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, 44.4% 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.

| Parameter                                      | 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   |
| **Gender**                                                                 |
| Male                          | 442   | 55.7          |
| Female                        | 352   | 44.3          |
| **Age group**                 |
| Gradeschooler                 |       |               |
| Teen                          |       |               |
| Boy                           |       |               |
| **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           |
| **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.

| Parameter                                      | No (%) | Yes (%) | p       |
|------------------------------------------------|--------|---------|---------|
| Length of stay in the emergency service (Avr±SS (Median)) | 98.26±87.43(60) | 68.87±72.71(30) | 0.017* |
| Emergency service cost (Avr±SS (Median))               | 68.39±70.14(41.9) | 47.49±39.62(30) | 0.344   |
| Mother working status                                  |
| No                                                          | 10 (%66.7) | 259 (%33.6) | 0.016* |
| Yes                                                         | 5 (%33.3)  | 512 (%66.4)|         |
| The location of trauma 1.group                           |
| Out of the house                                          | 18 (%78.3) | 599 (%77.7)| 1.000   |
| In the house                                              | 5 (%21.7)  | 172 (%22.3)|         |
| The location of trauma 2.group                           |
| Out of school                                             | 15 (%65.2) | 483 (%62.6)| 0.974   |
| Inside school                                             | 8 (%34.8)  | 288 (%37.4)|         |
| Impact-collision                                          |
| Other                                                      | 7 (%30.4)  | 266 (%34.5)| 0.856   |
| Impact-collision                                          | 16 (%69.6) | 505 (%65.5)|         |
| Fall                                                       |
| Other                                                      | 8 (%34.8)  | 305 (%39.6)| 0.806   |
| Fall                                                       | 15 (%65.2) | 466 (%60.4)|         |
| Bicycle                                                   |
| other                                                      | 21 (%91.3) | 738 (%95.7)| 0.269   |
| bicycle                                                   | 2 (%8.7)   | 33 (%4.3) |         |
| Sport activity                                            |
| Other                                                      | 14 (%60.9) | 520 (%67.4)| 0.662   |
| Sport activity                                            | 9 (%39.1)  | 251 (%32.6)|         |
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 3: Evaluation of working parameters among maternal working conditions.

| Mother working status | No (%) | Yes (%) | p       |
|-----------------------|--------|---------|---------|
| Length of stay in the emergency service *Av* [median] | 92.75±65.22 [60] | 57.7±74.64 [30] | 1.000* |
| Emergency service cost *Av* [median] | 50.43±40.95 [30] | 46.71±40.31 [30] | 1.0065 |
| Radiological | No | Yes | 2.067 |
| The location of trauma 1.group | Out of house | 208±77.3 | 402±77.8 | 2.0890 |
| | In the house | 61±22.7 | 11±22.2 | 2.0017 |
| The location of trauma 2.group | Out of school | 158±58.7 | 334±64.6 | 2.0107 |
| | Inside school | 111±41.3 | 183±35.4 |
| Impact-collision | Other | 88±32.7 | 183±35.4 | 2.0453 |
| | Impact-collision | 181±67.3 | 334±64.6 |
| Fall | Other | 93±34.6 | 217±42 | 2.004 |
| | Fall | 176±65.4 | 300±58 |
| Bicycle | Other | 262±97.4 | 491±95 | 3.155 |
| | Bicycle | 7±2.6 | 26±5 |
| Sport activity | Other | 147±54.6 | 381±73.7 | 2.000 * |
| | Sport activity | 122±45.4 | 136±26.3 |

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

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

| The location of trauma 2. Group | Out of school | Inside school | p       |
|---------------------------------|---------------|---------------|---------|
| n (%)                           | n (%)         | p            |
| Length of stay in the emergency service *Av* [median] | 69.76±75.95 [30] | 69.66±68.68 [40] | 1.494 |
| Emergency service cost *Av* [median] | 51.39±44.42 [30] | 42.54±33.53 [30] | 1.000* |
| Radiological | No | 54±10.8 | 15±5.1 | 2.008* |
| | Yes | 444±89.2 | 281±94.9 |
| Impact-collision | Other | 176±35.3 | 97±32.8 | 3.461 |
| | Impact-collision | 322±64.7 | 199±67.2 |
| Fall | Other | 211±42.4 | 102±34.5 | 3.027* |
| | Fall | 287±57.6 | 194±65.5 |
| Bicycle | Other | 463±93 | 296±100 | 2.000* |
| | Bicycle | 35±7 | 0±0 |
| Sport activity | Other | 35±71.3 | 179±60.5 | 3.002* |
| | Sport activity | 143±28.7 | 117±39.5 |

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

| Length of stay in the emergency service | Emergency service cost | r  | 0.387 |
|----------------------------------------|------------------------|----|-------|
| Spearman rho correlation analysis      |                        | p  | 0.000*|

![Figure 1: Relationship between the cost of emergency service and the length of stay in the emergency room.](image)

### 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. 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. 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 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%. 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. 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%). 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. 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...
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 crush-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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