

# Motorcycle Accident Cases Presented to the Emergency Department Before and During the COVID-19 Pandemic

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Submitted: 14.01.2024  
Revised: 21.01.2024  
Accepted: 26.02.2024

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**Keywords:** COVID-19;  
EMTRAS; ESI; motorcycle  
accident; pandemic; trauma.



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## ABSTRACT

**Objective:** To examine patients who presented to the emergency department following motorcycle accidents before and during the COVID-19 pandemic period in order to comparatively assess the incidence of these accidents, associated trauma severity, and patient outcomes.

**Methods:** In this retrospective observational study, we evaluated 1,137 patients who presented to the Adult Emergency Department of Bakırköy Dr. Sadi Konuk Training and Research Hospital with injuries caused by motorcycle accidents. The electronic files of the patients who were determined to have presented to the emergency department after a motorcycle accident were screened, and their age, gender, blood pressure, pulse, oxygen saturation, respiratory rate, body temperature (at presentation), time of the accident, motorcycle speed at the time of the accident as reported by the driver, protective equipment used, time of arrival at the emergency department, length of stay in the emergency department and hospital, the types of treatment applied throughout the patients' stay, and the outcomes of the patients were recorded in the case forms.

**Results:** Of the 1135 patients included in the study, 129 (11.4%) presented to the emergency department before the pandemic and 1,006 (88.6%) during the pandemic period. There were 1,055 (93%) male patients and 80 (7%) female patients. Of all the patients, 145 (12.9%) were hospitalized, and 990 (87.2%) left the hospital. Of those who left the emergency room, 42 (3.7%) refused treatment, and 35 (3.1%) left without the physician's approval. Of the hospitalized patients, 20 (1.8%) were admitted to the intensive care unit, and four (0.4%) were referred to other hospitals. Upon examination of in-hospital mortality, it was determined that 1,132 (99.7%) patients survived, and three (0.3%) died. When assessing the association between injury locations according to the use of full-body protective equipment, a correlation was found in terms of head and neck, lung, extremity, pelvis, and multi-trauma injuries.

**Conclusion:** Regardless of traffic density, the use of protective equipment by motorcycle drivers prevents serious injuries in accidents. The EMTRAS and ESI scores are clinical prediction tools that can be used to predict mortality and morbidity in motorcycle accidents.

## INTRODUCTION

Trauma is one of the leading causes of mortality worldwide.<sup>[1]</sup> According to the data of the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), more than nine individuals die every minute in the world as a result of violence and injury.<sup>[2]</sup> Trauma is the most common cause of death and disability in the population under the age of 35.<sup>[3]</sup> More than 50 million patients receive some form of trauma-related medical care each year in the USA, and trauma patients constitute 30% of all intensive care patients.<sup>[4]</sup> Globally, motor vehicle

crashes rank as the third most prevalent cause of mortality and are the primary cause of death in young adults, accounting for more than half of road traffic deaths.<sup>[5]</sup> In Türkiye, deaths due to accidents ranked sixth among all causes of mortality in 2018 and 2019.<sup>[6]</sup> Therefore, it is crucial to promptly assess injuries resulting from traffic accidents and ensure the use of protective equipment.

The COVID-19 pandemic necessitated that individuals stay at home and opt for home deliveries due to the restrictions implemented. Although this resulted in a decline in general traffic, it also prompted an increased involve-

ment of motor couriers in traffic. In a previous study, Sutherland et al.<sup>[7]</sup> examined the rates of traffic accidents in different US states during the pandemic, and another study conducted in Peru reported that traffic accidents decreased during the pandemic lockdown period.<sup>[8]</sup> However, the authors expected an increase in traffic accidents in the post-lockdown period.

In this study, we examined 1,137 cases that presented to the emergency department of a tertiary health center following motorcycle accidents, with the aim of comparing the differences in the incidence of these accidents, associated trauma severity, and patients' outcomes between the pre-pandemic and pandemic periods.

## MATERIALS AND METHODS

This retrospective observational study included 1,137 patients aged 18 years and over who presented to the Adult Emergency Department of Bakırköy Dr. Sadi Konuk Training and Research Hospital after incurring injuries in motorcycle accidents from March 11, 2019, through March 10, 2022. The study was conducted in accordance with the ethical standards of the Declaration of Helsinki and approved by the Hospital Clinical Research Ethics Committee (No: 2022-15-04/Date: 01-08-22).

