

Child pedestrian fatalities in Diyarbakir, Turkey

Suleyman Goren, MD, Mehmet Subasi, MD, Fuat Gurkan, MD, Yasar Tirasci, MD, Kemalettin Acar, MD.

ABSTRACT

Objective: As there is an increase in modernization, transportation, unskilled, and drunk drivers, injuries from traffic accidents have taken on an epidemic form all over the world. The present study aims to describe the demographic data of childhood pedestrian fatalities in a large urban area in Turkey.

Methods: The demographic data of childhood pedestrian fatalities in a large urban area in Turkey was described retrospectively, with respect to age, gender, injury pattern and location. Cases less than 16 years of age were collected retrospectively from the files of the Branch of the Council of Forensic Medicine in Diyarbakir between 1998 and 2003.

Results: There were 232 childhood pedestrian fatalities

among a total of 267 children involved in lethal traffic accidents. The mean age of the victims was 7.2 years, most of them being in the 6-10 years of age group (49.1%). Male predominated among our victims (76.3%). With regard to injury location, the most common site was the head (73.7%). There was an increase in pedestrian fatalities in the summer season (33.6%). There was no difference in rates of pedestrian deaths between years.

Conclusion: Child pedestrian deaths have constituted a significant percentage of all child fatalities due to traffic accidents in our region. There were 6.4 deaths per 100,000 populations, and this rate was also higher than in other populations.

Saudi Med J 2005; Vol. 26 (7): 1116-1118

With modernization, a rapid increase in transportation, unskilled, and drunken drivers, injuries from traffic accidents have taken on an epidemic form, particularly in developing countries.^{1,2} Children have been reported to be involved in 6% of all traffic-related deaths.³ A significant percentage of all fatal accidents in childhood have been reported as traffic accidents.⁴ The traffic accident rate per thousand vehicles is greater in developing countries than in the developed.² In forensic literature there are only a few investigations dealing with pedestrian deaths in children.

The aim of the present study was to describe the demographic data of childhood pedestrian fatalities

in a large urban area in Turkey, between 1998 and 2003, with respect to age, gender, sites of significant injury, and relationship between the injury and season.

Methods. There were 232 childhood pedestrian fatalities among a total of 267 children involved in lethal traffic accidents. Medicolegal death records of cases less than 16 years of age were collected retrospectively from the files of the Branch of the Council of Forensic Medicine in Diyarbakir between 1998 and 2003. During this period total number of medicolegal deaths were found to be 3,472 and the most frequent 3 reasons were traffic

From the Department of Forensic Medicine (Goren, Tirasci), Department of Orthopedics and Trauma (Subasi), Department of Pediatrics (Gurkan), Faculty of Medicine, Dicle University, Diyarbakir, and the Department of Forensic Medicine (Acar), Faculty of Medicine, Pamukkale University, Denizli, Turkey.

Received 9th January 2005. Accepted for publication in final form 14th April 2005.

Address correspondence and reprint request to: Dr. Suleyman Goren, Assistant Professor, Department of Forensic Medicine, Faculty of Medicine, Dicle University, Diyarbakir, Turkey. Tel/Fax. +90 (412) 2488001 Ext. 4136. E-mail: sgoren@dicle.edu.tr

Table 1 - Age and gender distribution of victims.

Age	Male		Female		Total	
	n	(%)	n	(%)	n	(%)
1-5	60	(33.9)	19	(34.5)	79	(34.1)
6-10	81	(45.8)	33	(60)	114	(49.1)
11-15	36	(20.3)	3	(5.5)	39	(16.8)
Total	177	(100)	55	(100)	232	(100)

Table 3 - Seasonal distribution of the victims.

Season	n	(%)
Winter	39	(16.8)
Spring	52	(22.4)
Summer	78	(33.6)
Autumn	63	(27.2)
Total	232	(100)

Table 2 - Injury localization of the victims with respect to age (n=232).

