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Relationship Between Severity of Trauma and Blood Alcohol Concentration in Road Traffic Accident Cases Admitted to the Emergency Department of Bursa, Turkiye

العلاقة بين شدة الصدمة وتركيز الكحول في الدم في حالات حوادث المرور على الطرق التي أدخلت إلى قسم الطوارئ في بورصة، تركيا

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Abstract

Objective: The purpose of this study was to determine if blood alcohol content and trauma severity were related to patients who had been in road traffic accident.

Methods: This study examined the medical records of patients that were admitted to the Department of Emergency Medicine of Yuksek Ihtisas Training and Research Hospital, Bursa city of Turkiye, as a result of road traffic accidents between 01/01/2022 and 01/08/2023.

Results: Out of the 5279 car occupants, 121 used alcohol (2.2%), and 111 (91%) of them were males. The most common type of trauma in the cases was head trauma (n = 76, 62.8%), while 26 cases (21.5%) required major surgery. The mean blood ethanol level of the cases was 137,39 ± 95,03 mg/dl, the median Injury Severity Score (ISS) score was 3 (IQR, 25-75: 2-9), and the median Revised Trauma Score (RTS) score was 9 (IQR, 25-75: 4-4). A statistically significant difference was determined between the blood alcohol concentration of the cases and head trauma and upper extremity injuries [(p<0.05), (p=0.002)]. We note a correlation between blood alcohol concentration and age [(p<0.001, r = 0.416)].

Conclusion: Our study revealed that high blood alcohol concentrations in road traffic accident cases are associated with high morbidity and mortality.

Keywords: Forensic sciences, blood alcohol concentration, emergency medicine, road traffic accident, trauma severity.

المستخلص

الهدف: كان الغرض من هذه الدراسة هو تحديد ما إذا كان مستوى الكحول في الدم وشدة الإصابة مرتبطان بالمرضى الذين تعرضوا لحوادث المرور على الطرق.

الطرق: فحصت هذه الدراسة السجلات الطبية للمرضى الذين تم إدخالهم إلى قسم طب الطوارئ في مستشفى التدريب والبحث في مدينة بورصة بتركيا، نتيجة لحوادث المرور على الطرق بين 01/01/2022 و 01/08/2023.

النتائج: من بين 5279 راكبًا في السيارات، استخدم 121 منهم الكحول (2.2%)، وكان 111 منهم (91%) من الذكور. كان النوع الأكثر شيوعًا للإصابة في الحالات هو إصابة الرأس (ن = 76، 62.8%)، بينما احتاجت 26 حالة (21.5%) إلى جراحة كبرى. كان متوسط مستوى الإيثانول في الدم للحالات 137.39 ± 95.03 ملغ/ديسيلتر، وكان متوسط درجة مقياس شدة الإصابة (ISS (3 (المدى الربيعي، 25-75: 2-9)، وكان متوسط درجة مقياس الصدمة المعدل (RTS (9 (المدى الربيعي، 25-75: 4-4). تم تحديد فرق ذو دلالة إحصائية بين تركيز الكحول في الدم للحالات وإصابات الرأس وإصابات الأطراف العلوية [(ق < 0.05)، (ق = 0.002)]. نلاحظ وجود ارتباط بين تركيز الكحول في الدم والعمر [(ق < 0.001، ر = 0.416)].

الاستنتاج: كشفت دراستنا أن ارتفاع تركيزات الكحول في الدم في حالات حوادث المرور على الطرق يرتبط بارتفاع معدل المراضة والوفيات.

الكلمات المفتاحية: علوم الأدلة الجنائية، تركيز الكحول في الدم، طب الطوارئ، حادث مرور على الطرق، شدة الإصابة.

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1. Introduction

Road traffic accident (RTA) is a major source of avoidable injuries and fatalities. In the field of forensic medicine, it remains a crucial topic. Approximately 1.2 million people lose their lives as a result of RTA every year worldwide [1]. In Turkey in 2023, there were 235,071 RTAs that resulted in fatalities and injuries [2]. For 27% of them, driving after intoxication poses a significant risk [3]. While there have been some research that have attempted to show the relationship between Blood Alcohol Concentration (BAC) and the intensity of trauma, a more recent and thorough investigation is required. [4]. RTA death has been extensively studied, while morbidity data is less common but nonetheless significant because of the human and financial costs involved.

