

## Evaluation of Disability in Cases Presenting Due to Traffic Accidents

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**Citation:** Cihangir Işık, Musa Dirlik (2026). Evaluation of Disability in Cases Presenting Due to Traffic Accidents, *J International Journal of Public Health Research and Epidemiology*; 2 (2) 09, DOI: IJPHRE-RA-26-09

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### Abstract:

#### Objective

This study aimed to evaluate the physical and psychological sequelae in individuals who had been involved in traffic accidents, with a focus on age, gender, type of accident, internal organ injuries, bone fractures, and disability rates.

#### Methods

A total of 133 cases over the age of 18 who were admitted to the Forensic Medicine Outpatient Clinic of Adnan Menderes University Medical Faculty between 01.04.2018 and 31.12.2019 and had experienced a traffic accident after 01.06.2015 were included in the study. Findings were assessed based on the “Regulation on Disability Assessment for Adults” dated 20 February 2019.

#### Results

Of the cases, 71.42% were male and 28.57% were female. The mean age was 36.9 for males and 43.94 for females. The most common fracture was in the lower extremities for males (25.3%) and in the upper extremities for females (18.4%). Intracranial hemorrhage was detected in 9.5% of males and 7.9% of females. Disability rates were between 1–9% in 53.4% of cases and between 10–49% in 45.1% of cases. The musculoskeletal system was the most commonly affected area (65%).

#### Conclusion

Traffic accidents were found to affect mainly young and male individuals. Musculoskeletal injuries and moderate levels of disability were common. Increasing awareness of traffic safety is of great importance in reducing accidents and their consequences.

**Key words:** traffic accident; disability; trauma; fracture

### Introduction:

Traffic accidents constitute a significant public health problem not only due to their medical consequences but also because of their social, economic, and legal impacts. It is estimated that approximately 1 million people lose their lives and more than 15 million are injured each year worldwide due to traffic accidents. These accidents rank among the leading causes of death, excluding natural disasters, both globally and in Turkey. According to data from the General Directorate of Security, Traffic Services Department, the number of people who died at the scene due to traffic accidents in Turkey between 1981 and 2009 was 156,422. However, considering that these statistics only cover deaths occurring at the accident scene and do not include deaths during transport to hospital, during treatment, or afterward, it is evident that actual losses are much higher.

Injuries resulting from road traffic accidents constitute a serious public health problem in terms of both permanent disability and death. Although technological advances have made vehicles safer, there has been no significant reduction in the frequency of serious injuries in accidents. For example, in Australia, while death rates from traffic accidents have decreased by an annual average of 3% since 1992, an increase in serious injury cases has been observed [1]. Today, the consequences of non-fatal traffic accidents are also considered as an indicator of traffic safety [2]. However, there is no universal

consensus yet on what level of injury should be used as the basis for evaluating road safety performance [2].

One of the important consequences of traffic accidents is the emergence of permanent disabilities related to trauma. In Turkey, a total of 428,311 traffic accidents occurred in 2018; 6,675 people lost their lives and 307,071 were injured in these accidents [3]. Within the scope of this study, the physical and psychological sequelae of individuals who applied to the Forensic Medicine Outpatient Clinic of Adnan Menderes University Hospital between 01.04.2018 and 31.10.2019 and had experienced a traffic accident after 01.06.2015 were retrospectively evaluated. The evaluation was based on the "Regulation on Disability Assessment for Adults" published in the Official Gazette No. 30692 dated 20 February 2019.

In the study, the age and gender distributions of the cases, internal organ injuries, bone fractures, and the most commonly affected body regions related to traffic accidents were analyzed. In this context, the aim was to identify the most affected organs and systems resulting from high-energy trauma due to traffic accidents and to evaluate the disability rates resulting from these injuries.

## **Materials and Methods:**

### **Study Design**

This study is a retrospective and descriptive investigation. Medical records of individuals who applied to the Department of Forensic Medicine at Adnan Menderes University Medical Faculty between 01.04.2018 and 31.12.2019 and had experienced a traffic accident after 01.06.2015 were examined. In the study, the anatomical distribution of trauma due to traffic accidents and permanent impairment rates were evaluated.