Age	Head	Neck	Chest	Abdomen	Upper extremity	Pelvis	Lower extremity
1-5	53	12	8	12	3	3	6
6-10	85	10	19	15	8	3	6
11-15	33	6	6	4	7	1	10
Total	171	28	33	31	18	7	22

accidents with 915 (26.4%) deaths, falls from height with 501 (14.4%), and firearms with 433 (12.5%) deaths. According to The Turkish State Institute Statistics (SIS), the population of Diyarbakir is 1,362,708 with an age distribution of: 406,073 (29.8%) persons in 0-10 years group, and 185,473 (13.6%) in 11-15 years.⁵

Results. The mean age of the 232 victims with pedestrian fatalities was 7.2 years, ranging between 1-15 years. The majority were in the groups aged 6-10 years (49.1%). Of all victims 34.1% were in the group aged at 1-5 years, and 16.8% at 11-15 years (**Table 1**). Male predominated among our victims (76.3%) (**Table 1**).

With regard to injury location, the most common site was the head (73.7%), followed by the chest (14.2%), abdomen (13.4%), and neck (12.1%) (**Table 2**). The most frequently encountered injury combinations involved the head, chest and abdomen. There was an increase in pedestrian fatalities in the summer season (33.6%) but less common in winter (16.8%) (**Table 3**). There was no difference in rates of pedestrian deaths between years.

Pedestrian deaths occurred in urban center in 152 cases (65.5%), and in the rural areas in 80 cases (34.5%).

DISCUSSION. In many developed countries, modern safety measures have contributed to a decrease in the number of traffic fatalities, in spite

of increased traffic. Pedestrian injury mortality rates have been reported to be declining in developed countries due to decline in walking,⁶⁻⁸ but the percentage of motor vehicle accident deaths in childhood pedestrians may be even higher in non developed countries where children play outside on streets and are often engaged in economic activities along busy roads.⁹⁻¹¹ In urban areas and particularly in economically disadvantaged communities, children are at increased risk especially for pedestrian injuries.⁷ In our study over 38 pedestrian children died every year: 6.4 deaths per 100,000 populations. In the United States there are 1.5 pedestrian deaths per 100,000 persons aged between 1 and 7 years.¹² In Australia there are 3.1 pedestrian deaths per 100,000 persons aged between 1 and 14 years; in New Zealand there are 3/100,000; In the United Kingdom there are 2.4/100,000.⁹ As shown in our study childhood pedestrian deaths was more frequently seen than in the literature.

Most fatalities in this study had occurred between 6-10 years of age. Mean age of all fatalities was 7.2 years and 83.2% were lower than 10. Of all victims 34.1% were in the group aged at 1-5 years. Childhood pedestrian fatalities are a leading cause in those under 10 years of age, as supported by most previous studies.^{7,9,11} However in Hajar's study,¹ more fatalities occurred in older individuals, the majority being in the 10-14 years age group. Young children maybe considered as they may choose the most direct route to cross a road rather than the safest one.^{9,13}

Male predominated among our victims (76.3%) with a male to female ratio of 3.2:1. Byard et al⁹ have reported this rate as 1.5:1 and Bockholdt et al⁴ as 1:1. Males may be considered to be at greater risk for pedestrian injury than girls, since they have more tendencies to play outside and they get greater risk when taking activities.

In our study, with regard to injury location, the most common site was the head (73.7%), followed by the chest (14.2%), abdomen (13.4%), and neck (12.1%). In different series of pediatric trauma, there were documented cranial injury in 91% and abdominal injury in 33% of seriously injured children, followed by injuries to the lower limbs (22%) and thorax (18%).¹³ In Byard's⁸ study, the rate of severe head injury was 91.2%, with injuries to the abdomen in 50%, chest in 47.1%, and neck in 38.2% of cases. In Bockholdt's⁴ study the rate of severe head injury was 100%.