The emergency department where the study was conducted serves a tertiary training and research hospital, to which approximately 300,000 patients are admitted annually. In addition to being a level 3 trauma center, this department is the center for cardiological and neurological emergencies.

The adult emergency department contains two red zones, one of which is allocated for trauma patients, and accepts ambulance referrals from the 112-emergency line. There are six stretchers and monitors in both rooms. In addition to these critical care rooms, there is a resuscitation room where only cardiac arrest patients are managed. There are also yellow and green zones where all outpatients are evaluated. In the red zone, patient admissions can be made through the 112-ambulance service. After the triage evaluation and doctor's examination of outpatients, if necessary, the management of the diagnosis and treatment process of patients is transferred to the red zone. Due to the round-the-clock provision of emergency services, the study was conducted continuously for 24 hours without interruption.

The study included 1,137 patients after sustaining injuries as a result of motorcycle accidents. The electronic files of the patients who were determined to have presented to the emergency department after a motorcycle accident were screened, and their age, gender, blood pressure, pulse, oxygen saturation, respiratory rate, body temperature (at presentation), time of the accident, motorcycle speed at the time of the accident as reported by the driver, protective equipment used, time of arrival at the emergency department, length of stay in the emergency department and hospital, the types of treatment applied

throughout the patients' stay, and the outcomes of the patients were recorded in the case forms. In addition, the emergency severity index (ESI) scores of the patients were calculated according to the information obtained at the time of presentation and recorded in the case forms. Lastly, the emergency trauma score (EMTRAS) was calculated based on imaging, examination, and test findings accessed through the electronic system and recorded in the same forms.

Patients were evaluated for all exclusion criteria, and eligible patients with complete data were included in the sample. According to their presentation dates, the patients included in the sample were evaluated in three groups: pre-pandemic (March 11, 2019-March 10, 2020), lockdown period during the pandemic (March 11, 2020-March 10, 2021), and post-lockdown period during the pandemic (March 11, 2021-March 10, 2022). After the study was completed, the data in the study forms were recorded in electronic format for statistical analysis. A data collection form prepared by the researchers was used to collect data in a standard way. Using this form, the following information was recorded regularly throughout the study:

The patient's name, surname, and protocol number; the date and time of the patient's presentation to the emergency department; whether the patient presented during the lockdown or post-lockdown period for those who presented during the pandemic; the patient's age and gender; the time of the accident; the speed at which the accident occurred (according to the anamnesis taken from the driver); protective equipment use; whether the patient was working as a motor courier; vital parameters (pulse, respiratory rate, blood pressure, body temperature, and SpO<sub>2</sub>) at the time of presentation to the emergency department; physical examination findings; injury areas; types of injuries; fracture area in the presence of a bone fracture; laboratory findings according to the blood samples taken at the time of presentation; EMTRAS and ESI scores; length of stay in the emergency department and hospital; hospitalization and discharge status; inpatient clinic to which the patient was admitted if hospitalization was required; and outcomes (ward admission, intensive care unit admission, and in-hospital mortality).

### Inclusion criteria

- Presenting to the emergency department following a motorcycle accident from March 11, 2019, through March 10, 2022, and being assigned the International Classification of Diseases code V29.9
- An age of 18 or over
- Complete data being accessible through the electronic system
- Examination findings being accessible through the electronic system
- Data availability for the calculation of the ESI and EMTRAS scores

## Exclusion criteria

- Lack of patient consent to participate in the study

The primary endpoint of the study was the incidence of patient presentations to the emergency department as a result of a motorcycle accident. The secondary endpoint was the relationship between the evaluation scores and outcomes of patients who presented to the emergency department following a motorcycle accident.

## Statistical Analysis

Continuous variables were expressed as mean  $\pm$  standard deviation or median (minimum-maximum) according to normal or non-normal data distributions. Categorical variables were presented as absolute values and percentages. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to evaluate the distribution of the data. In correlation analyses, Pearson's rho test was used for parametric data and Spearman's rho test for non-parametric data. The comparison of the groups was undertaken using the Mann-Whitney U and Wilcoxon W tests for continuous variables, while the Pearson  $\chi^2$  and Fisher's exact tests were utilized for categorical variables. The Kruskal-Wallis test was conducted to examine the relationship of the ordinal three-group data with other independent groups. The statistical alpha significance level was accepted as  $p < 0.05$ . Statistical analysis of the data was undertaken using IBM SPSS version 25.

