

Prevalence and Characteristics of Traffic Accidents Endangering Vulnerable Pedestrians in Hungary [†]

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Abstract: In Hungary, around 14,000 to 15,000 traffic accidents result in personal injuries on public roads annually. Half of the individuals involved in fatal collisions are considered vulnerable pedestrians or cyclists. Our retrospective cross-sectional study reviewed the police and medical aspects of personal injury traffic accidents in our county. In 2023, there were 26 fatal accidents, 9 of which involved pedestrians, with 8 being at-fault pedestrians. Additionally, 920 traffic accident patients visited the emergency care department of the county hospital, with 68% of them having injuries that healed within 8 days.

Keywords: traffic accident; vulnerable pedestrian; road traffic injury



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1. Introduction

Traffic accidents are a major cause of morbidity and mortality globally, particularly in developing countries. Nearly 10% of deaths worldwide are caused by these accidents. After surveying 178 countries, WHO data from 2009 revealed that these factors cause 1.3 million deaths annually. This ranks them as the eighth leading cause of death and the primary cause of death in the 15–29 age group. An estimated 20–50 million people suffer non-fatal injuries on roads each year, making this a major public health problem, especially in low- and middle-income countries. It is predicted to become the fifth leading cause of death by 2030. However, the latest report from 2023 suggests that efforts to improve road safety are paying off, with global deaths falling to 1.19 million per year [1]. The main causes of accidents, which have remained unchanged for years, include inappropriate use of speed considering road conditions (road alignment and pavement quality), failure to yield despite road signs, and failure to follow the rules on changing direction, passing, and turning, including improper use of the left-hand side of the road [2].

Vulnerable road users (pedestrians, cyclists, or even the nowadays popular e-scooter users) are considered to be the most vulnerable group of road accident victims (accounting for almost half of all road accident fatalities). Studies have shown that pedestrians are the most vulnerable road users compared with drivers and passengers. Additionally, men, older drivers, and front-seat passengers face a higher risk of serious or fatal injuries [3]. However, these groups may not only be the victims of road accidents but also the causes.

Reducing these accidents is a major global problem. This is why road safety has been a priority for years in the actions of the European Union Valletta Declaration (Council of the European Union 2017), Europe on the move (European Commission 2018), and efforts of national governments [4–7].

Characteristics of Vulnerable Road Users

- Pedestrian crossings

According to a study covering the years 2010 to 2013, nearly one-fourth of road accident fatalities in Hungary involved pedestrians. This group accounts for almost half of all accidents. The most common causes of these accidents are failure to yield the right of way (38.1%); pedestrian errors (34.3%), such as careless or sudden stepping onto the roadway, crossing at a forbidden sign or in a prohibited place, crossing in front of a stationary vehicle or a pole, and distracting behavior while crossing; change of direction, passing, and turning (10.7%); incorrect use of speed (8.5%); other driver errors (3.8%); failure to stop (2.2%); and failure to overtake (2.1%) [8].

- Cycling traffic

Among vulnerable road users, the number of cyclists injured is particularly high, in addition to pedestrians. Most of these cases are due to a lack of knowledge or poor application of the rules on priority and turning. The situation is made worse by the fact that the number (from 6 to 20 (233.3%)) and the proportion (from 8.9% to 21.9%) of cyclists involved in drink-driving accidents has risen significantly in the last year.

- E-scooter users

A new and increasingly popular urban transport option worldwide is the e-scooter. Unfortunately, e-rollers have a higher accident rate than cyclists, with head injuries being the most common. Therefore, it is highly recommended to wear a helmet while using this vehicle, even though helmets are only worn in less than 5% of accidents [9].

2. Materials and Methods

We conducted a retrospective cross-sectional study of traffic accidents in Győr-Moson-Sopron County. This study was based on data from 2022 to 2023, and we performed a systematic sample documentary analysis using data from the Police Headquarters and patient records of the Traumatology Department at Petz Aladár University Teaching Hospital in 2023. This study included injuries caused by a means of transport (car, bicycle, motorcycle, scooter, and other (van, skateboard, truck, and moped)) and injuries sustained in pedestrian traffic where police action was taken and/or treatment was provided in the hospital's Emergency Department. Incomplete documentation was excluded. We recorded and analyzed the data using Microsoft Excel version 2021 and descriptive statistical tests (frequency calculation). Throughout this study, subject anonymity was always ensured.