### **Study Population and Sample**

The study population consisted of a total of 460 cases who applied due to traffic accidents and for whom disability reports were prepared by the Department of Forensic Medicine at Adnan Menderes University between 01.04.2018 and 31.12.2019. Among these cases, 133 individuals who met the inclusion criteria constituted the sample group. Excluded cases were those with incomplete documentation, insufficient medical data for diagnosis, or those who could not be evaluated for other reasons.

### **Data Collection Tools**

The data collection form was prepared by the researchers by reviewing the relevant literature and in accordance with the study objectives. The form included variables such as age, gender, type of accident, type of injury (bone fracture, skin lesion, internal organ damage, intracranial hemorrhage, pneumothorax/hemothorax, etc.), type of treatment, localization and severity of the injury.

The disability status of the cases was evaluated based on the "Regulation on Disability Assessment for Adults" published in the Official Gazette No. 30692 dated 20 February 2019.

### **Data Analysis**

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 20.0 statistical software. Descriptive statistics including frequency (percentage), mean, standard deviation, minimum and maximum values were calculated. The normality of data distribution was assessed using Shapiro-Wilk and Kolmogorov-Smirnov tests. Chi-square test and, where appropriate, Fisher's Exact test were used for comparing categorical variables.

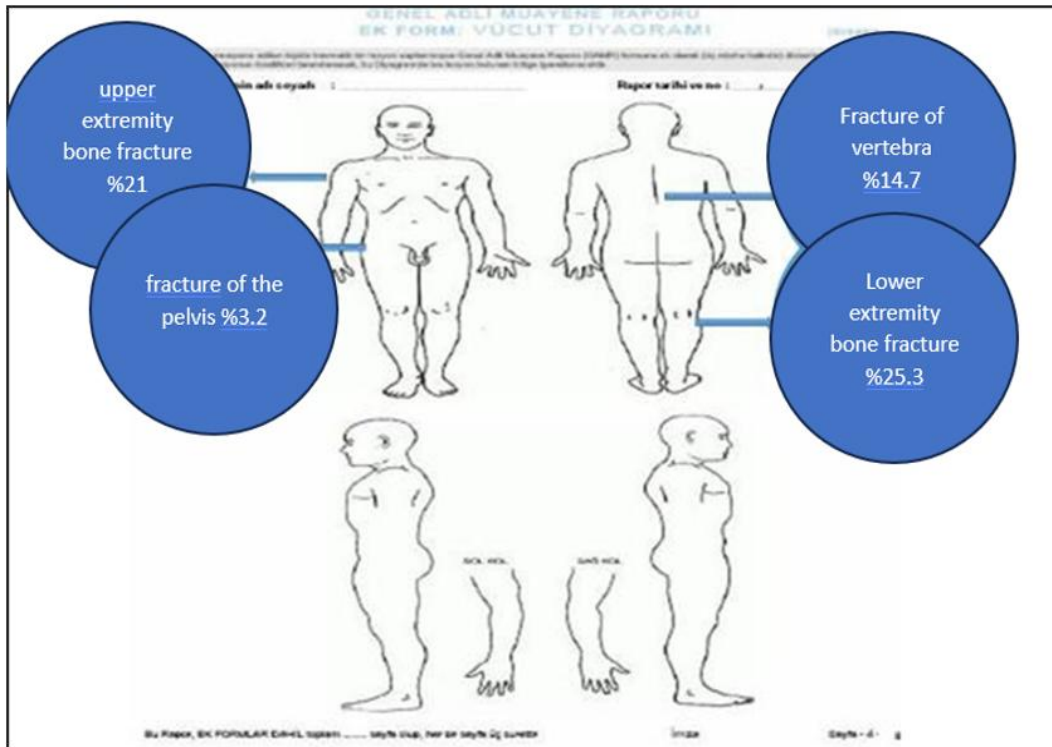
### **Ethical Considerations**

The study was conducted with the approval of the Ethics Committee of Adnan Menderes University Medical Faculty. Personal information of the individuals included in the study was kept confidential and evaluated only for scientific purposes. All data were anonymized before analysis.