Alcohol's effects initially show up in the parts of the brain that are responsible for highly integrated processes, like performing skills. When a driver is under the influence of alcohol, his or her driving abilities, tracking, attentiveness, and visual function are all reduced [5]. Alcohol starts to have an impact on driving when the BAC reaches 20 mg/dl. These effects include a decrease in visual functions (quick tracking of a moving target) and the inability to multitask (divided concentration). When a driver's BAC reaches 150 mg/dl, it significantly reduces their ability to drive [6].

Our study aims to determine whether BAC levels and the severity of trauma (as measured by various trauma scores and injury paterns) resulting from RTAs are related. In order to do this, statistical analyses were conducted separately to examine the relationships between trauma scores, injury patterns, and BAC. Our study also tries to highlight the injuries and deaths that happened while describing the clinical and demographic features of the cases that were included. Evaluation of the contributing elements to these accidents is another goal.

2. Materials and Methods

Design and participants

The study's inclusion criteria included being an adult, having data on alcohol use, and being the driver of any car involved in an RTA who either died before arriving at the hospital or was admitted. Children, those with insufficient data, and those with concomitant diseases were the exclusion criteria for study participants.

To prevent incorrect BAC results, the ED staff disinfects the antecubital region before drawing venous blood samples using solely Povidone iodine antiseptic solution rather than any alcohol-based solution. Blood samples were measured spectrophotometrically by the alcohol dehydrogenase method on the Abbott Architect C8000 autoanalyzer.

The medical records of 5279 cases that applied as a result of RTAs between January 1, 2022, and January 8, 2023, to the University of Health Sciences Yuksek İhtisas Training and Research Hospital in Bursa, Turkiye, were analyzed in this study. Of all the cases that were presented throughout this period, 1637 patients were RTA instances. To ascertain the BAC, venous blood samples were obtained from those cases. 121 samples had positive BAC results.

The medical records of the cohort were reviewed in order to obtain the patient's information, including BAC, medical status, and epidemiological data regarding age, sex, race, type of presentation to the Emergency medicine department (ED), vehicle type, mechanism of the accident, time, location of injury, medical status, Glasgow Coma Scale (GCS), Injury Severity Score (ISS), Revised Trauma Score (RTS), treatment methods, hospital stay, and mortality.

Our study was approved by the Ethics Committee of Bursa Yuksek Ihtisas Training and Research Hospital (No:2011-KAEK-25 2023/05-12).

Data analysis

According to the sample case form, which was designed before the study, medical records were filled in digital environment and statistical analysis was performed. IBM SPSS Statistics for Windows, Version 21.0. (IBM Corp. Armonk, NY: USA. Released 2012) software package program was used for statistical analysis. A p-value below 0.05 was accepted as statistically significant.

3. Results

A total of 1637 patient visits were screened for BAC during the study period: 121 (7,39%) of these tested positive. Parameters of RTA cases showed differences with regard to age, gender, time, and medical status. Basic demographic informations and injury patterns of the patients can be found in Table 1.

The median age of the cases was found to be 30 (IQR,25-75: 24-43.25). 110 (90,9%) patients were locals. Males were more frequently involved (n=111, 91,7%). Three quarter of the cases presented as a consequences of a passenger car crash (n=93, 76,9%). The mechanism of car collision in more than half of the cases were hit to a stationary object (n=68, 56,2%). The most cases occured in the summer (n=41, 33,9%) and on Sundays (n=26, 21,5%). With the exception of minor wounds, lacerations occurred in nearly every case. Head trauma was the leading type of trauma in patients (n=76, 62,8%), and significant surgery was needed in 26 cases (21,5%). Approximately five sixths of the patients (n=105, 86,8%) arrived at the ED via ambulance. A bone fracture was seen in more than one-third of the cases (n=49, 40,5%). Of the cases, 4 (3.3%) resulted in in-hospital mortality (Table 1).

