ORIGINAL ARTICLE

DOI: 10.4274/eamr.galenos.2022.43265
Eur Arch Med Res 2023;39(1):26-29

Selection of the Appropriate Population for Education to Prevent Pediatric Head Trauma

Haydar Gök, Gökhan Perçinoğlu

University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital, Clinic of Neurosurgery, İstanbul, Turkey

Abstract

Objective: Pediatric head trauma is one of the leading causes of childhood death. However, it is possible to reduce deaths with measures to be taken. Since it is important to educate the person(s) responsible for the care of the child and for whom the education should be applied first, we aimed to conduct a study to shed light on this situation.

Methods: 14,243 patients aged 0-6 years admitted to the emergency department with head trauma were included in the study. Apart from the routine parameters, who was responsible for the care of the patient during the trauma was questioned. It was investigated whether there was a correlation between the person(s) who took care of the patient and the severity of the trauma.

Results: It was determined that patients in all age groups were predominantly under maternal supervision. For the remaining patients, older siblings and fathers in younger age groups; in older age groups, grandmother, grandmother and grandfather played the role of caregiver. Non-family persons, who constitute a very small group in caregiving, show an equal distribution for age groups. The incidence of moderate head trauma was found to be higher in patients who were cared for by third parties, compared to other caregiver groups ($p<0.05$). No relationship was found between the mild and severe head trauma and caregiver groups.

Conclusion: Mortality and morbidity rates due to pediatric head trauma are high. It is possible to prevent traumas with the education of caregivers. Clinical experiences can provide guidance on what kind of training programs will be prepared and which groups of caregivers will receive these training primarily.

Keywords: Pediatric head trauma, community education, trauma preventive training

INTRODUCTION

Head trauma is one of the leading causes of mortality amongst the pediatric population in developed countries (1,2). Most of the childhood head traumas are preventable injuries; therefore, precautions can decrease the incidence rates and devastating consequences that may be attributed to trauma (3). Especially when preschool ages are examined, the importance of people who take care of the children increases. Moreover, educational level of the caregiver and the intensity of affection towards the child can affect the mechanism and severity of trauma. Children who are looked after by caregivers with male gender, low-income, teenage parenting or impulse control disorders have a higher risk of trauma (4). There are studies that demonstrate positive outcomes after parental training on preventing trauma (5). When examining pre-school pediatric head traumas in our society, identification of an individual that is responsible for the child's care is crucial for targeted solutions and educational planning. We aim to help in the quality and content of trauma education, along with decreasing trauma incidences.

METHODS

In the study, 14,243 pediatric patients were analyzed who were aged between 0-6 years and admitted with head trauma to the emergency department of our city hospital between 2016-2022.

Address for Correspondence: Haydar Gök, University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital, Clinic of Neurosurgery, İstanbul, Turkey
Phone: +90 506 309 29 65 **E-mail:** haydarctf@hotmail.com **ORCID ID:** orcid.org/0000-0002-5211-7388

Received: 29.03.2022
Accepted: 05.08.2022

Cite this article as: Gök H, Perçinoğlu G. Selection of the Appropriate Population for Education to Prevent Pediatric Head Trauma Eur Arch Med Res 2023;39(1):26-29

Patients were either evaluated by neurosurgeons primarily or consulted to neurosurgery department by other departments. Age, gender, and mechanism of trauma of the patients were recorded. The relationship between the caregiver and the patient was also noted. Mechanism of trauma was categorized as fall, traffic accident, assault and other causes (explosion, gunshot, etc.). The Glasgow Coma scale (GCS) was used in the evaluation of trauma severity and neurological status of the patients. Patients with a GCS of 13-15 were categorized as mild, GCS of 9-12 as moderate and GCS of 3-8 as severe trauma.

Along with other routine examinations, brain computed tomography (CT) was obtained from patients with moderate and severe head trauma. In patients with mild trauma, CT scans were performed only if there were signs of headache, vomiting, amnesia, drowsiness or mental/motor changes. Patients without these complaints were observed closely.

This study, the University of Health Sciences Turkey, Prof. Dr. Cemil Tascioglu City Hospital (04.04.2022, 89) approved.