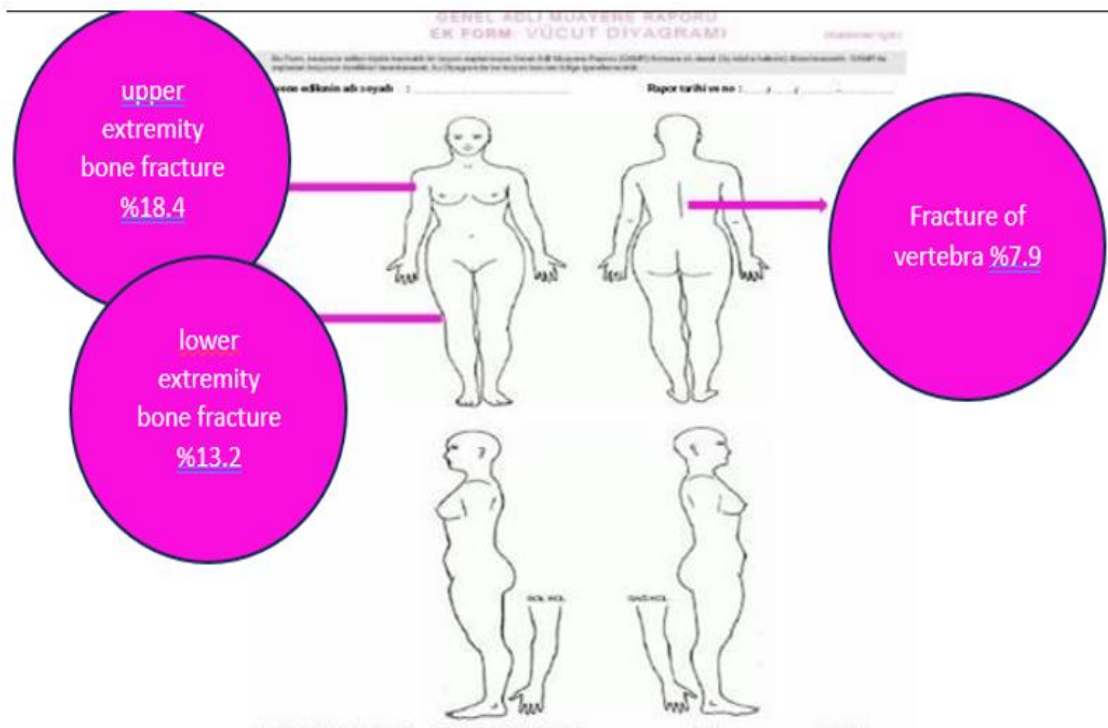
## **Results:**

A total of 133 cases who applied to the Department of Forensic Medicine at Aydın Adnan Menderes University Medical Faculty between 2018 and 2019 and for whom disability reports were prepared after traffic accidents were examined. Of the cases, 71.4% were male (28.6% female), with a mean age of 36.9 for males and 43.9 for females.

Bone fractures were most commonly observed in the lower extremities in males (25.3%) and in the upper extremities in females (18.4%). Vertebral fractures occurred in 2.1% of males and 5.3% of females (Figures 1, 2). Thoracic pathologies were more common in females (15.8%) than in males (7.4%).



**Figure 1:** *Distribution of bone fracture sites in males*



**Figure 2:** *Distribution of bone fracture sites in females*

Intra-abdominal hemorrhage was more common in females (13.2%) than in males (4.2%), while intracranial hemorrhage was slightly higher in males (9.5%) than in females (7.9%).

According to the type of accident, the majority of females were involved in in-vehicle accidents (73.7%), while males were more commonly involved in motorcycle/bicycle accidents (44.2%). Out-of-vehicle accidents predominantly involved males (83.3%) (Tables 1, 2).