The mean BAC of the cases was 137.39 ± 95.03 mg/dl, median ISS score was 3 (IQR,25-75: 2-9), and median RTS score was 9 (IQR,25-75: 4-4). Additional clinical trauma ratings for our cohort were provided in Table 2, including the GCS, TRISS, and AIS.

A statistically significant difference was determinated between GCS, ISS, RTS, AIS, TRISS and in-hospital mortality, ($p<0.05$), ($p=0,002$), ($p<0.05$), ($p=0.001$), and ($p=0.005$), respectively. However, any statistically significant difference was not found between age, BAC levels and In-hospital mortality, Table 3.

A statistically significant association was found between abdominal trauma, intracranial hemorrhage, intra-abdominal hemorrhage and in-hospital mortality $p<0.05$), ($p<0.05$), ($p<0.05$), Table 4.

Head trauma, the upper extremity injuries, and BAC levels were found to be statistically significantly associated ($p<0.05$), ($p=0.002$). A statistically significant difference was observed between the type of vehicle in which the accident occurred, the type of trauma mechanism and blood ethanol levels ($p<0.05$), ($p=0.009$). In the posthoc analysis conducted to investigate which vehicle type and trauma mechanism caused the difference; it was determined that there was a statistically significant difference in BAC levels between motorcycle and bicycle users ($p<0.05$).

A positive statistically significant correlation was found between the BAC levels of the cases and age ($p<0.001$, $r= 0.416$). In the Chi-square/Fisher's exact analysis was performed to determine the relationship between gender, nationality, admission to ED, vehicle type, accident mechanism, day and season of the accident and, in-hospital mortality. However, no statistically significant relationship was found.

4. Discussion

Alcohol use while driving is one of the leading causes of RTAs that result in morbidities and mortalities. This study assessed the association

Table 1- *Description of cohort: epidemiologic data and medical records of the cases*

Variable		n / (%)
Age (years) &		30 (24-43,5)
Sex#	Male	111 (91,7)
	Female	10 (8,3)
Race#	Turkish	110 (90,9)
	Foreign	11 (9,9)
Brought to the ED by#	Self	16 (13,2)
	112/911 ambulance	105 (86,8)
Vehicle type#	Passenger car/4wd	93 (76,9)
	Motorcycle	26 (21,5)
	Pedal cycle	2 (1,7)
Mechanism of the accident	Hit to stabyl thing	68 (56,2)
	Hit to moving thing	27 (22,3)
	Other	26 (21,5)
Day of the week #	Sunday	26 (21,5)
	Monday	14 (11,6)
	Tuesday	17 (14,0)
	Wednesday	18 (14,9)
	Thursday	15 (12,4)
	Friday	15 (12,4)
	Saturday	16 (13,2)
Season#	Spring	31 (25,6)
	Summer	41 (33,9)
	Fall	25 (20,7)
	Winter	24 (19,8)
Location of trauma#	Head	76 (62,8)
	Face	48 (39,7)
	Neck	28 (23,1)
	Thorax	32 (26,4)
	Abdomen	20 (16,5)
	Upper Extremity	36 (29,8)
	Lower Extremity	33 (27,3)
	Spine	19 (15,7)
Radiologyc and Clinical Findings#	Bone fracture	49 (40,5)
	Abrasion/contusion	114 (94,2)
	Laceration	116 (95,9)
	Joint and/or ligament injury	34 (28,1)
	Dental fracture	1 (0,8)
	Soft tissue injury	117 (96,7)
	Intracranial hemorrhage	6 (5,0)
	Intraabdominal bleeding	6 (5,0)
	Pneumothorax	3 (2,5)
	Hemothorax	5 (4,1)
	Lung contusion	15 (12,4)
	Pelvic fracture	2 (1,7)
	Spine fracture	7 (5,8)

Table 1- Continued.