## RESULTS

A total of 754,961 patients presented to the Adult Emer-

gency Department of Bakırköy Dr. Sadi Konuk Training and Research Hospital between March 11, 2019, and March 10, 2022. Of these patients, 626,066 were excluded because they had reasons other than trauma. In addition, 126,045 of the trauma patients were excluded because they were not motorcycle drivers; 375 were excluded because they were motorcycle drivers under the age of 18; and 836 were excluded due to missing data. Lastly, although 502 patients had available electronic data, they were not included in the study due to a lack of information on whether they used protective equipment. After applying the inclusion and exclusion criteria, the study was conducted with a total of 1,137 motorcycle drivers who had had a traffic accident. Of the patients included in the study, 129 (11.4%) presented to the emergency department before the pandemic, and 1,006 (88.6%) during the pandemic. There were 1,055 (93%) male and 80 (7%) female patients. The mean age of the patients was  $25.61 \pm 5.74$  years.

Table I shows the comparison of the demographic characteristics and vital parameters of the patients according to their presentation periods. Upon examining the laboratory values of the patients presenting before and during the pandemic, statistically significant differences were detected in white blood cell count ( $p=0.000$ ), platelet count ( $p=0.006$ ), neutrophil count ( $p=0.000$ ), and activated partial thromboplastin time ( $p=0.000$ ) (Table 2).

The ESI scores statistically significantly differed between the pre-pandemic and pandemic lockdown groups, with the latter having a higher mean rank than the former ( $p=0.000$ ). There was also a statistically significant difference in the EMTRAS scores of the pre-pandemic and pan-

**Table I.** Comparison of the demographic characteristics and vital parameters of the patients according to the presentation period

	Pre-pandemic (n=129) median (25th- 75th)	Pandemic (n=1,006) median (25th-75th)	p	z	u
SBP (mmHg)	120.0 (115.5-124.0)	122.0 (119.0-127.0)	0.002	-3.172	53,860.50
DBP (mmHg)	75.0 (72.5-80.0)	80.0 (74.0-85.0)	0.000	-4.849	48,388.50
Pulse (beats/min)	76.0 (74.0-80.5)	75.0 (75.0-78.0)	0.096	-1.666	59,180.50
Respiratory rate (breaths/min)	15 (13-15)	15 (15-16)	0.000	-4.645	49,706.50
SpO <sub>2</sub> (%)	99 (99-100)	99 (98-99)	0.000	-4.165	51,409.00
Body temperature (°C)	36.2 (36.1-36.4)	36.2 (36.2-36.4)	0.068	-1.822	58,607.00
Speed at the time of accident (km/h)	40 (40-60)	40 (30-40)	0.000	-7.217	40,765.00
Length of stay in emergency department (min)	95.0 (48.5-233.5)	103.0 (54.0-201.0)	0.686	-0.404	63,469.50
Length of hospital stay (min)	97.0 (50.0-258.5)	103.0 (54.0-210.0)	0.894	-0.133	64,420.00
	Pre-pandemic (n=129) mean $\pm$ SD	Pandemic (n=1,006) mean $\pm$ SD	P	t	95% confidence interval Lower bound Upper bound
Age	24.74 $\pm$ 5.68	25.72 $\pm$ 5.74	0.68	-1.82	-2.033 0.073

SBP: Systolic blood pressure; DBP: Diastolic blood pressure; SpO<sub>2</sub>: Oxygen saturation; SD: Standard deviation.