3. Results and Discussion

3.1. Pedestrian and Cyclist Accidents in 2022 and 2023 in Győr-Moson-Sopron County

In 2023, there was only a 0.8% decrease in the number of personal injury accidents compared with the previous year. Despite an 18.2% increase in the number of fatal accidents, the 26 fatal accidents represent the third-lowest ever.

The primary causes of accidents were priority violations (27.3%), speeding (21.6%), and violations of the rules on turning, passing, and changing direction (16.2%). It is important to note that the majority of road accidents (68%) were caused by drivers of passenger cars, with lorries accounting for 9% and bicycles for 8% of the accidents.

Of the 26 fatalities in our county in 2023, 9 involved pedestrians, and in 8 of these cases, pedestrians were the at-fault victims. Three of the pedestrians were hit at a designated pedestrian crossing. Additionally, there were three fatal accidents involving cyclists, one of which was caused by a cyclist [10,11].

The 2022–2023 data by metropolitan area are illustrated in Table 1.

Table 1. Incidence of personal injury accidents in the major cities of GYMS County in 2022–2023.

Factors Examined		Total Accidents Involving Personal Injury (nr)	From Total Cyclists Affected (pcs.)	From Total Cyclists as Causers (nr.)	From Total Pedestrians Affected (pcs.)	From Total Pedestrian Causers (nr.)	Percentage of Cycling Involvement (%)	Percentage of Cyclists as Causers (%)	Percentage of Pedestrian Involvement (%)	Percentage of Pedestrians as Causers (%)
Győr Head-quarters	2022. I–XII.	364	59	22	68	11	16.21%	37.29%	18.68%	16.18%
	2023. I–XII.	359	58	31	65	11	16.16%	53.45%	17.83%	17.19%
	Tendency	−1.37%	−1.69%	40.91%	−5.88%	0.00%				
Sopron HQ	2022. I–XII.	152	18	10	26	4	11.84%	55.56%	17.11%	15.38%
	2023. I–XII.	159	9	6	29	8	5.66%	66.67%	18.24%	27.59%
	Tendency	4.61%	−50.00%	−40.00%	11.54%	100%				
Moson-magyaróvár HQ	2022. I–XII.	91	10	2	10	2	10.99%	20.00%	10.99%	20.00%
	2023. I–XII.	101	4	0	11	6	3.96%	0.00%	10.89%	54.55%
	Tendency	10.99%	−60.00%	−100.00%	10.00%	200.00%				
Csorna HQ	2022. I–XII.	29	6	2	2	0	20.69%	33.33%	6.90%	0.00%
	2023. I–XII.	31	2	0	5	1	6.45%	0.00%	16.13%	20.00%
	Tendency	6.90%	−66.67%	−100.00%	150.00%					
Kapuvár HQ	2022. I–XII.	37	4	1	3	2	10.81%	25.00%	8.11%	66.67%
	2023. I–XII.	23	1	0	1	0	4.35%	0.00%	4.35%	0.00%
	Tendency	−37.84%	−75.00%	−100.00%	−66.67%	−100%				

3.2. Data on Traffic Accidents in 2023 Based on Patient Register of Petz Aladár University Teaching Hospital of Győr Moson Sopron County

During the reporting period, 920 patients sought treatment at the Petz Aladár University Teaching Hospital of Győr-Moson-Sopron County in Hungary because of a traffic accident (N = 920).

Among them, 298 patients (32.4%) sustained severe injuries, which took more than 8 days to heal. These injuries included poly-trauma involving multiple organs, multiple fractures (upper and lower limbs and ribs), traumatic head injuries (subarachnoid hemorrhage and facial fracture), and chest injuries caused by the steering wheel/airbags (hemo/pneumothorax). The remaining 622 patients (67.6%) suffered minor injuries, such as bruising, contusions, sprains, and/or dislocations, which healed within 8 days without any residual symptoms.