	Variable	n / (%)
Medical Care#	Conservative	78 (64,5)
	Minor Operation	17 (14,0)
	Major Operation	26 (21,5)
Prognosis #	Out patient	83 (68,6)
	In ward	26 (21,5)
	Reject the treatment	8 (6,6)
	Died	4 (3,3)
In-hospital Mortality#		4 (3,3)
Total#		121 (100)

Data given as # n (%) , &median (IQR 25-75)

Table 2- *Trauma scores of the cases*

Variables	Value
GCS, Median IQR (25-75)	15 (15-15)
ISS, Median IQR (25-75)	3 (2-9)
RTS, Median IQR (25-75)	8 (8-8)
TRISS Median IQR (25-75)	91,2 (86,8-91,8)
AIS, Median IQR (25-75)	1 (1-1)

GCS; Glasgow Coma Scale, ISS; Injury Severity Score, RTS; Revised Trauma Score, TRISS; Trauma Injury Severity Score, AIS; Abbreviated Injury Scale.

between RTA cases' BAC and the severity of their injuries as determined by many trauma scores, such as GCS, ISS, RTS, TRISS, and AIS. Numerous prior researchs have demonstrated a connection between alcohol use and the likelihood of more severe injuries. However, these studies did not entirely assess the relationships among BAC, age, demographic and injury patterns of the patients, and the severity of trauma. As a result, the medicolegal consequences of BAC at the time of RTA might not be accurately represented.

The age group of 24-35 years old had the highest frequency of RTA injuries when comparable studies from the literature were reviewed [7, 8]. In two-thirds to three-quarters of the cases, the male gender was predominant [9, 10, 11].

Consistent with our findings, weekend and summertime RTA of BAC positive cases are more common [7, 11, 12]. On the other hand, another study indicated that the occurrence of RTA of BAC positive cases was not related to the day of the week [13].

Table 3- *The comporison of age, BAC, various trauma scores and In-hospital mortality*

Variables	In-hospital mortality	n	Value	p value
Age	No	117	30 (24-42,5)	>0.05
	Yes	4	38 (25,25-51,5)	
BAC	No	117	137,92 ± 94,07	>0,05
	Yes	4	122,08 ± 136,93	
GCS	No	117	15 (15-15)	<0,001
	Yes	4	3 (3-12)	
ISS	No	117	3 (2-9)	=0,002
	Yes	4	51 (16,5-75)	
RTS	No	117	8 (8-8)	<0,001
	Yes	4	2 (1-6,75)	
AIS	No	117	1 (1-1)	=0,001
	Yes	4	2 (1-3,75)	
TRISS	No	117	91,2 (87,2-91,8)	=0,005
	Yes	4	5 (0,25-68,32)	

BAC: Blood Alcohol Concentration, GCS; Glasgow Coma Scale, ISS; Injury Severity Score, RTS; Revised Trauma Score, TRISS; Trauma Injury Severity Score, AIS; Abbreviated Injury Scale.

#Significant odds ratios at p < 0.05 are bolded.