**Table 2.** Laboratory values of patients admitted before and during the pandemic period

	Pre-pandemic (n=129) median (25th- 75th)	Pandemic (n=1,006) median (25th-75th)	P	Z	U
WBC count (10 e <sup>3</sup> /uL)	9.03 (7.57-10.75)	8.17 (6.69-9.57)	0.000	-4.442	49,318.00
Platelet count (10 e <sup>3</sup> /uL)	238.0 (197.5-277.0)	228.5 (189.0-264.0)	0.006	-2.756	55,238.50
Neutrophil count	5.60 (4.42-7.35)	4.61 (3.55-6.23)	0.000	-4.710	48,379.00
Lymphocyte count	2.49 (1.93-2.82)	2.31 (1.75-2.74)	0.068	-1.828	58,479.00
Neutrophil/lymphocyte ratio	2.15 (1.63-3.80)	2.03(1.49-2.86)	0.056	-1.910	58,192.50
Hematocrit (%)	43.20 (41.55-45.50)	43.80 (41.90-45.80)	0.132	-1.506	59,610.50
ALT (U/L)	19 (15-27)	19 (15-26)	0.355	-0.925	61,651.00
AST (U/L)	26 (20-34)	29 (21-37)	0.208	-1.259	60,483.00
PTT (sec)	14.0 (12.5-15.1)	13.9 (13.1-14.7)	0.947	-0.066	64,656.00
aPTT (sec)	29.40 (27.15-33.50)	28.10 (25.70-29.60)	0.000	-5.142	46,881.00
INR	1.05 (0.97-1.13)	1.04 (0.96-1.11)	0.091	-1.688	58,977.00
Base excess (mmol/L)	1.2 (-0.1-2.1)	1.5 (0.3-2.3)	0.060	-1.883	58,295.50
Lactate (mmol/L)	1.50 (1.10-1.95)	1.60 (1.20-2.00)	0.244	-1.166	60,811.00
	Pre-pandemic (n=129) mean±SD	Pandemic (n=1,006) mean±SD	P	t	95% confidence interval Lower bound Upper bound
Hemoglobin (gr/dL)	14.36±1.58	14.64±1.17	0.5	-1.96	-0.567 0.001

WBC: White blood cell; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase; PTT: Prothrombin time; aPTT: Active partial prothrombin time; INR: International normalized ratio.

demic lockdown groups, with the former having a higher mean rank than the latter [318.17 (median: 0 (min: 0-max: 7)) vs. 277.28 (median: 0 (min: 0-max: 4))] (p=0.000). Con-

cerning the GCS scores, a statistically significant difference was found between the pre-pandemic and pandemic post-lockdown groups, with the latter having a higher mean

**Table 3.** Comparison of fractures between the pre-pandemic and pandemic periods

	Pre-pandemic n (%)	Pandemic n (%)	p
Skull fracture	3 (2.3)	20 (2.0)	0.739*
Maxillofacial fracture	10 (7.8)	54 (5.4)	0.269
Cervical vertebra fracture	4 (3.1)	13 (1.3)	0.118*
Thoracal vertebral fracture	5 (3.9)	12 (1.2)	0.035*
Lumbar vertebral fracture	4 (3.1)	20 (2.0)	0.341*
Pelvic-sacroiliac bone fracture	8 (6.2)	10 (1.0)	0.000*
Rib fracture	7 (5.4)	47 (4.7)	0.705
Femoral fracture	4 (3.1)	16 (1.6)	0.272*
Patellar fracture	0 (0.0)	9 (0.9)	0.609*
Tibial fracture	7 (5.4)	35 (3.5)	0.316*
Fibular fracture	2 (1.6)	29 (2.9)	0.567*
Foot-ankle fracture	15 (11.6)	53 (5.3)	0.004
Humerus fracture	4 (3.1)	21 (2.1)	0.517*
Radius fracture	3 (2.3)	37 (3.7)	0.613*
Ulnar fracture	3 (2.3)	9 (0.9)	0.147*
Hand-wrist fracture	5 (3.9)	50 (5.0)	0.586
Clavicular fracture	4 (3.1)	19 (1.9)	0.321*
Scapular fracture	3 (2.3)	6 (0.6)	0.072*

rank than the former (351.06 [median: 15 (min: 6-max: 15)] vs. 326.60 [median: 15 (min: 3-max: 15)]) ( $p=0.000$ ).

Upon examining the use of protective equipment at the time of the accident, statistically significant differences were detected between the pre-pandemic, pandemic lockdown, and pandemic post-lockdown periods in terms of helmet use, glove use, knee pad use, jacket use, and full-body equipment use ( $p=0.000$ , 0.019, 0.000, 0.001, and 0.000, respectively). In addition, the rates of thoracic ver-

tebral fractures, pelvic-sacroiliac bone fractures, and foot-ankle fractures statistically significantly differed between the pre-pandemic and pandemic periods ( $p=0.035$ , 0.000, and 0.004, respectively) (Table 3).

