

Physicians' attitudes and perception of pediatric trauma cost

Tutku Soyer¹, Özlem Tekşam², Feyza Türkmen¹, Aytül Çakmak³, Murat Çakmak¹

Departments of ¹Pediatric Surgery and ³Public Health, Kırıkkale University Faculty of Medicine, Kırıkkale, and ²Department of Pediatrics, Hacettepe University Faculty of Medicine, Ankara, Turkey

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Pediatric trauma is the leading cause of mortality and morbidity in children. A questionnaire was applied to evaluate physicians' attitudes and perception of pediatric trauma cost.

Physicians working in the field of pediatric trauma (namely those who work in emergency services, pediatrics and pediatric surgery departments; who are consulted regarding pediatric traumas; and those for whom pediatric trauma patients constitute the majority of their patient spectrum) were enrolled in the survey. A questionnaire was administered to elicit the demographic data, features of pediatric trauma in their practice, self-perception of pediatric trauma knowledge, estimation of trauma severity, parameters used for pediatric trauma diagnosis, and perception of pediatric trauma score (PTS) and trauma cost.

A total of 103 physicians responded to the questionnaire (median age: 30.8 ± 5.6 years; range: 24–56). Of the 103 respondents, 49 were males (47.6%) and 54 were females (52.4%). Physicians responding to the questionnaire were specialists in Pediatrics (32.9%), Pediatric Surgeons (5.9%), Emergency Medicine Specialists (2.9%), and residents (47.6%) in those three disciplines in University Hospitals, Public Hospitals and Research Hospitals. Physicians reported falls (58.1%) as the most common cause of trauma, and noted head injuries with an incidence of 49.9% in their trauma practice. Physicians' self-perception of their pediatric trauma knowledge was questioned in three categories as: overall, diagnosis and treatment of trauma. They reported that their knowledge of pediatric trauma overall and regarding diagnosis and treatment was "efficient" at rates of 87.4%, 83.6% and 74.8%, respectively. However, while 76.7% of physicians perform radiological evaluations in all trauma patients, only 56.3% of them use laboratory tests routinely in diagnosis. Participants reported that cost of trauma was mostly affected by severity of trauma (49.5%) and least affected by the patient's sex (64.1%). They also believed that radiologic evaluations (66%) accounted for the largest portion of trauma cost and the cost of consultations (44.7%) for the smallest portion.

In conclusion, we suggest that although most physicians were aware of cost factors in trauma, they did not consider trauma costs in diagnosis and management.

Key words: trauma cost, children, physicians, perception, attitude.

Pediatric trauma has a major impact on the health and well-being of children¹. More than 16% of all hospitalizations for unintentional injuries among children result in permanent disability². In addition to medical and emotional effects, pediatric traumas also constitute a substantial economic burden to the health care system as well as the patient's family. Several studies have examined the costs of pediatric trauma and aimed to reveal the determinants of trauma costs.

It has been suggested that many demographic features and diagnostic investigations may influence the cost of pediatric trauma³. Trauma scoring systems have been developed to predict the outcome of injury and have been frequently investigated in order to determine their impact on the burden of trauma⁴. However, physicians working in the arena of pediatric trauma constitute the primary trauma care, and to our knowledge, their perception and

attitudes regarding trauma cost have not been evaluated previously. A questionnaire-based study was performed to evaluate physicians' attitudes and perception regarding the cost of pediatric trauma.

Material and Methods

This study was focused on a physician group dealing primarily with pediatric trauma (namely those who work in emergency services, pediatrics and pediatric surgery departments; those who are consulted regarding pediatric traumas; and those for whom the pediatric trauma patients constitute the majority of their patient spectrum). Physicians attending the 4th National Congress of Pediatric Emergency Medicine and Intensive Care at Hacettepe University in 2007 were enrolled in the survey. A questionnaire was performed to obtain the demographic data, features of pediatric trauma in their practice, self-perception of pediatric trauma knowledge, estimation of trauma severity, parameters used for pediatric trauma diagnosis, and perception of pediatric trauma score (PTS) and trauma cost. All questions except those regarding demographics were prepared as statements and answered on a five-point scale (Likert scale) with minimum and maximum scores of 0 to 4 according to degree of the physician's agreement.

The data obtained from the survey were analyzed with SPSS 15.0 using independent samples t-test. Pearson correlation was done to evaluate the correlation of demographics with statements. Probability values lower than 0.05 were considered to be significant.

