

Original Research Article

How does mother's working status and number of siblings affect school age child trauma presenting to the emergency department

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ABSTRACT

Background: The aim of this study was to investigate the effects of mother working status and siblings on school-age child trauma admitted to the emergency department and to investigate school-age traumas.

Methods: This prospective study was conducted with the approval of the ethics committee in the emergency department of a training and research hospital. All demographic data of the school-aged children (66 months-18 years) who applied to the emergency department, the location of the trauma, the mechanism of occurrence, the mother's working status, the presence and number of siblings, the duration of stay in the emergency department, clinical outcome and hospital service cost were recorded.

Results: A total of 794 children were included in the study. 263(33.1%) were girls and 531(66.9%) were boys. Soft tissue trauma was the most common (94.3%). The place of the trauma was 62.7% out of school and 37.3% in school. When mother working conditions were analyzed, it was seen that 34.2% did not work. 97.1% of the children had one or more siblings. The most common trauma mechanism (65.6%) was collision and the second (60.6%) was falls. 99.1% of the patients were discharged. The length of stay in the emergency department of the Grade-schooler age group was higher than the Teen age group (p: 0,000). The length of stay in emergency department was higher in patients without siblings (p: 0.017). It was observed that those whose mothers did not work remained in the emergency room longer (p: 0,000). It was found that the ones whose mothers did not work mostly came with trauma mechanism as a result of falling (65.4%) (p: 0.044).

Conclusions: Providing education for protection from accidents in schools and out of school to all people, especially children, parents and teachers, and making safe playgrounds with solid floors will minimize accident and injury rates and severity levels.

Keywords: Child, Emergency medicine, Siblings, Trauma

INTRODUCTION

Trauma is the leading cause of death for the young population (1-44 years) worldwide.¹ Childhood trauma is an important public health problem requiring emergency

intervention and is the most common cause of disability and death.²⁻⁴ Hundreds of thousands of children die each year from injuries or violence, and millions of others suffer the consequences of non-fatal injuries.⁵ Age and gender have the greatest impact on the type of injuries.

Injuries due to falls are the most common cause of trauma for infants and young children, whereas injuries caused by motor vehicle and bicycle accidents are more common in adolescents. In addition, most childhood injuries occur in the home environment.⁶

Death from involuntary injuries constitutes 65% of all injuries among children under 19 years of age. Between 1972 and 1992, motor vehicle accidents were the leading cause of death in childhood between 1-19 years of age, followed by suicide, murder and suffocation. Every year, approximately 20,000 children and adolescents die due to trauma. In particular, boys have more serious injuries and mortality rates in childhood, and more aggressive behavior and contact sports can be considered as the most important reason.⁷ In the United States of America, more than 13 million children and young people are seriously injured every year, which may lead them to an emergency room.⁸

It is well known that trauma rates and associated morbidity and mortality for children are closely related to socioeconomic factors. Various studies have reported that trauma-related injuries and death rates among racial and / or ethnic minority groups, who do not have health insurance, reside in low-income societies and whose mothers are less educated.⁹ Family characteristics are defined as risk factors for pedestrian and motor vehicle accidents in children.¹⁰

The aim of this study was to evaluate the underlying causes and especially how the mother's working status and sibling presence affect the school-aged child trauma patients admitted to the emergency department.

METHODS

This prospective study was conducted with the approval of the ethics committee in the emergency department of a training and research hospital. The study protocol was planned in accordance with the Helsinki Declaration. The study was conducted with 794 children in the school age (66 months-18 years) who applied to the emergency department due to trauma.

Observations, measurements and data collection was done by trauma management of all traumatized patients was performed by the Emergency Medical Specialist according to current advanced trauma life support guidelines. All demographic data of school-age child trauma, age groups (grade-schooler: 5-12 years and teen:12-18 years) applied to emergency department, time zone, place of trauma (divided into two groups; in-home, out-of-school, in-school) (out-of-school), the mechanism of the occurrence of trauma (falling, collision with each other or an object, falling from cycling, traumas in sports activities), whether the mother is working, the presence of siblings, the general status, Glasgow Coma Scale (GCS), traumatized body area, diagnostic tests, requested consultations, duration of stay in emergency department,

clinical outcome in emergency department and hospital service cost were recorded.

Inclusion criteria

- Patients admitted to the emergency department; school-age trauma children whose parents agreed to participate in the study and whose consent was filled out were included.

Exclusion criteria

- Patients older than 18 years, non-trauma admissions, referral patients from the external center (those whose first intervention was performed at the external center), and patients without consent were not included in the study.