The evaluation of the injury sites of the patients according to whether they presented to the emergency department before or during the pandemic period revealed cardiac injuries in two (1.6%) cases before the pandemic and no case during the pandemic, extremity injuries in 100 (77%) and

**Table 4.** Comparison of injury sites between the pre-pandemic and pandemic periods

	Pre-pandemic n (%)	Pandemic n (%)	p
Head and neck injury	24 (18.6)	232 (23.1)	0.254
Thoracic injury	23 (17.8)	177 (17.6)	0.947
Cardiac injury	2 (1.6)	0 (0.0)	0.013*
Abdominal injury	8 (6.2)	89 (8.8)	0.312
Extremity injury	100 (77.5)	967 (96.1)	0.000
Vertebral injury	12 (9.3)	142 (14.1)	0.133
Pelvic injury	9 (7.0)	10 (1.0)	0.000*
Genitourinary injury	3 (2.3)	10 (1.0)	0.176*
Multi-trauma	20 (15.5)	130 (12.9)	0.415

\*Fisher's exact test

**Table 5.** Comparison of injury sites between the pre-pandemic and pandemic periods

	Pre-pandemic n (%)	Pandemic n (%)	p
Outcome			
Discharge	90 (69.8)	823 (81.8)	0.001
Hospitalization	27 (20.9)	111 (11.0)	0.001
Ward admission	19 (14.7)	99 (9.8)	0.087
Intensive care unit admission	8 (6.2)	12 (1.2)	0.001*
Refused treatment	4 (3.1)	38 (3.8)	1.000*
Left hospital without physician's approval	5 (3.9)	30 (3.0)	0.585*
Referred	0 (0.0)	4 (0.4)	1.000*
Death	3 (2.3)	0 (0.0)	0.001*
Inpatient clinic			
Orthopedics	15 (11.6)	82 (8.2)	0.184
General surgery	4 (3.1)	5 (0.5)	0.013*
Anesthesia and reanimation	3 (2.3)	3 (0.3)	0.022*
Neurosurgery	2 (1.6)	13 (1.3)	0.684*
Thoracic surgery	3 (2.3)	7 (0.7)	0.095*
Urology	0 (0.0)	1 (0.1)	1.000*
In-hospital mortality	3 (2.3)	0 (0.0)	0,001*
	Pre-pandemic n=8 median (25th-75th)	Pandemic n=12 median (25th-75th)	P
Length of hospital stay for those requiring intensive care (min)	19,264 (7,080-33,770)	14,006 (5,131-35,247)	0.396**

\*Fisher's exact test; \*\*Mann-Whitney U test.



967 (96.1%) cases, respectively, and pelvic injuries in nine (7.0%) and 10 (1.0%) cases, respectively. In addition, the rates of injury sites between the pre-pandemic and pandemic periods differ from each other (Table 4).

The inpatient clinics to which the patients were admitted were the general surgery clinic for four (3.1%) cases before the pandemic and five (0.5%) cases during the pandemic period, and the anesthesia and reanimation clinic for three (2%) and three (0.3%) cases, respectively. The pre-pandemic and pandemic presentations showed statistically significant differences in relation to the rates of patients admitted to the general surgery and anesthesia and reanimation clinics ( $p=0.013$  and  $0.022$ , respectively). No statistically significant differences were observed in terms of the remaining inpatient clinics to which the patients were admitted (Table 5).

In-hospital mortality occurred in three (2.3%) cases before the pandemic and no case during the pandemic period, indicating a statistically significant difference ( $p=0.001$ ).

## DISCUSSION

Globally, motor vehicle crashes are the third most common cause of death and account for 50% of all road fatalities among young adults. Of the 1,135 cases included in our study, 1,055 (93%) were male and 80 (7%) were female. In a study conducted by Moskal et al.,<sup>[9]</sup> the rate of male patients was found to be 94.7%. In another study, Santos et al.<sup>[10]</sup> reported the rate of male cases to be 85.81%. The higher rate of male patients in our study is consistent with the literature.<sup>[11,12]</sup>

According to WHO, the male gender is an important factor among the reasons that determine the occurrence of traffic accidents.<sup>[13]</sup>

In this study, the median length of stay in the emergency department was determined to be 101 (min: 53-max: 205) minutes, while the median length of hospital stay was 103 (min: 53-max: 216) minutes. In a study conducted by Qasim et al.,<sup>[14]</sup> no significant difference was found between patients with/without personal protective equipment in the length of stay of trauma patients in the emergency department. In another study, Güngör et al.<sup>[11]</sup> evaluated 59 patients who presented to the emergency department due to a motorcycle accident and reported their median stay in the emergency department as 134.50 (min: 15-max: 705) minutes.

