4	0.7	12	0.7	0.041*
	Assault	121	11.2	77	13.6	198	12.0		
	Electric shock	10	0.9	3	0.5	13	0.8		
	Suicide attempt	92	8.5	53	9.4	145	8.8		
	Work accident	242	22.4	104	18.4	346	21.0		
	CO poisoning	55	5.1	16	2.8	71	4.3		
	Traffic accident	541	50.1	297	52.5	838	50.9		
	Snake bite	10	0.9	12	2.1	22	1.3		
	Total	1079	100.0	566	100.0	1645	100.0		

Chi-square test with Likelihood ratio *: <0.05; **: <0.01

Among women, the proportion of forensic cases involving traffic accidents was higher in the DP period (BP: 40.0%, DP:46.3%, $p<0.01$). However, traffic accidents involving men decreased in DP (BP: 57.7%, DP:55.9%, $p<0.01$). In DP, the number of assaults decreased in women (BP: 14.1%, DP:13.9%, $p <0.01$) and increased in men (BP: 9.1%, DP:13.4%, $p < 0.01$). CO poisoning decreased in both women (BP: 6.9%, DP:3.0%) and men (BP: 3.7%, DP: 2.7%) in DP ($p<0.01$) (Table 3).

DISCUSSION

We detected no significant change in the mean age between DP and BP. Similar to our results, Bilgin et al. (8) found the mean age for traffic accidents in 2011 to be 31.7 ± 17.7 . In our study, we did not find a significant difference between the mean ages of women and men. Korkmaz et al. (9) reported the mean ages of women (32.77 ± 20.10) and men (32.24 ± 16.61) similar to our study. The reason for this may be because forensic events such as traffic accidents and work accidents occurred more in the young-middle age group, who are more active in social and business life.

Kukul Güven et al. (10) detected that 76.8% of the patients involved in forensic cases in 2006 were male. Also, Levent et al. (3) found that most of the forensic cases admitted to the emergency department in 2013 were men. Similarly, we found that males (59.7%) were in the majority of the forensic cases. This may be attributed to the fact that women in Turkey do not take part in business and social life as actively as do men.

Bilgin et al. [8] determined that most traffic accidents (68.6%) involved men. Similarly, we found that traffic accidents involved more men than women. Traffic and work accidents ranked in the first and second places for both women and men in our study. Similarly, Levent et al. (3) reported the traffic and work accidents as the first and second causes that ended up in the emergency department. Unlike our findings, Demircan et al. (11) in 2008 stated that traffic accidents, assaults, suicide attempts, and CO poisoning were the first four causes for 13823 forensic cases evaluated in six years. In our study, suicide attempts and assaults were the third and fourth causes for women, while the opposite was true for males. The difference may arise from the fact that the old records of work accidents were not kept as well as they are now in Turkey. Differently from our results, Karanfil et al.(12) pointed out that assaults, sexual assaults, and traffic accidents were the most important causes, respectively, from forensic department. The difference may result from the cases frequently examined by the emergency department versus the forensic department. In a study performed on children, the most common forensic cases were found as poisoning and suicide attempts, unlike adults (13).

In our study, suicide attempts were higher in women than men. This may be due to women's less participation in economic enterprises, inadequate professional and social supports for them, and their inadequate economic independence (2, 9, 11). Although snake bites, scorpion stings and CO poisoning were higher in females than males in our study, there was no significant difference in numbers except for scorpion stings. The higher traffic accidents and work accidents among men than women may explain the higher incidences of snake bites, scorpion stings and CO poisoning among women. Also, since the university hospital where our study was conducted provides services to a rural population, this result may be observed.

Given the changes in diagnoses between BP and DP in our study, the most striking results were the increased percent of suicide attempts and the decreased percent of work accidents in both women and men. This may be caused by many reasons such as lockdown processes, death of loved ones, economic difficulties, unemployment, and the increased stress and anxiety levels caused by the pandemic (6, 14, 15).

In our study, there was an increase in suicide attempts by both female and male in DP. Leske et al. (16) observed no significant change for 443 suspected suicide cases between BP and DP. Ammerman et al. (17) stated that the COVID-19 pandemic increased suicidal thoughts and tendencies among adults. Chiba et al. (18) reported that suicide cases rose by 38.5% during the lockdown period. However, more additional studies are needed to detect the change in suicide attempt in DP (6, 14–18).

On the other hand, Chiba et al. (18) detected that pedestrian hits and motorcycle and bicycle accidents decreased during the lockdown but there was no significant change in motor vehicle accidents. We observed a decrease in traffic accidents by men and an increase in traffic accidents by women in DP. The decreased traffic accidents by men may be related to the lockdowns, while the increased traffic accidents by women was parallel to the remarkable decrease in their work accidents. However, an examination of the subtypes of traffic accidents could not be performed due to the lack of available data. Therefore, it is not known which types of traffic accidents are related to the increase and the decrease.

In our study, the percent of assaults decreased with women. Domestic violence cases and assaults were reported to have increased in DP (15, 18, 19). Chiba et al. (18) reported an increase in knife injuries and gunshot injuries in DP. However, we found the decreased incidences of assaults in women. This may be because the emergency department where the study was conducted served rural areas where people live in larger families.

We detected decreased CO poisoning in DP. The incidences of CO poisoning admitted to the emergency department were caused mostly by chimney failures. This decrease appeared to coincide with the spring and summer months of DP.

Study Limitations: This study has some limitations. First, the study was designed as a retrospective study and conducted in a single center. Since the study was conducted retrospectively, forensic case diagnoses could not be collected clearly with sub-diagnoses. Traffic accidents could not be analyzed with sub-diagnoses such as motor vehicle accidents, motorcycle and bicycle accidents, and pedestrian hits. In addition, assaults could not be analyzed with sub-diagnoses such as gunshot injuries, sexual assaults, injuries with sharp objects, and injuries with blunt objects. Finally, the time intervals considered to be before and during the pandemic could not be kept equal. For this reason, the data were compared proportionally, not numerically.

CONCLUSION

We observed a significant change in the forensic cases admitted to the emergency department between BP and DP. Suicide attempts by both women and men increased. Work accidents by both women and men decreased. The COVID-19 pandemic negatively affects people due to not only the disease but also the other factors such as judicial, unemployment, economic, social, and psychological factors. Given few or no studies about the change in the forensic cases before and during the emergence of the pandemic, our study contributes to the related literature. There is an urgent need for larger and multi-center studies to examine the effects of the COVID-19 pandemic on the forensic cases and their multifaceted effects on individuals, through sub-diagnoses.

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