Accident type	Bone fracture	Age range			Total
		18-40	41-59	60 and above	
In-vehicle	None	3(%60)	2(%40)	0(%)	5(%100)
	Upper extremity Pelvis	4(%40)	3(%30)	3(%30)	10(%100)
	Lower extremity	1(%100)	0(%0)	0(%0)	1(%100)
	Vertebra	3(%75)	1(%25)	0(%0)	4(%100)
	Lower+upper extremity	6(%100)	0(%0)	0(%0)	6(%100)
	Vertebra+extremity	0(%0)	1(%100)	0(%0)	1(%100)
	Extremity+rib+face	0(%0)	1(%100)	0(%0)	1(%100)
	Extremity+face Vertebra+rib	1(%100)	0(%0)	0(%0)	1(%100)
	Extremity+rib	0(%0)	1(%100)	0(%0)	1(%100)
		1(%100)	0(%0)	0(%0)	1(%100)
		0(%0)	1(%50)	1(%50)	2(%100)
Out-of-vehicle	None	1(%50)	1(%50)	0(%0)	2(%100)
	Upper extremity Lower extremity Vertebra	2(%100)	0(%0)	0(%0)	2(%100)
	Skull	6(%60)	3(%30)	1(%10)	10(%100)
	Lower+upper extremity	1(%50)	1(%50)	0(%0)	2(%100)
	Extremity+rib+face	0(%0)	0(%0)	1(%100)	1(%100)
	Extremity+face	1(%100)	0(%0)	0(%0)	1(%100)
		1(%100)	0(%0)	0(%0)	1(%100)
		1(%100)	0(%0)	0(%0)	1(%100)
Motorcycle/bicycle	None	4(%66.7)	1(%16.7)	1(%16.7)	6(%100)
	Upper extremity Pelvis	6(%75)	1(%12.5)	1(%12.5)	8(%100)
	Lower extremity	1(%50)	0(%0)	1(%50)	2(%100)
	Vertebra	5(%50)	4(%40)	1(%10)	10(%100)
	Facial bones Skull	5(%83.3)	1(%16.7)	0(%0)	6(%100)
	Lower+upper extremity	2(%66.7)	1(%33.3)	0(%0)	3(%100)
	Vertebra+extremity	2(%100)	0(%0)	0(%0)	2(%100)
	Extremity+face	2(%100)	0(%0)	0(%0)	2(%100)
		0(%0)	1(%100)	0(%0)	1(%100)
		0(%0)	2(%100)	0(%0)	2(%100)

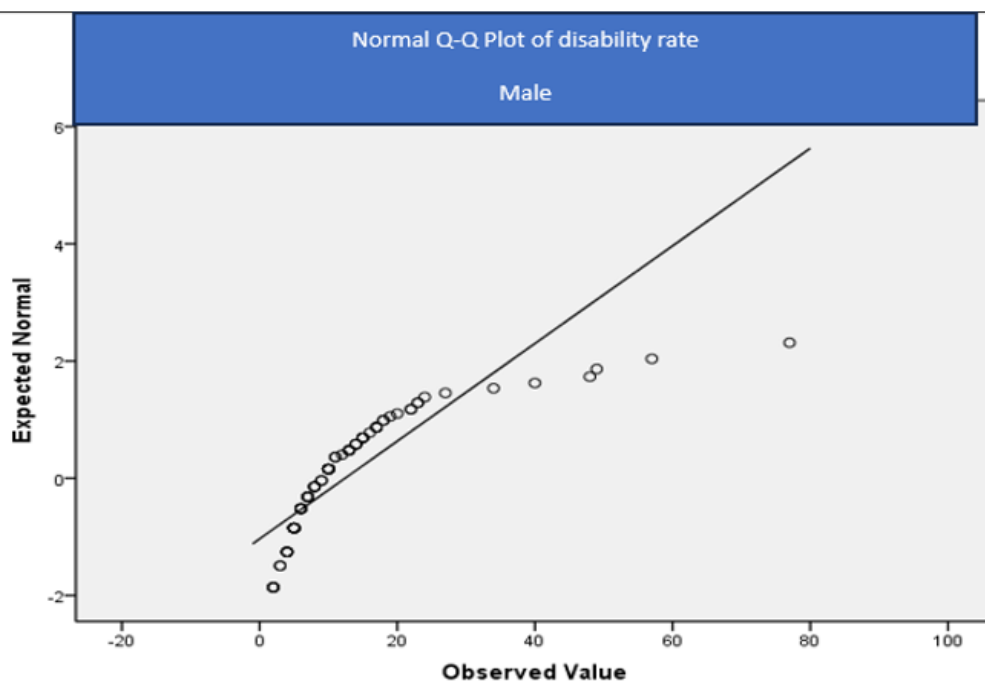
**Table 1:** Distribution of bone fractures by age and accident type in male cases