The majority of the cases (546 (59.3%)) resulted from collisions with a car involving both drivers and passengers. There were 144 cases (15.6%) of clients involved in accidents with a bicycle, including 42 collisions with a car (resulting in the cyclist being hit) and 14 pedestrian crossing incidents. In total, 88 cases (9.6%) involved motorcyclists (mopeds), some of which occurred during motorcycle races, while others were due to collisions with lorries or cars. In total, 80 individuals (8.7%) were unprotected pedestrians (mainly at pedestrian crossings) and suffered injuries that required emergency care. In total, 30 accidents involving scooters (3.3%) were recorded, with the majority involving the nowadays increasingly popular e-scooters (24 cases (80%)). We noted collisions where other vehicles were involved in 32 cases (3.5%), including vans, trucks, skateboards, and electric mopeds.

The severity of injuries by mode is depicted in Figure 1, which indicates that a larger proportion of serious injuries taking more than 8 days to heal were sustained by unprotected road users. This category comprised 24% of car occupants, 38% of cyclists, 39% of pedestrians, 51% of motorcyclists, 60% of e-scooter users, and 53% of individuals injured in other vehicles.

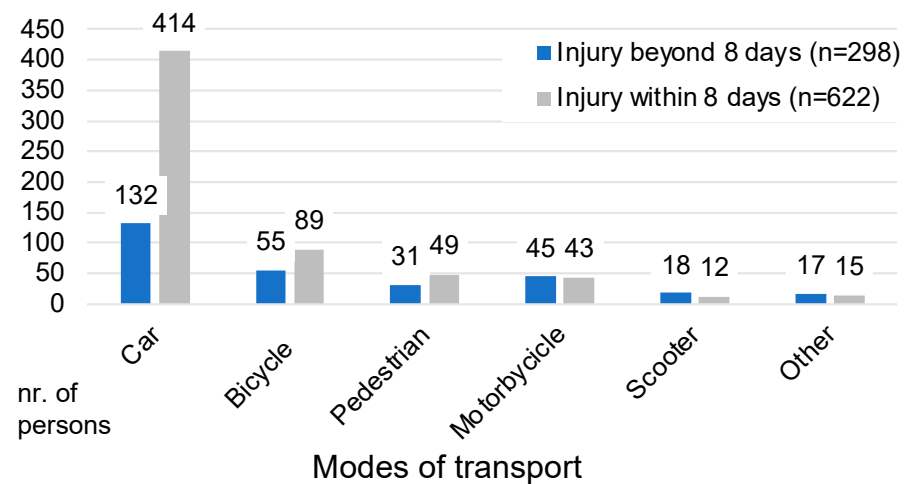


Figure 1. Distribution of injury severity by mode of transport (N = 920).

In the emergency department, 570 men (62%) and 350 women (38%) received treatment. Figure 2 shows the number of men and women injured by different modes of transport.