Statistical analysis

IBM SPSS Statistics 22 (SPSS IBM, Turkey) programs were used for statistical analysis. When evaluating the study data, the suitability of the parameters to normal distribution was evaluated with Shapiro Wilks test. The Mann Whitney U test was used for comparison of the non-normally distributed parameters in the comparison of quantitative data as well as descriptive statistical methods (mean, standard deviation, frequency). The chi-square test, Fisher's Exact test, Fisher Freeman Halton test and Continuity (Yates) Correction were used to compare the qualitative data. Spearman's rho correlation analysis was used to investigate the relationships between the parameters not conforming to normal distribution. Significance was evaluated at $p < 0.05$.

RESULTS

The study was conducted with 794 children, 263(33.1%) of which were girls and 531(66.9%) of them were boys. The mean age of the children was 10.85 ± 3.17 years. The demographic characteristics and distribution of the study parameters were given in (Table 1). The length of stay in the emergency department ranged from 10 to 480 minutes, with a mean of 69.72 ± 73.28 minutes. The average cost of emergency services was 48.09 ± 40.91 Turkish Liras (TL). In terms of the location of trauma, 77.7% were outside the home, 22.3% were inside the home, 62.7% were out of school and 37.3% had trauma at school, 99.1% of the children were discharged. When trauma types were examined, it was found that 65.6% had trauma by impact-collision, 60.6% had falls, 4.4% had bicycles and 32.7% had trauma as a result of sports activity. The evaluation of sibling presence and study parameters is given in (Table 2). The length of stay in the emergency department was longer in patients without siblings ($p < 0.017$). The rate of working mothers (66.4%) of the children with siblings was higher ($p < 0.016$). There was no significant difference between sibling and non-sibling in terms of impact-collision, fall, trauma due to sports activities ($p > 0.05$).

Table 1: Distribution of study parameters and demographic characteristics.

		n	%
Length of stay in the emergency service	Min-Max, Avr±SS (Median)	10-480	69.72±73.28(30)
Emergency service cost (Turkish lira)	Min-Max, Avr±SS (Median)	0-375.4	48.09±40.91(30)
Age	Min-Max, Avr±SS	6-17	10.85±3.17
Age group	Gradeschooller	442	55.7
	Teen	352	44.3
Gender	Girl	263	33.1
	Boy	531	66.9
Mother working status (N=786)	0 (Not working)	269	34.2
	1 (Working)	517	65.8
Sibling presence	No	23	2.9
	Yes	771	97.1
Diagnose	Soft tissue trauma	758	95.4
	Superficial head injury	31	3.9
	Burn	5	0.6
The location of trauma 1.group	Out of house	617	77.7
	In the house	177	22.3
The location of trauma 2.group	Out of school	498	62.7
	Inside school	296	37.3
Clinical outcome	Discharged	787	99.1
	Hospitalized and referral to another hospital	7	0.9
Impact-collision	Other	273	34.4
	Impact-collision	521	65.6
Fall	Other	313	39.4
	Fall	481	60.6
Bicycle	Other	759	95.6
	Bicycle	35	4.4
Sport activity	Other	534	67.3
	Sport activity	260	32.7

Table 2: Evaluation of study parameters among sibling groups.

	Sibling group		p
	No	Yes	
	n (%)	n (%)	
Length of stay in the emergency service	98.26±87.43(60)	68.87±72.71(30)	¹ 0,017*
Emergency service cost	68.39±70.14(41.9)	47.49±39.62(30)	¹ 0,344
Mother working status	No	10 (%66.7)	² 0,016*
	Yes	5(%33.3)	
The location of trauma 1.group	Out of the house	18(%78.3)	² 1,000
	In the house	5(%21.7)	
The location of trauma 2.group	Out of school	15(%65.2)	² 0,974
	Inside school	8(%34.8)	
Impact-collision	Other	7(%30.4)	² 0,856
	Impact-collision	16 (%69,6)	
Fall	Other	8 (%34,8)	² 0,806
	Fall	15 (%65,2)	
Bicycle	other	21 (%91,3)	³ 0,269
	bicycle	2 (%8,7)	
Sport activity	Other	14 (%60,9)	² 0,662
	Sport activity	9 (%39,1)	

Table 3: Evaluation of working parameters among maternal working conditions.