Accident type	Bone fracture	Age range			Total
		18-40	41-59	60 and above	
In-vehicle	None	5(%41.7)	5(%41.7)	2(16.7%)	12(%100)
	Upper extremity	2(%50)	2(%50)	0(%30)	4 (%100)
	Lower extremity	0(%0)	4(%100)	0(%0)	4(%100)
	Vertebra	0(%0)	3(%100)	0(%0)	3(%100)
	Rib	0(%0)	0(%0)	1(%100)	1(%100)
	Lower+upper extremity	1(%50)	0(%0)	1(%50)	2(%100)
	Vertebra+extremity	0(%0)	0(%0)	1(%0)	1(%100)
	Extremity+rib	0(%0)	1(%100)	0(%0)	1(%100)
Out-of-vehicle	None	1(%100)	0(%0)	0(%0)	1(%100)
	Upper extremity	1(%100)	0(%0)	0(%0)	1(%100)
	Facial bones	2(%100)	0(%0)	0(%0)	2(%100)
Motorcycle/bicycle	Upper extremity	2(%100)	0(%0)	0(%0)	2(%100)
	Lower extremity	1(%100)	0(%0)	0(%0)	1(%100)
	Rib	0(%0)	1(%100)	0(%0)	1(%100)
	Skull	0(%0)	1(%100)	0(%0)	1(%100)
	Vertebra+extremity	1(%100)	0(%0)	0(%0)	1(%100)

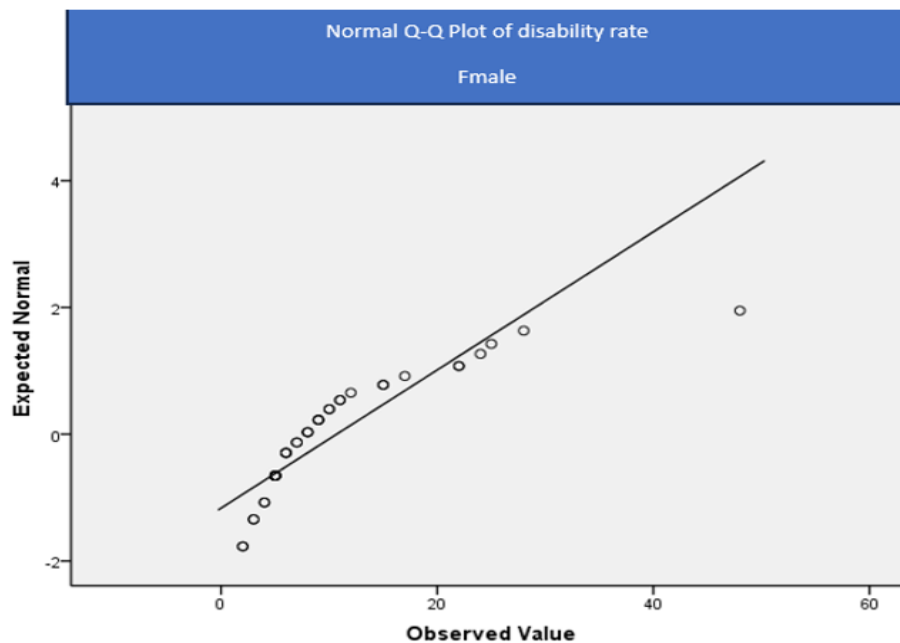
**Table 2:** Distribution of bone fractures by age and accident type in female cases

Internal organ damage was observed in 12.8% of cases; 9.5% in males and 21.1% in females. In in-vehicle accidents, internal organ damage was 18.2% in males and 21.4% in females, while no internal organ damage was observed in out-of-vehicle accidents. In motorcycle/bicycle accidents, internal organ damage was present in 7.1% of males and 33.3% of females.

The mean disability rate was 11.93%; 53.4% had a disability rate of 1–9%, 45.1% had 10–49%, and 1.5% had 50% or above (Figures 3, 4).