There was a predominance of cases in the summer months (33.6%) in our study, similarly to those reported in North American studies,^{9,14,15} Although the rate of child pedestrian fatalities have been reported to be declining in most previous studies,^{8,9,16} we have demonstrated no changes in these fatalities over time.

Diyarbakir is a large province in the Southeast of Turkey. People living in this region have lower socio-economic and educational status than the western parts of Turkey. In our region, total population of 0-15 years age group is 591,546 constituting 43.4% of the overall population. Among the 6-15 years age group, there was an illiteracy rate of 22.3% in 86,032 children.⁵

In conclusion, pediatric pedestrian deaths have constituted a significant percentage of all child fatalities due to traffic accidents in our region (232/267) and injuries predominated with head trauma in 74% victims. There were 6.4 deaths per 100,000 populations and this rate was also higher than in other populations. In order to reduce childhood pedestrian deaths in our region, interventions and additional strategies are clearly needed for improving the low socio-economic and educational levels of the families, training of children concerning their behavior in traffic

situations, increasing parental interest on children and increasing the number of playing areas.

References

- Hijar MC, Kraus J, Tovar V, Carrillo C. Analysis of fatal pedestrian injuries in Mexico City, 1994-1997. *Injury* 2001; 32: 279-284.
- Sharma BR, Harish D, Sharma V, Vij K. Road-traffic accidents - a demographic and topographic analysis. *Med Sci Law* 2001; 41: 265-274.
- Thompson EC, Perkowski P, Villarreal D, Block EFJ, Brown MF, Wright L, et al. Morbidity and mortality of children following motor vehicles crashes. *Arch Surg* 2003; 138: 142-145.
- Bockholdt B, Schneider V. The injury pattern to children involved in lethal traffic accidents in Berlin. *Leg Med* 2003; 5: 390-392.
- State Institute of Statistics Prime Ministry Republic of Turkey (SIS): Social and economic characteristics of population-Census of population. State Institute of Statistics Printing Division, Ankara; 2000. p. 31-97.
- Campos-Outcalt D, Bay C, Dellapenna A, Cota MK. Pedestrian fatalities by race/ethnicity in Arizona, 1990-1996. *J Prev Med* 2002; 23: 129-135.
- Durkin MS, Laraque D, Lubman I, Barlow B. Epidemiology and prevention of traffic injuries to urban children and adolescents. *Pediatrics* 1999; 103: e74.
- Roberts I. Why have child pedestrian deaths rates fallen? *BMJ* 1993; 306: 1737-1739.
- Byard RW, Green H, James RA, Gilbert JD. Pathologic features of childhood pedestrian fatalities. *Am J Forensic Med Pathol* 2000; 21: 101-106.
- Adesunkanmi AR, Oginni LM, Oyelami AO, Badru OS. Epidemiology of childhood injury. *J Trauma* 1998; 44: 506-511.
- Byard RW. Accidental childhood death and the role of the pathologist. *Pediatr Dev Pathol* 2000; 3: 405-418.
- Harruff RC, Avery A, Alter-Pandya AS. Analysis of circumstances and injuries in 217 pedestrian traffic fatalities. *Accid Anal Prev* 1998; 30: 11-20.
- Schieber RA, Thompson NJ. Developmental risk factors for childhood pedestrian injuries. *Inj Prev* 1996; 2: 228-236.
- Brison RJ, Wicklund K, Mueller BA. Fatal pedestrian injuries to young children: a different pattern of injury. *Am J Public Health* 1998; 78: 793-795.
- Pless IB, Verreault R, Arseneault L, Frappier J-Y, Stulgingskas J. The epidemiology of road accidents in childhood. *Am J Public Health* 1987; 77: 358-360.
- Tanz RR, Christoffel KK. Pedestrian injury: the next motor vehicle injury challenge. *Am J Dis Child* 1985; 139: 1187-1190.