Table 4- *The comporison of injury patterns and In-hospital mortality*

Variables			In-hospital Mortality		Total	Fisher's exact Test
			No	Yes		
Head trauma	No	n (%)	44 (97.8)	1 (2.2)	45 (100)	p>0,05
	Yes	n (%)	73 (96.1)	3 (3.9)	76 (100)	
Face trauma	No	n (%)	72 (98.6)	1 (1.4)	73 (100)	p>0,05
	Yes	n (%)	45 (93.8)	3 (6.3)	48 (100)	
Neck trauma	No	n (%)	91 (97.8)	2 (2.2)	93 (100)	p>0,05
	Yes	n (%)	26 (92.9)	2 (7.1)	28 (100)	
Thoracic trauma	No	n (%)	87 (97.8)	2 (2.2)	89 (100)	p>0,05
	Yes	n (%)	30 (93.8)	2 (6.3)	32 (100)	
Abdominal trauma	No	n (%)	100 (99.0)	1 (1.0)	101 (100)	**p<0,05**
	Yes	n (%)	17 (85.0)	3 (15.0)	20 (100)	
Spine injury	No	n (%)	99 (97.1)	3 (2.9)	102 (100)	p>0,05
	Yes	n (%)	18 (94,7)	1 (5.3)	19 (100)	
Upper extremity trauma	No	n (%)	84 (98.8)	1 (1.2)	85 (100)	p>0,05
	Yes	n (%)	33 (91.7)	3 (8.3)	36 (100)	
Lower extremity trauma	No	n (%)	85 (96.6)	3 (3.4)	88 (100)	p>0,05
	Yes	n (%)	32 (97.0)	1 (3.0)	33 (100)	
Intracranial hemorrhage	No	n (%)	113 (98.3)	2 (1.7)	115 (100)	**p<0,05**
	Yes	n (%)	4 (66.7)	2 (33.3)	6 (100)	
Pneumothorax	No	n (%)	115 (97.5)	3 (2.5)	118 (100)	p>0,05
	Yes	n (%)	2 (66.7)	1 (33.3)	3 (100)	
Hemothorax	No	n (%)	113 (97.4)	3 (2.6)	116 (100)	p>0,05
	Yes	n (%)	4 (80.0)	1 (20.0)	5 (100)	
Lung contusion	No	n (%)	104 (98.1)	2 (1.9)	106 (100)	p>0,05
	Yes	n (%)	13 (86.7)	2 (13.3)	15 (100)	
Intraabdominal bleeding	No	n (%)	113 (98.3)	2 (1.7)	115 (100)	**p<0,05**
	Yes	n (%)	4 (66.7)	2 (33.3)	6 (100)	
Spine fracture	No	n (%)	111 (97.4)	3 (2.6)	114 (100)	p>0,05
	Yes	n (%)	6 (85.7)	1 (14.3)	7 (100)	
Pelvic fracture	No	n (%)	115 (96.6)	4 (3.4)	119 (100)	p>0,05
	Yes	n (%)	2 (100)	0	2 (100)	
Total		n (%)	117 (96.7)	4 (3.3)	121 (100)	

#Significant odds ratios at $p < 0.05$ are bolded.

While ambulances transported the majority of cases to the ED, A study conducted in Mexico suggested that a significant portion of cases (80,59%) were brought there by the patient's own facilities [8]. This can be inferred from the variations in medical facilities among countries.

Certain studies found that in-hospital mortality was lower than ours, corresponding to [respectively, (n=3, 0.67%), (n=2, 1,7%)] [9, 14]. However, another study found far greater fatality rates, which came to 4-5% [15]. These variations in mortality across studies most likely result from the size of the study populations.

A recent investigation pointed out a significant relationship between severe head injury and the in-hospital mortality of those cases, very similar to our findings [16].

Motorcyclists had BAC levels that were statistically considerably higher than those of other vehicle types when drivers who were wounded in RTA and brought to the ED were assessed [8]. Motorcycle riders have significant injury rates, according to our data as well.

Our findings show that BAC and age are correlated [(p<0.001, r = 0.416)]. Our results are consistent with the research that found that the mean age of patients with BAC levels below 100 mg/dl was 33.6, whereas the mean age of cases with BAC levels above 100 mg/dl was 34.9 [15]. A study that discovered significant differences between the patient's age (p 0.002) with increasing age for higher BAC obtained results that were similar to ours [17]. Conversely, some studies claimed that alcohol use did not alter with age [18]. These disparate findings from the research are probably due to the age at which alcohol intake is prevalent in the society in which the investigations were conducted. A statistically significant difference was seen between age and BAC values above the legal limit and those identified at the legal level, which is consistent with the findings of our investigation [9].

The BAC level of the cases in some studies were found to be almost 176 mg/dl and 150 mg/dl, which are higher than our findings [9, 19]. Moreover, some investigations showed higher mean BAC levels than us, up to 358 mg/dl [7]. However, some researchers found lower rates to be 121 mg/dls [13]. The magnitude of the research populations is possibly the cause of these differences in mean BAC levels between studies.