		Mother working status		p
		No	Yes	
		N (%)	N (%)	
Length of stay in the emergency service <i>Avr±ss (median)</i>		92.75±65.22(60)	57.7±74.64(30)	¹ 0,000*
Emergency service cost <i>Avr±ss (median)</i>		50.43±40.95(30)	46.71±40.31(30)	¹ 0,065
Radiological	No	21(%7.8)	45(%8.7)	² 0,667
	Yes	248(%92.2)	472(%91.3)	
The location of trauma 1.group	Out of house	208(%77.3)	402(%77.8)	² 0,890
	In the house	61(%22.7)	11(%22.2)	
The location of trauma 2.group	Out of school	158(%58.7)	334(%64.6)	² 0,107
	Inside school	111(%41.3)	183(%35.4)	
Impact-collision	Other	88(%32.7)	183(%35.4)	² 0,453
	Impact-collision	181(%67.3)	334(%64.6)	
Fall	Other	93(%34.6)	217(%42)	² 0,044*
	Fall	176(%65.4)	300(%58)	
Bicycle	Other	262(%97.4)	491(%95)	³ 0,155
	Bicycle	7(%2.6)	26(%5)	
Sport activity	Other	147(%54.6)	381(%73.7)	² 0,000*
	Sport activity	122(%45.4)	136(%26.3)	

The evaluation of maternal working status and working parameters is given in (Table 3). The duration of stay in the emergency department was longer for those whose mothers did not work (p: 0.000). There was no significant difference in terms of the cost of emergency services between mothers' employees and non-employees (p>0.05). There was no difference between the first and

second groups in terms of the location of the trauma between the mother's employees and non-employees (p>0.05). The rate of trauma due to falls (65.4%) was found to be significantly higher in the group whose mothers who did not work (p: 0.044). The rate of trauma occurring as a result of sports activity (45.4%) of those whose mothers did not work was significantly higher than that of whose mothers worked (26.3%) (p:0.000).

Table 4: Evaluation of study parameters among groups of trauma areas.

		The location of trauma 2. Group		p
		Out of school	Inside school	
		n (%)	n (%)	
Length of stay in the emergency service <i>Avr±ss (median)</i>		69.76±75.95(30)	69.66±68.68(40)	¹ 0.494
Emergency service cost <i>Avr±ss (median)</i>		51.39±44.42(30)	42.54±33.53(30)	¹ 0.000*
Radiological	No	54(%10.8)	15(%5.1)	² 0.008*
	Yes	444(%89.2)	281(%94.9)	
Impact-collision	Other	176(%35.3)	97(%32.8)	³ 0.461
	Impact-collision	322(%64.7)	199(%67.2)	
Fall	Other	211(%42.4)	102(%34.5)	³ 0.027*
	Fall	287(%57.6)	194(%65.5)	
Bicycle	Other	463(%93)	296(%100)	² 0.000*
	Bicycle	35(%7)	0(%0)	
Sport activity	Other	355(%71.3)	179(%60.5)	³ 0.002*
	Sport activity	143(%28.7)	117(%39.5)	

¹Mann Whitney U test ²Continuity (yates) correction ³Chi-square test *p<0.05

The cost of emergency service was significantly higher in traumatized patients outside the school (p:0.000). The

rate of trauma due to falls (57.6%) was lower in traumatized out-of-school trauma (65.5%) than those who

had trauma in school (p:0.027). The rate of trauma (28.7%) as a result of sports activities was significantly lower in traumatized patients outside the school (p:0.002).

The relationship between the cost of emergency service and the length of stay in the emergency room is shown in (Table 5 and Figure 1). A significant positive correlation was found between the values of emergency service cost and length of stay in the emergency department (38.7%) (p:0.000).

Table 5: Evaluation of the correlation between emergency service cost and length of stay in emergency service.

		Emergency service cost
Length of stay in the emergency service	r	0,387
	p	0,000*

Spearman rho correlation analysis *p<0.05

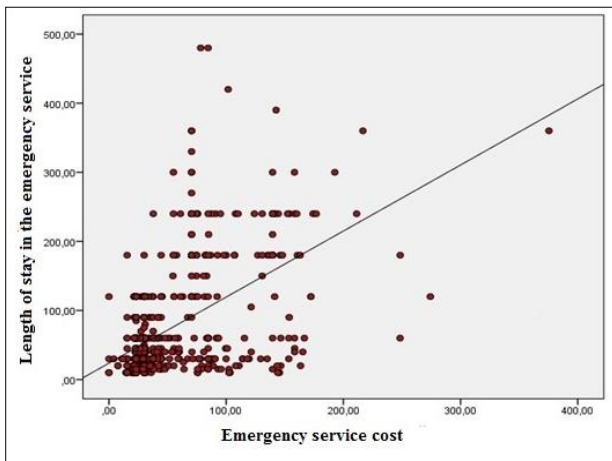


Figure 1: Relationship between the cost of emergency service and the length of stay in the emergency room.