Statistical Analysis

Statistical analysis was performed using Excel and the SPSS 22.0 statistical package software. Continuous variables were summarized as medians or means and standard deviations. The influence of all the categorical variables was tested using the chi-square test. A two-sided p value of <0.05 was considered to be statistically significant. A multivariate analysis was then carried out using a forward stepwise logistic regression analysis.

RESULTS

The mean age of 14,243 patients was 3.17 (±1.58). Five thousand four hundred twelve were female (38%) and 8.831 were male (62%). Falls were encountered in 12,391 (87%) patients, traffic accident was the cause of trauma in 1.709 (12%) and assault was noted in 143 (<2%) of patients. Majority of falls occurred from a cradle, parent's lap, seat or chair or from the ground height while playing or attempting to walk especially in toddlers. In addition, falls outside the home occurred while playing in the park or in the day-care center. Most of the traffic accident cases were in-vehicle and involved hitting the heads of children who were usually in their mother's embrace. Assaults were mainly caused by blunt trauma with toys or other objects that were thrown by a sibling or a playmate.

Fourteen thousand two hundred two patients had mild, 34 patients had moderate and seven patients had severe head trauma (Table 1). Sixty-seven patients were operated on epidural hematoma, subdural hematoma and displaced cranial fracture or open compression fracture (Table 2). Six hundred ninety-eight patients were hospitalized and monitored due to cranial fracture (linear, non-displaced), traumatic contusion or non-operative epidural/subdural hematoma (Table 3).

During the trauma of these patients, mothers in 12,027 patients, fathers or siblings in 767 patients, grandfathers or grandmothers in 1.292 patients and non-family members in 157 patients were responsible for caregiving. In all age groups, the mother was clearly the major attendee. Fathers and siblings were found to be more common in the first age groups and in older age groups, grandparents, who assumed the role of caregivers, came to the fore. Non-family persons were equal in all age groups (Table 4).

Statistically; moderate head trauma was more common in patients who were in the care of non-family individuals compared to other caregiver groups ($p<0.05$). No significant relationship was found between the caregiver groups in mild and severe traumas.

Table 1. Number of patients according to trauma severity

Trauma severity	Number of patients
Mild (GCS 13-15)	14,202
Moderate (GCS 9-12)	34
Severe (GCS 3-8)	7

GCS: Glasgow Coma scale

Table 2. Data of operated patients

Reason for operation	Number of patients
Compression fracture	37
Epidural hematoma	25
Subdural hematoma	5

Table 3. Patients hospitalized and followed up

Follow-up	Number of patients
Fracture	352
Contusion	243
Thin epidural/subdural hematoma	103

Table 4. Distribution of the number of patients according to the people who caregiver at the time of trauma and the severity of the trauma

Caregiver at the time of trauma	Trauma severity		
	Mild	Moderate	Severe
Mother	12,003	20	4
Father or sibling	762	3	2
Grandmother/father	1.290	1	1
Third person	147	10	0

DISCUSSION

Although ethnic and cultural differences can lead to demographic changes, the mother is the main person who takes care of the children because of the traditions of our society. In our study rate of the mother is 85%. In recent years, women are more involved in business life and their roles in socio-economic life have increased, thus caregiver support was desired for childcare. Because of our strong family relationships, family elders volunteered on the role of caregiving and salaried caregivers are very rare in our country unlike classical notions. In our study group, family members are favored to other third person caretakers. When the mother care-giving group is omitted, only in 6% a third person is giving the care, 94% a family member is taking care of the child.

The most common age range in childhood traumas has been determined as 3-7 years and in many studies, the rate of boys was found to be significantly higher than girls (3,6-9). However, between zero and three ages, no significant difference was observed between genders (10). Depending on the child's growth, the time spent outside the home increases, constant movement, and the desire to play makes the child more vulnerable to trauma. This situation is more evident in the male gender, and our study confirms this. Before the age 3, the incidence of trauma is same between genders but after age 3 male gender is more prone to trauma. After age 3, 62% of the patients were boys.