In comparison to our results, other researchers observed similar median GCS scores (15-14, 7-12), but the median ISS (11-3, 21-6) and RTSs (respectively 12-12) were higher. [20, 9, 21]. Furthermore, a study found that practically all cases had RTS values greater than 4 (n=363, 98,4%) [14]. A research finding that included two groups with BAC levels above and below 50 mg/dl (p<0,001) and ISS showed a statistically significant difference was somewhat comparable to ours [9]. Another study found that mean ISS scores (17,3-14,4) decrease as BAC (0-200 mg/dl) increases [15]. According to a study, the cohort's ISS was 15.6 ± 11.06 [13]. The different ISS scores between previous studies and ours probably derives from several of reasons including the number of the cases, and the differences of safety of roads or vehicles. On the other hand, a study indicates a strong correlation between the BAC level and the severity of injury (r = 0.63) [22].

A study implies that there was no relationship between the BAC of RTA patients that were brought to a hospital and the severity of the injuries, which runs counter to our findings [13]. The argument probably depends on RTA for several of reasons, and alcohol use on its own cannot be considered a reliable indicator of significant injury.

Head and facial injuries accounted for 94% of all injuries in comparable studies, which is consistent

Table 5- *The Comporison of various parameters and BAC*

Variables		BAC		95% Confidence Interval for Mean		One-way Anova test
	N	Mean	Std. Deviation	Lower Bound	Upper Bound	
Day Monday	14	163,129	102,2532	104,089	222,168	
Tuesday	17	120,600	117,8885	59,987	181,213	
Wednesday	18	159,983	78,6647	120,864	199,102	
Thursday	15	109,967	84,0685	63,411	156,522	p>0,05
Friday	15	100,160	91,9667	49,231	151,089	
Saturday	16	142,031	105,3475	85,896	198,167	
Sunday	26	153,327	83,4508	119,620	187,033	
Season Fall	25	165,268	94,0545	126,444	204,092	
Winter	24	133,429	76,6337	101,070	165,789	p>0,05
Spring	31	135,019	108,9759	95,047	174,992	
Summer	41	124,512	93,9752	94,850	154,174	
Mechanism of accident Hit to stabyl thing	68	139,038	91,0735	116,994	161,083	
Hit to moving thing	27	96,407	95,4158	58,662	134,153	**p=0,009**
Other	26	175,654	91,1387	138,842	212,466	
Vehicle type Passenger car/4wd	93	142,804	91,8670	123,885	161,724	
Motorcycle	26	107,450	98,5808	67,632	147,268	**p<0,05**
Pedal cycle	2	275,050	19,0212	104,152	445,948	
Treatment type Conservative	78	132,668	94,9658	111,256	154,079	
Minor Operation	17	174,153	94,1328	125,754	222,552	p>0,05
Major Operation	26	127,535	93,8610	89,623	165,446	
Medical status of the patient Out patient	83	133,767	96,7849	112,634	154,901	
In ward	27	137,793	81,3301	105,619	169,966	p>0,05
Died	3	111,167	165,5655	-300,121	522,454	
Reject the treatment	8	183,500	98,9956	100,738	266,262	
Total	121	137,393	95,0302	120,289	154,498	

#Significant odds ratios at $p < 0.05$ are bolded.

with our findings [20, 21]. In a study, head trauma (37.13%), maxillofacial (8.33%), thoracic (15.31%), abdominal (5%), and limb traumas (23.58%) were lower than us when compared to our data. However, spinal column injuries (44.67%) were higher [23]. According to a different study, the most frequent site of injury for those cases was the limb (n=53, 47,5%) [14]. Our results are consistent with a study that found a correlation ($p < 0.0001$) between head trauma and all forms of intoxication, including drugs and alcohol [23]. Our results are in conflict with a study that showed a decreased adjusted rate of significant extremity injury (OR 0.10; 0.01-0.76) and serious head injuries (OR 0.65; 0.48-0.87) in cases with excessive alcohol consumption. Furthermore, the same study implies that elevated BAC can result in less severe injuries without affecting death [24]. It is probable that the reason for this statement is because driving at a high speed after consuming a lot of alcohol is almost impossible. Consequently, due to its modest impact velocity, RTA only results in minor injuries.

Similar to what we found, another study revealed that cerebral and intraabdominal bleeding were associated with higher fatality rates ($p <0,05$) [25].