DISCUSSION

In this study, which included school age children admitted the clinic due to trauma, the mean age of the male patients was higher (66.9%) and the mean age was 10.85±3.17. In the literature, in the study designed by Marcin et al, on pediatric traumas, 67.6% of the patients were male and the mean age was 12.6 years.⁹ In the study of Soreide et al, the mean age was 13 years and in the study conducted by Mihalicz et al, the mean age was 11 years.^{11,12} As can be seen in the study in accordance with the literature, the rate of boys is higher, they are more active than girls, their games are more rigid and based on physical strength, more out-of-home activities than girls, less parental supervision can be explained as.

In a study conducted in İzmir, the duration of stay in the emergency department was 160.8 minutes.¹³ In this study, it was seen that the duration of stay in the emergency

department of those without siblings was extended to 185 minutes and those whose mothers did not work were extended to 157 minutes. The shorter duration of the emergency service stay of the mother employees and siblings depends on work and other sibling liability. Although these are the responsibilities, we can say that the application of trauma follow-up before the end of medical care will prevent against more serious consequences. A positive correlation (38.7%) was found between the values of emergency service cost and length of stay in the emergency department. We think that these long stay periods, which are consistent with the literature, are due to the patients with more severe trauma, which are directly proportional to the cost of the service, in patients diagnosed with long-term follow-up in the emergency department and due to the lack of space in the hospital.

In this study, falls were found to be the most common causes of trauma (60.6%). In the literature, it was seen that the fall rate was 40.67% in the study conducted by Tambay et al. In the study conducted by Sozuer et al, it was found to be in the first place with 26.1%.^{14,15}

The high rate of fall and collision among school-age children can be explained by the choice of climbing trees, playing on walls and high places and choosing climbing games in playgrounds.

In the literature, Coreil et al, reported that working mothers did not contribute positively to the fall rates of children and even stated that the mother's study contributed to preventive practices from accidents.¹⁶ Author found that the children whose mothers were working had less trauma due to falls and sports activities (58% and 26.3%). This result, which is consistent with the literature, is thought to be due to the fact that working mothers inform and warn more about preventive and protective measures especially from school-age children.

In the literature, Sozuer et al, reported that trauma of school children who applied to the emergency department was the most common fall outside the school (40.3%) and traffic accidents (38.3%).¹⁵ In this study, traumas were found to be high outside the school (62.7%) and we can explain the high number of falls and traffic accidents in school age children by spending most of their time outside.

In many studies, discharge rates of trauma patients were 65.33%, 65.97%, 50.15% respectively and were found to be higher than hospitalization rates.^{15,17,18} In this study, discharge rates were higher than hospitalization (99.1%) compared to the literature. This high rate causes simple injuries to be applied to the emergency department more quickly and easily because our hospital is located in the city center and there are many schools in the vicinity.

In the literature, it was stated that the hospital service costs of trauma patients were \$ 52.85 (USA dollars) and

\$ 84.68(USA dollars) in 2014 and 2016, respectively.^{19,20} Author found that the average hospital service cost of trauma patients was 8,48±7,21 \$. The hospital service costs, which are less than the literature, are encountered with less hospital service costs due to the fact that school traumas are simple falls and crash-collision minor traumas compared to traumas occurring outside the school (falling from high, traffic accident etc.).

Limitations of the study was conducting the study in the tertiary level emergency department of our hospital could not be considered as the limitation of the study as the fact that the patients who applied to the 1st and 2nd level emergency services of other hospitals in the city and / or the country could not provide detailed information on the demographic characteristics, general conditions and clinical results of the patients could be considered. Author also think that the fact that the study was conducted in a certain age range and did not cover all ages and included a period of 6 (six) months may be a limitation in terms of both clinical outcomes and hospital service costs.

CONCLUSION

In this study, the effects of mother working status and sibling presence on school-age child traumas and school-age traumas was examined. It can be said that traumas due to falls and sports activities are seen less frequently as a result of being informed by the mothers about preventive and preventive measures from accidents due to the fact that working children are away from parental control. The presence and number of siblings do not have any positive or negative relationship with the mechanism of trauma formation. Taking preventive measures to prevent trauma in childhood and especially in schools and out-of-school areas will reduce the number of cases.