In a study conducted with 792 courier accidents in Seoul between 2007 and 2009, it was concluded that although motor accidents constituted only 5% of all accidents, the mortality rate was 12% due to the use of fast engines for fast delivery.<sup>[15]</sup> In our study, the median speed of the patients at the time of their motorcycle accident was found to be 40 (min: 30-max 40) km/h. Upon examining in-hospital mortality, we determined that 1,132 (99.7%) patients survived, while three (0.3%) patients died.

We consider that the difference is due to the lower speed

of motorcycle use in urban areas in our study and the lower vehicle density in traffic resulting from the prevailing pandemic conditions for much of the study period.

Before the pandemic, five (3.9%) of our patients had thoracic vertebral fractures, eight (6.2%) had pelvic-sacroiliac bone fractures, and 15 (11.6%) had foot-ankle fractures, while these fractures were detected in 12 (1.2%), 10 (1.0%), and 53 (5.3%), respectively, during the pandemic period, indicating a statistically significant difference. In a study conducted by Salottolo et al.,<sup>[16,17]</sup> statistically significant differences were found in the rates of superficial head, lower extremity, and knee injuries between the pre-pandemic and pandemic periods. We consider that the disparity between the two studies may be related to the differences in the rates of injury mechanisms. While Salottolo et al.<sup>[16]</sup> reported that 42.2% of the pre-pandemic cases were due to a simple fall and 43.8% of the pandemic cases were due to simple fall-related injuries, head trauma cases in our study were lower both before and during the pandemic periods due to the majority of our patients wearing a helmet at the time of the accident (71.3% and 85.8%, respectively).

In a study of 212 patients evaluating motorcycle accidents in Türkiye,<sup>[18]</sup> it was determined that 50% of the traumas resulting from motorcycle accidents were extremity injuries and 48.6% were head injuries. A study examined 381 motorcycle accident injuries and reported that 75.5% of the fractures were of the lower extremity and 24.5% were of the upper extremity.<sup>[19]</sup> Similarly, in the current study, the rates of lower extremity fractures were higher both in the pre-pandemic and pandemic periods. In addition, extremity injuries constituted the most frequent injury sites at a rate of 77.5% before the pandemic and 96.1% during the pandemic period, and there was also a statistically significant difference between the two groups.<sup>[19]</sup>

In this study, there was a negative correlation between the EMTRAS score and working as a motor courier. A negative correlation was also found between working as a motor courier and experiencing multiple traumas. In addition, the ESI score groups statistically significantly differed between the pre-pandemic and pandemic periods. While the rate of patients with ESI scores 1 and 2 was 13.9% before the pandemic, it was 2.1% during the pandemic period. The ESI score groups statistically significantly differed between the pre-pandemic and pandemic periods. ESI is a five-level triage system with four basic decision stages included in its algorithm that identifies patients who require urgent intervention and are at risk of being kept waiting and determines the triage category of the patient based on the probable use of resources.<sup>[20,21]</sup> An increase in the ESI score indicates a lower possibility of resource use or intervention requirements. Similar to our study, İlhan et al.<sup>[22]</sup> observed a statistically significant difference in the ESI score of their groups, but since our study was focused on motorcycle accidents, we detected a decrease in the patient group with ESI scores 1 and 2 during the pandemic period, while İlhan et al.<sup>[22]</sup> reported an increase in these patients during this period since they included all trauma

groups in their evaluation.

In our study, despite the increasing number of motorcycle accidents during the pandemic period, the EMTRAS and ESI scores were found to be better when compared to the pre-pandemic period. The decreased incidence of severe trauma during the pandemic, as indicated by the lower EMTRAS and ESI scores, can be attributed to increased inspections and reduced traffic density during this period, as well as the use of protective gear in accidents involving motor courier drivers. These findings suggest that it would be beneficial to implement company policies supporting protective equipment among motor couriers. Maintaining these policies at the same level in non-pandemic periods will be an important factor in preventing high mortality and morbidity in motorcycle accidents.

### Limitations

The first limitation of our study is that it was conducted in a single center in a single province. There is a need for multicenter studies with a larger patient population to confirm the data obtained from our study. In addition, although the study was conducted in a trauma center, our hospital being designated as a pandemic reference center during the pandemic period may have affected the homogeneity of presenting patients, which can be considered another limitation.

