ORIGINAL RESEARCH

TRAUMATIC CHILDHOOD DEATHS IN AFYONKARAHISAR

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ABSTRACT

Objective: We aimed to research the epidemiological and clinical properties of childhood deaths from autopsy records in Afyonkarahisar.

Method: State prosecution files, autopsy reports, place investigations and death examination protocols of 122 cases among children 0 to 17 years were studied.

Results: Seventy five (61.5%) of 122 were boys, mean age 9.1±5.4. The highest mortality was among children 5 to 9 years with 36 (29.5%) cases. Prominent mortality causes of trauma were motor vehicle accidents (59.8%). The origin of mortality causes were accidents (103 cases (84.4%)), suicide (11 cases (9.0%)) and homicide (8 cases (6.6%)). Mortality from motor vehicle accidents was most frequent (34.2%) among children 5 to 9 years. Thirty five (42.0%) of motor vehicle accidents were from trauma in vehicles. The most frequent wounded sides of the body were head and neck region (69.7%). Autopsy was performed in 26 (21.3%) cases.

Conclusion: Motor vehicle accidents and falls are the leading causes in childhood traumas and motor vehicle accidents were mostly as pedestrian traumas. Mostly head and neck injuries were experienced and deaths occurred on scene. Besides, judicious physical evaluation may be enough to diagnose the mortality cause.

Keywords: Childhood, Injury, Death, Autopsy

AFYONKARAHİSAR'DA TRAVMAYA BAĞLI ÇOCUKLUK DÖNEMİ ÖLÜMLERİ

ÖZET

Amaç: Bu çalışmamızın amacı, otopsi kayıtlarından yararlanarak bölgemizdeki travmaya bağlı çocukluk dönemi ölümlerinin epidemiyolojik ve bazı klinik özelliklerinin değerlendirilmesidir.

Gereç ve Yöntem: 0-17 yaşları arasındaki 122 olgunun savcılık dosya belgeleri, otopsi raporları, olay yeri inceleme ve ölü muayene tutanakları incelenmiştir.

Bulgular: Toplam 122 olgunun 75'i (%61.5) erkek ve yaş ortalamaları 9.1±5.4 idi. En yüksek mortalite oranının 36 olgu (%29.5) ile 5-9 yaş arasında olduğu belirlendi. En önemli ölüm sebebinin kaza (%84.4) olduğu ve kazalar içinde de en sık 73 vaka (% 59.8) ile motorlu taşıt kazalarının görüldüğü tespit edildi. Motorlu taşıt kazalarının en sık 25 olgu (%34.2) ile 5-9 yaş arasındaki çocuklarda görüldüğü saptandı. Motorlu taşıt kazalarının 38'inin (%58.0) araç dışı kaza olduğu tespit edildi. En sık yaralanan vücut bölgesinin, 85 olgu (%69.7) ile baş-boyun bölgesi olduğu belirlendi. Toplam 26 olguda (%21.3) otopsi yapıldığı saptandı.

Sonuç: Çocukluk çağı travmalarında, motorlu taşıt kazalarının ve yüksekten düşmelerin ön planda olduğu ve çoğunlukla taşıt kazalarının yayaya çarpma şeklinde meydana geldiği görülmektedir. En fazla baş-boyun bölgesinin etkilendiği, ölümlerin çoğunlukla olay yerinde olduğu ve ölüm sebebinin tayininde adli dış muayenenin yeterli olduğu anlaşılmaktadır.

Anahtar Kelimeler: Çocukluk Dönemi, Yaralanma, Ölüm, Otopsi

INTRODUCTION

Injuries are the most important cause of mortality and disability during childhood and adolescence[1,2]. They are the cause of more than 50% of all the childhood deaths among children ages 1 to 19 years. Injuries remain

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the major factor in 44% of the death among children 1 to 4 years of age, and 74% from 15 to 19 years[3]. Motor vehicle accidents (MVAs) are the leading causes of death in children aged 1-19 years, followed by homicide or suicide (predominantly with firearms) and drowning[4].

Injuries remain the major problem because of the effects on social, physiological, economic and medical issues. Besides, they are a severe problematic part of public health[5,6]. It is important to find out the origin and causes of childhood deaths to guide health policy. Besides, different legal approaches are also needed for different causes.

We aimed to study the epidemiological and clinical properties of childhood deaths from the autopsy records in Afyonkarahisar.