**Figure 3:** Distribution of disability rates in male cases



**Figure 4:** *Distribution of disability rates in female cases*

Hemothorax and/or pneumothorax was more frequently observed in females (15.8%) than in males (7.4%). Intra-abdominal hemorrhage was observed only in in-vehicle accidents in males (12.1%), while it occurred in both in-vehicle and motorcycle/bicycle accidents in females.

In the age groups, internal organ damage and intracranial hemorrhage rates increased with age. Nervous system complaints were prominent in those with vertebral fractures.

Disability rates were higher in those with skin lesions and musculoskeletal complaints.

## Discussion:

In our study, the mean age was 36.9 for males and 43.94 for females. These results are partially consistent with the findings of Mohammed Seid et al. (mean age 32.15) [4] and Kir et al. (mean age 39.3) [5]. The finding by Eshrak Alfalahi et al. that 73% of their cases were under 30 years of age [6] similarly indicates that the younger age group is more affected, consistent with our finding (56.4% of cases were in the 18–40 age range).

Regarding gender distribution, the proportion of male cases in our study was 71.42%, which is parallel to the 78.4% male rate reported by Ali Khorshidi et al. [7], the 74% male rate by Anu Kushwaha and Pankaj Singh [8], and the 68.6% male rate by Bilgin Uve et al. [9]. This finding supports the general consensus in the literature that males are more frequently involved in traffic accidents. The more active role of males in working life and the finding by Li et al. that females are more cautious in traffic [10] can be considered as reasons for the higher accident rate in males.

The finding that in-vehicle traffic accidents were more common (73.7% in our study) is consistent with Mehmet Askay's findings (71% in-vehicle) [11]. When accident types were examined by age groups, the higher proportion of motorcycle/bicycle accidents in the younger group supports similar results in the literature [12]. The low rate of internal organ damage in out-of-vehicle accidents suggests that these accidents generally occur in urban areas at low speeds.

Regarding active complaints, the predominance of musculoskeletal problems (65% in our study) is parallel to Mehmet Askay's study [11]. The finding that head trauma leads to greater disability in high-energy trauma, while musculoskeletal problems occur more frequently in lower-severity trauma, is consistent with the literature [13–15].

The higher rate of internal organ damage in females (21.1%) compared to males (9.5%), and the higher rate of intracranial hemorrhage in females in in-vehicle accidents compared to males, may be associated with differences in seat belt use among female passengers. The study by Tavris et al. similarly reported that female passengers experienced more head trauma than males [16].

When the relationship between disability rates and accident type and age was examined, higher disability rates were observed in out-of-vehicle and motorcycle accidents, indicating that these accidents lead to more serious trauma. This finding is consistent with other studies in the literature [17]. The relationship between the localization of bone fractures and accident type is parallel to the distributions reported in the literature [18].

The higher rate of bone fractures in the over-50 age group in females can be explained by the effect of postmenopausal osteoporosis [19,20]. Additionally, the lack of a significant relationship between bone fractures and disability rates can be interpreted as extremity fractures generally not leading to functional loss. The effect of musculoskeletal complaints on disability is consistent with the literature and should be supported by further research.

In conclusion, the findings of our study are generally consistent with other studies, indicating that traffic accidents predominantly affect the young and male population, and that motorcycle and out-of-vehicle accidents result in more severe outcomes due to higher-energy trauma.

### Conclusion:

The increasing population and number of vehicles worldwide have made traffic accidents a significant public health problem. The majority of accidents are caused by human error, and as they particularly affect the young age group, they both reduce individuals' quality of life and cause serious damage to the national economy.

To prevent traffic accidents, emphasis should be placed on educational activities, equipping vehicles with safety features, and promoting and effectively enforcing the use of seat belts and child safety seats.

The complete and detailed preparation of medical records and forensic examination reports is of great importance for the accurate assessment of post-accident sequelae. This will be effective in preventing the loss of individuals' material and moral rights.

Furthermore, access to treatment and rehabilitation services for accident victims should be facilitated; disruptions in access to treatment due to financial concerns should be eliminated. The social adaptation of individuals experiencing accident-related disability should be supported, and social policies to improve their quality of life should be developed.

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