Providing education for protection from accidents in schools and out of school to all people, especially children, parents and teachers, and making safe and playgrounds with solid floors a will minimize accident and injury rates and severity levels.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. American College of Surgeons, Committee on Trauma, National Trauma Data Bank (NTDB). Available at: <http://www.facs.org/trauma/ntdb>. Accessed May 12, 2016.
2. American Academy of Pediatrics, Pediatric Orthopaedic Society of North America. Management of pediatric trauma. *Pediatr*. 2008 Apr 1;121(4):849-54.
3. Sala D, Fernández E, Morant A, Gascó J, Barrios C. Epidemiologic aspects of pediatric multiple trauma

- in a Spanish urban population. *J Pediatr Surg*. 2000 Oct 1;35(10):1478-81.
4. Hauda II WE. Pediatric trauma. In: Tintinalli JE, Kelen GD, Stapczynski JS, editors. *Emergency Medicine, A Comprehensive Study Guide*. International ed. USA: McGraw-Hill; 2000:1614-1623.
5. T Elizabeth Scott I. Child injuries in context. In: Peden M, Oyegbite K, Ozanne-Smith J, Hyder AA, Branche C, AKM Fazlur Rahman, et al. *World report on child injury prevention*. Switzerland: WHO Press; 2008:1-30.
6. Alterman DM, Daley BJ, Kennedy A et al. Considerations in pediatric trauma, 2009. URL:<http://emedicine.medscape.com/article/435031-overview>. Accessed 25 July 2019.
7. Fabricant PD, Robles A, Downey-Zayas T, Do HT, Marx RG, Widmann RF, et al. Development and Validation of a Pediatric Sports Activity Rating Scale: The Hospital for Special Surgery Pediatric Functional Activity Brief Scale (HSS Pedi-FABS). *Am J Sports Med*. 2013;41(10):2421-9.
8. Centers for Disease Prevention and Control, Health, United States, Injury, 2014. Available at: www.cdc.gov/nchs/hsus/injury.htm. Accessed 28 August, 2015.
9. Marcin JP, Schembri MS, He J, Romano PS. A Population-Based Analysis of Socioeconomic Status and Insurance Status and Their Relationship With Pediatric Trauma Hospitalization and Mortality Rates. *Am J Public Health*. 2003;93(3):461-6.
10. Celis A, Gomez Z, Martinez-Sotomayor A, Arcila L, Villaseñor M. Family characteristics and pedestrian injury risk in Mexican children. *Inj Prev*. 2003;9(1):58-61.
11. Soreide K, Kruger AJ, Ellingsen CL, Tjosevik KE. Pediatric trauma deaths are predominated by severe head injuries during spring and summer. *Scand J Trauma Resusc Emerg Med*. 2009;17:3.
12. Mihalicz D, Phillips L, Bratu I. Urban vs rural pediatric trauma in Alberta: where can we focus on prevention? *J Pediatr Surg*. 2010;45:908-11.
13. Oktay C, Cete Y, Eray O, Pekdemir M, Gunerli A. Appropriateness of emergency department visits in a Turkish university hospital. *Croatian Med J*. 2003 Oct 1;44(5):585-91.
14. Tambay G, Satar S, Kozaci N, Acikalin A, Ay MO, Gulen M, et al. Retrospective analysis of pediatric trauma cases admitted to the emergency medicine department. *J Acad Emerg Med*. 2013;12(1):8.
15. Sözüer EM, İkizceli İ, Avşaroğulları L, Yürümez Y, Yavuz Y, Yücel M. Trauma care characteristic of primary school-age children in the Emergency Department. *Türkiye Acil Tıp Derg*. 2004;4:464-7.
16. Coreil J, Wilson F, Wood D, Liller K. Maternal employment and preventive child health practices. *Prev Med*. 1998;27(3):488-92.
17. Sever M, Saz EU, Kosargelir M. An evaluation of the pediatric medicolegal admissions to a tertiary hospital emergency department. *Ulus Travma Acil Cerrahi Derg* 2010;16:260-7.

18. Navascues del Rio JA, Romero Ruiz RM, Soleto Martin J, et al. First Spanish trauma registry: analysis of 1500 cases. *Eur J Pediatr Surg.* 2000;10:310-8.
19. Akay N, Çelik GK, Karakayalı O, Memiş M, Tanrıverdi F, Vural S, et al. The effects of blood alcohol levels on the severity of injury and on cost in the traumas caused by motor vehicle accidents. *Ankara Med J.* 2014;14(1):5-10.
20. Dogan S, Acar N, Cevik AA, Özakin E, Kaya FB, Arslantas D. The relationship between blood alcohol concentration and injury severity in patients

admitted to the hospital emergency department after a motor vehicle accident. *J Acad Emer Med.* 2016 Sep 1;15(3):121-5.

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