METHODS

State prosecution files, autopsy reports, evident place investigations and death examination protocols of 136 cases among children 0 to 17 years were studied. All the cases were from between 2000 and 2004. Fourteen cases were excluded from the study because the cause of death was not trauma. Age, sex, evident place, type, origin, death cause, injured body parts, injury severity scores and autopsy records were evaluated. The cases were divided into four groups as 0-4, 5-9, 10-14 and 15-17 years. Percentage was used as definitive statistics. Means were expressed as mean ± standard deviations (SD).

RESULTS

One hundred and twenty two (89.7%) of the 136 evaluated cases of judicial death examination and autopsies in the last five years among children 0 to 17 years were trauma cases. Seventy five (61.5%) were boys, 47 (38.5%) were girls mean age 9.1±5.4. The mean age of the boys was 9.3±5.1 and the mean age of the girls was 8.8±5.8. The highest mortality was in 2004 with 48 cases (38.3%) and among children 5 to 9 years with 36 (29.5%) cases. The second highest mortality group was among children 15 to 17 years with 34 (27.9%) cases. When sex was compared, boys were more frequent among children 5 to 9 years with 24 (32.0%) cases and girls were more frequent among children 0 to 4 years with 16 (34.0%) cases (Table I). Prominent mortality causes of trauma were MVAs (73 cases (% 59.8)), falling (20 cases (%16.4)), firearm wounds (9 cases (%7.4)) and drowning (7 cases (%5.7)), respectively. Mortality from MVAs was most frequent (25 cases (%34.2)) among children 5 to 9 years (Table II). Prominent mortality causes of trauma were MVAs in both boys and girls (Table III). The origin of mortality causes was accidents (103 cases (%84.4)), suicide (11 cases (%9.0)) and homicide (8 cases (%6.6)). Accidents were most frequent among children 5 to 9 years with 34 (33.0%) cases, and accidents were most frequent in boys (62 cases (%60.2)). Seven (63.6%) of the suicides were boys and nine (81.8%) were among children 15 to 17 years (Table IV).

Table I. Distribution of traumatic childhood deaths according to sex and age groups.

Age Group	Gender				Total	
	Male		Female			
	n	%	n	%	n	%
0-4	16	21.3	16	34.0	32	26.2
5-9	24	32.0	12	25.5	36	29.5
10-14	15	20.0	5	10.6	20	16.4
15-17	20	26.7	14	29.9	34	27.9
Total	75	100.0	47	100.0	122	100.0

Table II. Distribution of traumatic childhood deaths according to etiology and age groups

Age Group	Etiology											
	MVA		Fall		Gunshot		Drowning		Other		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
0-4	20	27.5	6	30.0	0	0	3	42.8	3	23.1	32	26.2
5-9	25	34.2	7	35.0	0	0	2	28.6	2	15.4	36	29.5
10-14	12	16.4	0	0	3	33.3	2	28.6	3	23.1	20	16.4
15-17	16	21.9	7	35.0	6	66.7	0	14.3	5	38.4	34	27.9
Total	73	100.0	20	100.0	9	100.0	7	100.0	13	100.0	122	100.0

Table III. Distribution of traumatic childhood deaths according to etiology and gender

Etiology	Gender					
	Male		Female		Total	
	n	%	n	%	n	%
MVA	43	57.3	30	63.8	73	59.8
Fall	14	18.7	6	12.9	20	16.4
Gunshot	8	10.6	1	2.1	9	7.4
Drowning	5	6.7	2	4.2	7	5.7
Other	5	6.7	8	17.0	13	10.7
Total	75	100.0	47	100.0	122	100.0

Table IV. Distribution of traumatic childhood deaths according to origin and gender

Origin	Gender					
	Male		Female		Total	
	n	%	n	%	n	%
Accident	62	82.7	41	87.2	103	84.4
Suicide	7	9.3	4	8.5	11	9.0
Homicid	6	8.0	2	4.3	8	6.6
Total	75	100	47	100	122	100

Fifty two (71.2%) cases of MVAs occurred on city roads and 21 (28.8%) on intercity roads. Thirty five (42.0%) MVAs were from trauma in vehicles. Thirty eight (58.0%) cases of MVAs occuurred by vehicle crashing into pedestrians.

The most frequent wounded areas of the body were the head and neck regions (85 cases (69.7%)), thorax (18 cases (24.2%)), extremities (15 cases (12.3%)) and abdomen (10 cases (9.1%)), respectively.

The most frequent mortality cause was brain and medulla spinalis injuries (80 cases (65.6%)) and the next was haemorrhagic shock [13 cases (10.7%)] . The mean injury severity scores of the trauma patients who died in hospital were 29.4±10.9 (min:9-max:59).