### Conclusion

In this study, we determined that the use of full-body equipment by motorcycle riders and motor couriers had the potential to prevent serious injuries and trauma. Therefore, it is important for individuals working in this sector and employers to encourage the use of appropriate safety equipment that will protect the head, neck, lungs, extremities, and pelvic area while riding a motorcycle.

### Ethics Committee Approval

This study approved by the Bakırköy Dr. Sadi Konuk Training and Research Hospital Ethics Committee (Date: 01.08.2022, Decision No: 2022-15-04).

### Informed Consent

Retrospective study.

Peer-review

Externally peer-reviewed.

### Authorship Contributions

Concept: E.C., H.D.; Design: E.C., H.D.; Supervision: E.C., H.D.; Fundings: E.C., H.D.; Materials: E.C., H.D.; Data: E.C.; Analysis: E.C.; Literature search: E.C.; Writing: E.C., H.D.; Critical revision: H.D.

### Conflict of Interest

None declared.

## REFERENCES

- Murray CJL, Lopez AD. The global burden of disease: Summary; a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. Geneva: World Health Organization; 1996.
- World health statistics 2018: monitoring health for the SDGs, sustainable development goals. Available at: <https://www.who.int/publications-detail-redirect/9789241565585>. Accessed Aug 22, 2023.
- Alberdi F, Garcia I, Atutxa L, Zabarte M. Epidemiology of severe trauma. *Med Intensiva* 2014;38:580–8. [CrossRef]
- MacKenzie EJ, Rivara FP, Jurkovich GJ, Nathens AB, Frey KP, Egleston BL, et al. the national study on costs and outcomes of trauma. *J Trauma Acute Care Surg* 2007;63:S54. [CrossRef]
- McNicholas WT. Medico Legal and Economic Aspects of OSA. In Janes SM, editor. *Encycl Respir Med* (2nd Ed). Oxford: Academic Press; 2022. [CrossRef]
- TUIK. Life Tables, 2016-2018. Available at: <https://data.tuik.gov.tr/Bulten/Index?p=Hayat-Tablolari-2016-2018-30712>. Accessed Aug 22, 2023.
- Sutherland M, McKenney M, Elkbuli A. Vehicle related injury patterns during the COVID-19 pandemic: What has changed? *Am J Emerg Med* 2020;38:1710–4. [CrossRef]
- Calderon-Anyosa RJC, Kaufman JS. Impact of COVID-19 lockdown policy on homicide, suicide, and motor vehicle deaths in Peru. *Prev Med* 2021;143:106331. [CrossRef]
- Moskal A, Martin JL, Laumon B. Risk factors for injury accidents among moped and motorcycle riders. *Accid Anal Prev* 2012;49:5–11. [CrossRef]
- Santos AMRD, Moura MEB, Nunes BMVT, Leal CFDS, Teles JBM. Profile of motorcycle accident victims treated at a public hospital emergency department. *Cad Saude Publica* [Article in Portuguese] 2008;24:1927–38. [CrossRef]
- Güngör F, Oktay C, Topaktaş Z, Akçimen M. Characteristics of motorcycle accident cases admitted to the emergency department. *Turk J Trauma Emerg Surg* [Article in Turkish] 2009;15:390–5.
- Koçak S, Uçar K, Bayir A, Ertekin B. Characteristics of the cases of bicycle and motorcycle accidents referred to the Emergency Department. *Turk J Emerg Med* 2010;10:112–8.
- World Health Organization. WHO global status report on road safety 2013: Supporting a decade of action. Geneva: World Health Organization; 2013.
- Qasim Z, Sjöholm LO, Volgraf J, Sailes S, Nance ML, Perks DH, et al. Trauma center activity and surge response during the early phase of the COVID-19 pandemic - the Philadelphia story. *J Trauma Acute Care Surg* 2020;89:821–8. [CrossRef]
- Chung Y, Song TJ, Yoon BJ. Injury severity in delivery-motorcycle to vehicle crashes in the Seoul metropolitan area. *Accid Anal Prev* 2014;62:79–86. [CrossRef]
- Salottolo K, Caiafa R, Mueller J, Tanner A, Carrick MM, Lieser M, et al. Multicenter study of US trauma centers examining the effect of the COVID-19 pandemic on injury causes, diagnoses and procedures. *Trauma Surg Acute Care Open* 2021;6:e000655. [CrossRef]
- Hökenek NM, Seyhan AU, Erdoğan MÖ, Tekyol D, Yılmaz E, Korkut S. Evaluation of blood gas analysis as a mortality predictor. *South Clin Ist Euras* 2019;30:228–231. [CrossRef]
- Alicioglu B. Injuries associated with motorcycle accidents. *Acta Orthop Traumatol Turc* 2008;42:106–11. [CrossRef]
- Tekyol D, Çolak Ş, Tayfur İ, Hökenek NM, Algin A. Evaluation of the effects of airbag and seat belt use on the severity of the injury in traffic accidents. *Haydarpaşa Numune Med J*. 2020;60:400. [CrossRef]
- Wuerz RC, Travers D, Gilboy N, Eitel DR, Rosenau A, Yazhari R. Implementation and refinement of the emergency severity index. *Acad Emerg Med* 2001;8:170–6. [CrossRef]
- Erdogan MÖ, Hökenek NM. How to score acute pancreatitis in the emergency setting: Five systems against ED-SAS. *Signa Vitae* 2021;1:8.
- İlhan B, Bozdereli BG, Aydın H, Arslan Erduhan M, Doğan H. COVID-19 outbreak impact on emergency trauma visits and trauma surgery in a level 3 trauma center. *Ir J Med Sci* 2022;191:2319–24.