In our study, the low GCS was the primary cause of the low RTS. The most likely reason for the decrease in GCS is alcohol consumption. Additionally, the current study shows that in individuals with positive BAC, GCS is a poor indicator of the severity of brain injuries.

5. Conclusion

Critically injured patients who died at the scene of RTA were excluded from our investigation; these victims may have been more intoxicated and this bias may have lowered the difference in the rates of severe injury or death in our study groups to a negligible level. However, this sampling bias could have decreased the rate of severe injury in the patients, and might have led to the conclusion that BAC was not related with severe injury.

It is necessary to increase the frequency of BAC checks for drivers, particularly during periods of high alcohol use. Our results showed that sundays and the summer had the highest number of incidents. Based on our findings, nearly two-thirds of our cohort experienced head trauma. Automobile manufacturers must provide safer designs for their vehicles in order to reduce head injuries to both drivers and passengers. Car cabins must be made of soft materials to avoid serious injuries. Our findings indicate that over one-third of the cases had a bone fracture. To reduce fatal injuries and death, there must be more modern, safer vehicles on the road. Legislators need to enact laws requiring outdated vehicles with inadequate equipment to be removed from the road. Furthermore, it is obvious that regulations against drunk driving ought to be enforced more strictly.

An important public health concern is RTAs. As a result, it is essential that society be routinely educated about the dangers of driving under the influence of alcohol. Campaigns to raise public awareness should be launched. Significant brain injuries may go undetected if the low state of consciousness is wrongly attributed to alcohol usage. It should be assumed that all alcoholic patients involved in RTA have significant brain damage until the opposite is proven. Every one of these people should have a trauma CT scan in order to rule out any potentially deadly injuries [21].

The cohort in this study cannot be typical of all RTA cases in Bursa city due to its limitations as a single center study. Furthermore, there are not a lot of patients. Due to our study is limited to a single center, it may limit the generalizability of the findings. In order to assess alcohol abuse's effects and create preventative measures, a national database with data on the issue is needed. Furthermore, it is necessary to take into account the inherent limits of depending on medical records.

GCS scores are believed to be challenging to interpret in patients who are drunk. It is a common misconception that alcohol consumption may make it difficult for the GCS to determine how severe the Traumatic Brain Injury (TBI) is. Despite popular belief, for patients with blunt TBI, alcohol intoxication does not cause clinically meaningful alterations in GCS scores, excluding the most severely injured [26, 27].

An additional limitation on this type of researches is the potential impact of the BAC measurement time delay. This may result in underestimated BAC levels. As a result, the correlation analysis can be impacted. While clinical signs and trauma scores are normal, BAC measurements can be found to be reasonably low. It's likely that this delay may cause relationships between trauma scores and BAC to be undetected. As soon as the intoxicated patient arrives at the ED, a blood sample is taken for the BAC measurement. Since our study is retrospective, we were unable to determine the exact time of alcohol consumption. Thus this information is not included in medical records.

Our study revealed that BAC in RTA cases are related with high morbidity and mortality. It has been shown that head trauma is the most common in RTAs that occur under the influence of alcohol. When the cases included in our study were examined, it was revealed that BAC increased with age. It is noteworthy that almost all the cases were male.

Five things are implied by our findings. Initially, the mean BAC of the cases was 137,39 ± 95,03 mg/dl, the median ISS score was 3 (IQR, 25-75: 2-9), and the median RTS score was 9 (IQR, 25-75: 4-4) of all BAC positive cases. Second, a statistically significant difference was determined between head trauma, upper extremity injuries and the BAC [($p<0.05$), ($p=0.002$)]. Third, a correlation was revealed between BAC and age [($p<0.001$, $r = 0.416$)]. Fourth, RTA's regional data was gathered. Subsequently, male casualties were more likely to test positive for alcohol rather than female cases.

Overall, this study makes a significant contribution to the field; nevertheless, further multi-center studies with bigger sample sizes are necessary to validate and generalize these findings. Further research is suggested using the composite trauma scores and a more thorough examination of head and neck injuries.

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Conflict of interest

The authors declare no conflicts of interest.

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