Eighty (75.9%) fatal trauma cases occurred on the scene, 13 (9.2%) occurred in the emergency unit and 29 (14.8%) died in hospital services. Autopsy was performed in 26 (21.3%) cases, while judicious external

examination was performed in 96 (78.7%) cases.

DISCUSSION

Childhood injuries are a major public health problem worldwide, and injuries are the leading cause of death for children from early childhood through adolescence[7,8]. In industrialised countries, trauma remains the leading cause of death[9]. The more serious injuries that lead to hospitalization, absence from school and other daily activities and, in the worst cases, to permanent disability, form about 5–10% of all children's injuries[10,11]. These injuries, along with fatal accidents, cause not only major suffering to the children and their families but also a large economic burden to society[12,13].

Several factors influence childhood injuries, including age, sex, behavior, and environment. Of these, age and sex are the most important factors affecting the patterns of injury. Male children younger than 18 years have higher injury and mortality rates[2]. The mortality rate of traumatic injury reach 55% in boys while it reaches 45% in girls as the study of Esposito et al[14] stated in USA. However, Souminen et al[9] found that the rate was 65% in boys and 35% in girls in a study carried out in Finland. It was found to be 69% in boys and 31% in girls in a study carried out in United Arab Emirates (UAE)[15]. Besides, our mortality rate was found comparable with the study of Finland and UAE. Th mortality rate was quite high in boys compared to the mortality rate in girls. Perhaps in part because of their more aggressive behavior and exposure to contact sports.

Mortality rates and injury types differ among different age groups in childhood traumas. The mortality rate was highest (55%) among children 15 to 18 years according to the study in Turkey[16]. It was found as 28% in children 0 to 5 years and 38% in children 11 to 15 years of age. In the infant and toddler age group, falls were a common cause of severe injury, whereas bicycle-related mishaps, with or without the interaction of motor vehicles, were the main causes of injury among older children and adolecents[4]. The highest mortality was 28% in children among 1 to 4 years of age, according to a study carried out in UAE[15]. Falls were the most encountered injury cause, however traffic accidents were the most lethal injury cause. Falls were the most encountered injury cause among children 6 to 13 years of age in Turkey[17]. Besides, mortality was mostly encountered among children 5 to 9 years of age and vehicle accidents were the most encountered cause in our study.

Traffic injuries and pedestrian injuries in particular are an important and preventable cause of severe morbidity to children[18]. MVAs are the leading cause of death among children over the age of 1 year, accounting for 18 percent of all deaths and 37 percent of all deaths due to trauma[2]. MVAs were the most encountered mortality cause among adults and children in many studies carried out in Europe, America, Japan and Africa[9,14,19,20]. The majority of all injuries (58.2 per cent) and deaths (59.3 per cent) in children were caused by road traffic accidents in Helsinki[9]. Martin et al[21] stated that the majority of school children experience bicycle accidents and vehicle accidents outside the vehicles. Furthermore, Remers et al[22] found that children experience bicycle and pedestrian injuries more than adults. However, falls were found as the leading cause of injury in nonmortal traumas[17]. MVAs were found as the leading cause of injury as other studies state, and the majority of mortalities were experienced with vehicle crash outside the vehicles in our study. Besides, falls were the following cause of mortality following vehicle accidents.

Studies state that the frequency of murders is increasing in childhood deaths in Europe. The frequency of murders was found as 11% by Salacin et al[23] in Adana, 18.8% by Aksoy et al[24] in İstanbul, and 15.7% by Karagoz et al[7] in Antalya. However, we found 6.6% in Afyonkarahisar. This lower frequency of murder may be explained by the cosmopolitan structures of other cities compared to Afyonkarahisar.

Anatomical and physiological properties of children are known to influence the mortality rates from head traumas. Of pediatric traumatic deaths, 75% result from head injury[25]. Among children, the CNS is the most commonly injured isolated system. Because CNS injury is the leading cause of death among injured children, it is the principal determinant of outcome[4]. Head and neck injury was the major type of injury causing death (57.5%)[16]. 85.6 percent had head injury alone, or combined with other injuries[9]. Besides, our study also stated that head and neck injuries were the leading mortality cause.

In conclusion, MVAs and falls are the leading causes in childhood traumas and MVAs were mostly as pedestrian traumas. Mostly head and neck injuries were experienced and deaths were on scene. Besides, judicious physical evaluation may be enough to diagnose the mortality cause. We suggest that new prevention strategies for vehicle accidents and improving health services will decrease the childhood mortality from trauma.