## Covid-19 Salgını Öncesinde ve Sırasında Acil Servise Başvuran Motosiklet Kazası Vakalarının Değerlendirilmesi

**Amaç:** COVID-19 pandemisi öncesinde ve sırasında motosiklet kazası sonrası acil servise başvuran hastaları inceleyerek, bu kazaların görülme sıklığını, travma şiddetini ve hasta sonuçlarını karşılaştırmalı olarak değerlendirmek.

**Gereç ve Yöntem:** Bu retrospektif gözlemsel çalışmada, Bakırköy Dr. Sadi Konuk Eğitim ve Araştırma Hastanesi Erişkin Acil Servisi'ne motosiklet kazalarından kaynaklanan yaralanmalarla başvuran 1.137 hastayı değerlendirdik. Motosiklet kazası sonrası acil servise başvurduğu belirlenen hastaların elektronik dosyaları taranarak yaş, cinsiyet, kan basıncı, nabız, oksijen saturasyonu, solunum sayısı, başvuru anındaki vücut ısısı, başvuru zamanı gibi bilgiler incelendi. Kaza, sürücünün bildirdiği kaza anındaki motosiklet hızı, kullanılan koruyucu ekipman, acil servise varış zamanı, acil serviste ve hastanede kalış süresi, hastaların kalış süresi boyunca uygulanan tedavi türleri veri formuna kaydedildi.

**Bulgular:** Çalışmaya dahil edilen 1135 hastanın 129'u (%11.4) pandemi öncesinde, 1.006'sı (%88.6) pandemi döneminde acil servise başvurdu. 1.055 (%93) erkek hasta ve 80 (%7) kadın hasta vardı. Hastaların 145'i (%12.9) hastaneye yatırıldı, 990'ı (%87.2) hastaneden ayrıldı. Acil servisten ayrılanların 42'si (%3.7) tedaviyi reddetti, 35'i (%3.1) ise doktor onayı olmadan ayrıldı. Yatan hastaların 20'si (%1.8) yoğun bakıma, 4'ü (%0.4) diğer hastanelere sevk edildi. Hastane içi mortalite incelendiğinde 1.132 (%99.7) hastanın hayatta kaldığı, 3 (%0.3) hastanın ise öldüğü belirlendi. Tam vücut koruyucu ekipman kullanımına göre yaralanma yerleri arasındaki ilişki değerlendirilirken, baş ve boyun, akciğer, ekstremiteler, pelvis ve çoklu travma yaralanmaları açısından bir korelasyon bulundu.

**Sonuç:** Trafik yoğunluğu ne olursa olsun motosiklet sürücülerinin koruyucu ekipman kullanması kazalarda ciddi yaralanmaların önüne geçmektedir. EMTRAS ve ESI skorları motosiklet kazalarında mortalite ve morbiditeyi tahmin etmek için kullanılabilir klinik tahmin araçlarıdır.

**Anahtar Sözcükler:** COVID-19; motosiklet kazası; pandemi; travma; EMTRAS; ESI.