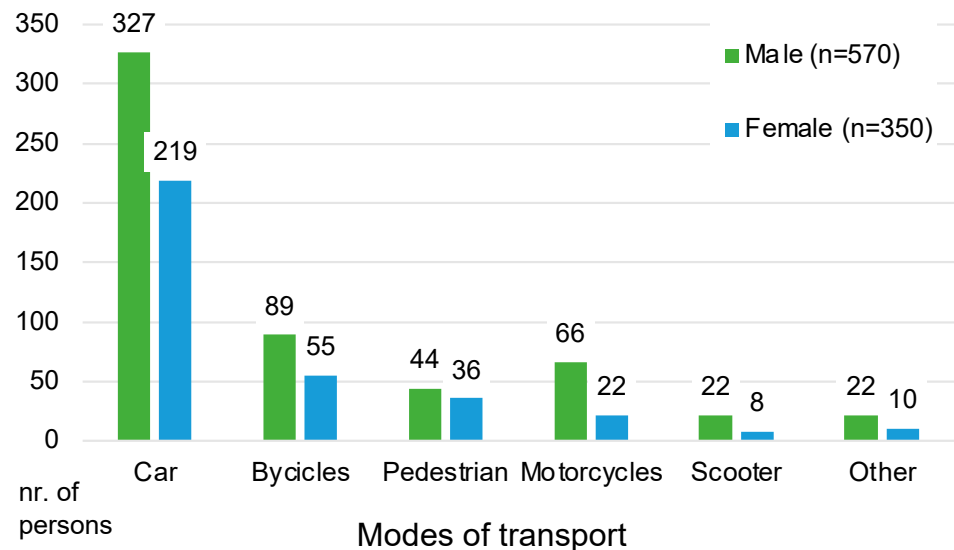


Figure 2. Gender distribution of patients injured by each mode of transport in the sample (N = 920).

In terms of the severity of the injuries suffered, 35% of men and 27% of women in our sample had a serious injury that healed in more than 8 days (Figure 3).

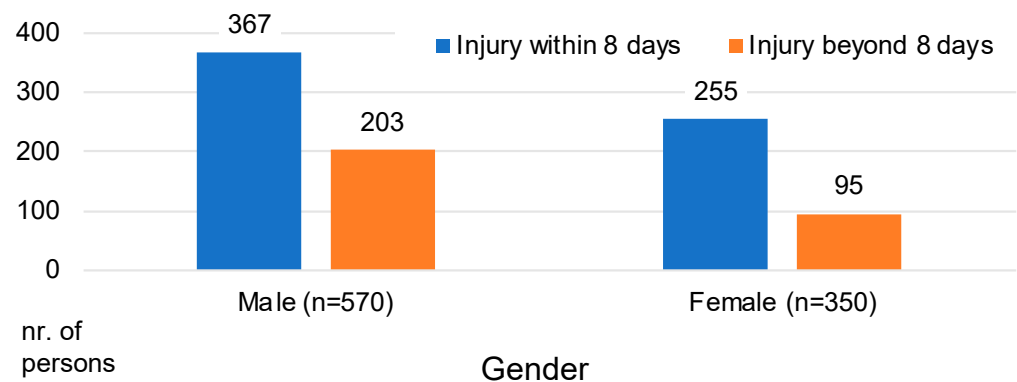


Figure 3. Distribution of injury severity by gender in the sample (N = 920).

The mode of transport to the hospital (transported by the Hungarian National Ambulance Service or arriving on their own feet) and the nature of the police action were not indicated in all documentation. The results should be treated with caution, as patient documentation is not always complete (e.g., exactly where the car/bicycle collision occurred). There were also cases of people being injured while pushing their bicycles or motorbikes.

4. Discussion

In our county, the number of accidents involving vulnerable road users has been decreasing, albeit slightly, in recent years. Cyclists, motorcyclists, e-scooter users, and pedestrians are at high risk among this group. It is evident from the statistics for the period under review that a high percentage of accidents are attributable to these vulnerable road users. However, the underlying causes of these accidents can be quite diverse.

For the most vulnerable road users, the speed of the vehicles is a key determinant of the outcome. It is, therefore, essential to regulate and control the speed of vehicles in and around designated pedestrian crossings and areas with high pedestrian activity. The failure to yield and the incorrect application or ignorance of rules can also contribute to accidents for both pedestrians and drivers.

Inattention can result from faulty human judgment as well as health and physical or mental conditions. When it comes to pedestrian collisions that happen outside of road junctions and non-pedestrian crossing areas, there is often poor communication between road users. This is often because pedestrians' intentions to cross are not always clear. In some cases, pedestrians hesitate at the pedestrian crossing or appear indecisive, making it difficult for drivers to anticipate their actions. Additionally, pedestrians might misjudge the distance or speed of oncoming vehicles. It is also worth considering that mental and health factors can contribute to these situations.

While it would be important to analyze and define them with greater precision, the current data and information do not allow this.

5. Conclusions

Our findings show that domestic road safety measures are moving in the right direction, but there is still room for improvement. Drivers need to understand the significance of respecting speed limits and following right-of-way rules. For pedestrians and other vulnerable road users, raising awareness, improving knowledge, and following rules (such as signaling the intention to cross at pedestrian crossings) can significantly reduce the number of incidents.

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