REFERENCES

1. Sala D, Fernandez E, Morant A, et al. Epidemiologic aspects of pediatric multiple trauma in a Spanish urban population. J Pediatr Surg 2000;35:1478-1481.
2. Hauda II WE. Pediatric trauma. In: Tintinalli JE, Kelen GD, Stapczynski JS, editors. Emergency Medicine: A Comprehensive Study Guide. International ed. NewYork, NY: McGraw-Hill; 2003:1614-623.
3. Ruddy RM, Fleisher GR. An Approach to the Injured Child. In: Fleisher GR, Ludwig S, Henretig FM, eds. Textbook of Pediatric Emergency Medicine. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2000:1339-1350.
4. Nguyen TD. Considerations in pediatric trauma. Online eMedicine Journal. October 2, 2003; topic3223.
5. Bulut M, Korkmaz A, Akkose S et al. Epidemiologic and clinical features of childhood falls. Ulus Travma Derg 2002;8:220-223.
6. Wheatley J, Cass DT. Traumatic deaths in children: the importance of prevention. Med J Aust 1989;150:72-8.
7. Karagöz YM, Atılgan M, Karagöz SD, et al. Forensic childhood autopsy. The Bulletin of Legal Medicine. 1999;4:120-122.
8. Parkkari J, Kannus P, Niemi S, et al. Childhood deaths and injuries in Finland in 1971–1995. Int J Epidemiol 2000;29:516-523.
9. Suominen P, Kivioja A, Ohman J, et al. Severe and fatal childhood trauma. Injury 1998; 29:425-430.
10. Stefansdottir A, Mogensen B. Epidemiology of childhood injuries in Reykjavik 1974–1991. Scand J Prim Health Care 1997;15:30–34.
11. Holmdahl L, Ortenwall P. Causes and consequences of trauma in Swedish county 1989–1992. Eur J Surg 1997;163:83–92.
12. Borgman MA, Williams JM, Prescott JE. Injury in West Virginia: an introduction to injury control and prevention. W V Med J 1994;90: 279–283.
13. Lindqvist KS, Brodin H. One-year economic consequences of accidents in a Swedish municipality. Accid Anal Prev 1996;28:209–219.
14. Esposito TJ, Sandal ND, Dean JM, Hansen JD, Reynolds SA, Battan K. Analysis of preventable pediatric trauma deaths and inappropriate trauma care in Montana. J Trauma 1999;47:243-253.
15. Bener A, Al-Salman KM, Pugh RNH. Injury mortality and morbidity among children in the United Arab Emirates. Eur J Epidemiol 1998;14:175-178.
16. Türkmen N, Fedakar R. Unnatural childhood deaths autopsied in Bursa, Turkey between 1996-2001. Anadolu Tıp Derg 2002;4:142-151.
17. Sözüer EM, İkizceli İ, Avşaroğulları L, Yürümez Y, Yavuz Y, Yücel M. Trauma caresteristic of primary-school-age children in the Emergency Department. Türkiye Acil tıp Derg 2004;4:64-467.
18. Durkin MS, Laraque D, Lubman I. Epidemiology and prevention of traffic injuries to urban children and adolescents. Pediatrics 1999;103: 74-78.
19. Meel BL. Mortality of children in the Transkei region of South Africa. Am J Forensic Med Pathol 2003;24:141-147.
20. Nakahara S, Wakai S. Diffirences between Japanese pre-school and school-age pedestrian mortality and morbidity trends. Public Health 2002;116:166-172.
21. Martin V, Langley B, Coffman S. Patterns of injury in pediatric patients in one Florida community and implications for prevention programs. J Emerg Nurs 1995 ;21:12-16.
22. Remmers D, Regel G, Neumann C. Pediatric polytrauma. A retrospective comparison between pediatric, adolescent and adult polytrauma. Unfallchirurg 1998; 10:388-394.
23. Salaçin S, Alper B, Çekin N. Local carestiristic of fatal childhood accident in Adana, Turkey. Adli Tıp Derg 1992;8:125-130.
24. Aksoy E, İnancı A, Çolak B, et al. Childhood deaths, in: 1st Congress of Forensic Science, Adana, April 12–15, 1994;233-235.
25. Scheidler MG, Lynch JM, Ford HR. Pediatric Trauma. In Peitzman AB, Rhodes M, Schwap CW eds: The Trauma Manuel. 2th Ed. Philadelphia, PA. Lippincott Williams & Wilkins; 2004: 446-460.