Shaken child syndrome has been reported more recently because of studies on awareness of the issue; however, there was no child with this diagnosis in our study. This can be caused by the inability to examine the trauma history in depth in emergency conditions or concealment of the truth by those responsible for the child's care. In our study, we think, having no information about the shaken baby syndrome in the records is also important information.

According to studies, anamnesis after autopsy could be obtained from the family in 40% of patients with a diagnosis of shaken child syndrome. Other families reported different causes of trauma (11). Even this situation indicates the importance of targeted education to family and other caregivers. Durkin et al. (5) showed that education on traffic rules and providing secure playgrounds had an essential role in decreasing trauma rates. However, in our study, caregiver education is of paramount importance due to the challenges in providing such a training for pre-school children.

CONCLUSION

In conclusion, pediatric head traumas cause many deaths and high expenditure in our country as well as all over the world. Education plays an important role in preventing undesirable consequences of trauma along with the training of the caregiver especially in pre-school era. Demographic structures of countries cause variation in the distribution of caregivers. In our study, according to our finding we suggest that if we are to choose a group of people to educate for child trauma that group must definitely include mothers. 85% of trauma takes place under maternal witness. If our resources are limited, we can omit the babysitters, because when the mother is not involved, %94 of the time a family member is giving the care at the time of trauma. Increasing the number of studies on this topic in our country will help in the quality and content of education, along with decreasing trauma incidences.

Ethics

Ethics Committee Approval: University of Health Sciences Turkey, Prof. Dr. Cemil Tascioglu City Hospital (04.04.2022, 89).

Informed Consent: Informed consent was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: H.G., G.P., Concept: H.G., Design: H.G., Data Collection or Processing: G.P., Analysis or Interpretation: H.G., G.P., Literature Search: H.G., Writing: H.G., G.P.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

REFERENCES

1. DiGuiseppi C, Roberts IG. Individual-level injury prevention strategies in the clinical setting. Future Child 2000;10:53-82.
2. Kidder K, Stein J, Frase J. The health of Canada's children. A CICH profile 3rd ed. Ottawa (Ontario): Canadian Inst of Child Health 2000:81-102.
3. Işık HS, Gökyar A, Yıldız O, Bostancı U, Ozdemir C. Pediatric head injuries, retrospective analysis of 851 patients: an epidemiological study. Ulus Travma Acil Cerrahi Derg 2011;17:166-72.
4. Duzinski SV, Guevara LM, Barczyk AN, Garcia NM, Cassel JL, Lawson KA. Effectiveness of a pediatric abusive head trauma prevention program among Spanish-speaking mothers. Hisp Health Care Int 2018;16:5-10.
5. Durkin MS, Laraque D, Lubman I, Barlow B. Epidemiology and prevention of traffic injuries to urban children and adolescents. Pediatrics 1999;103:e74.

6. Mast JE, Antonini TN, Raj SP, Oberjohn KS, Cassedy A, Makoroff KL, et al. Web-based parenting skills to reduce behavior problems following abusive head trauma: a pilot study. Child Abuse Negl 2014;38:1487-95.

7. Güzel A, Karasalihoğlu S, Küçükuğurluoğlu Y. Evaluation of the fall-related trauma cases applied to our pediatric emergency department. Ulus Travma Acil Cerrahi Derg 2007;13:211-6.

8. Schneier AJ, Shields BJ, Hostetler SG, Xiang H, Smith GA. Incidence of pediatric traumatic brain injury and associated hospital resource utilization in the United States. Pediatrics 2006;118:483-92.

9. Gurses D, Sarioglu Buke A, Baskan M, Herek O, Kilic I. Epidemiologic evaluation of trauma cases admitted to a pediatric emergency service. Ulus Travma Derg 2002;8:156-9.

10. Love PF, Tepas JJ 3rd, Wludyka PS, Masnita-Iusan C. Fall-related pediatric brain injuries: the role of race, age, and sex. J Trauma 2009;67:S12-5.

11. Gill JR, Goldfeder LB, Armbrustmacher V, Coleman A, Mena H, Hirsch CS. Fatal head injury in children younger than 2 years in New York City and an overview of the shaken baby syndrome. Arch Pathol Lab Med 2009;133:619-27.