Results

The total of 104 physicians responded to the questionnaire but 103 of them were found eligible for analysis. The median age

of participants was 30.8 ± 5.6 years (range: 24-56). Of the 103 participations, 49 were male (47.6%) and 54 were females (52.4%). Physicians who responded to the questionnaire were specialists in Pediatrics (32.9%), Pediatric Surgeons (5.9%), Emergency Medicine Specialists (2.9%) and residents (47.6%) in those three disciplines. Affiliations included University Hospitals (51.5%), Public Hospitals (24.3%) and Research Hospitals (21%).

Physicians reported falls (58.1%) as the most common cause of trauma, and they noted head injuries with an incidence of 49.9% in their trauma practice. Physicians' self-perception of pediatric trauma knowledge was questioned in three categories as: overall, diagnosis and treatment of trauma. They reported their knowledge about pediatric trauma in these three categories as "efficient" at rates of 87.4%, 83.6% and 74.8%, respectively.

Most of the physicians (85.3% to 99%) reported consciousness, blood pressure, breathing, heart rate, vomiting, fractures, wound, type of trauma, and age of the patients as the important parameters in estimating trauma severity. However, the patient's weight and pain were considered as a parameter of severe trauma by only 58.3% and 59.2% of physicians, respectively.

The majority of physicians agreed that monitoring and vascular access should be performed in the initial assessment. Most of them also conducted consultations. However, while 76.7% of physicians performed radiological evaluations in all trauma patients, only 56.3% of them used laboratory tests routinely in diagnosis. When routine laboratory and radiologic tests in different pediatric traumas were questioned, physicians reported different diagnostic tools in head, abdominal and genitourinary traumas. Physicians' preferences in different traumas are listed in Table I.

Table I. Physicians' Preference of Routine Diagnostic Tests in Head, Abdominal and Genitourinary Trauma

	Head trauma	Abdominal trauma	Genitourinary trauma
Perform routinely	CBC 98% UA 82% X-ray 74% Bio 70%	CBC 99% Bio 84% X-ray 81% USG 59%	CBC 100% UA 100% Bio 88% X-ray 86% USG 57%
Perform only in selected cases	CT 86.4 % MRI 76.7%	CT 99% MRI 87%	CT 89% MRI 70%

CBC: Complete blood count. UA: Urine analysis. Bio: Biochemical analysis. USG: Ultrasound. CT: Computed tomography. MRI: Magnetic resonance imaging.

Physician's perceptions on given statements about PTS are listed in Table II. While the majority of physicians obtain and use the PTS, only half of them use PTS in choosing diagnostic tests.

Participants reported that trauma cost was mostly affected by severity of trauma (49.5%) and least affected by the patient's sex (64.1%). They also believed that radiologic evaluations (66%) accounted for the largest part of trauma cost and cost of consultations (44.7%) for the smallest portion.

Physicians' overall perceptions on statements about pediatric trauma cost are listed in Table III. The demographic features of physicians were correlated with their perception about trauma costs and PTS. When results of self-perception of pediatric trauma were correlated with sex, there was no difference between males and females with respect to "overall" and "diagnosis of trauma" categories. However, male participants more frequently found their knowledge about pediatric trauma "treatment" to be more efficient ($p < 0.05$, chi-square and Fisher's exact test). Male and female physicians demonstrated similar perceptions of PTS and trauma cost ($p > 0.05$).

The perception of specialists and residents was also compared. However, while self-perception of pediatric trauma knowledge

by specialists was more efficient in "overall" and "diagnosis" of pediatric trauma ($p = 0.031$ and $p = 0.005$, respectively), there was no difference between residents and specialists with respect to self-perception of knowledge in trauma treatment. In contrast to the specialists, residents believed that the patient's weight was not an important factor to elucidate the trauma severity ($p < 0.05$). Although residents and specialists had a similar perception of PTS, residents believed that patients with lower PTS do not have higher trauma costs ($p < 0.05$). No difference was detected between residents and specialists in overall trauma cost statements.

Finally, physicians younger than 30 years of age ($n: 72$, mean age: 30.8 ± 5.6) and older than 31 years of age ($n: 31$) were compared for self-perception of trauma knowledge, PTS and overall trauma cost statements. No statistical difference was detected between the younger and older physicians.

Discussion

In countries where other health problems are well controlled, unintentional injury ranks as the leading cause of death in children. Pediatric trauma accounts for 40% of all deaths in the age group from 1 to 14 years⁵. Preventable injuries cause an enormous financial and emotional burden on injured children and their families². The cost of trauma per hospital

Table II. Physicians' Perception on Given Statements About the Pediatric Trauma Score (PTS)

Statements	Agree (%)	Disagree (%)
PTS should be obtained in all trauma patients	71.8	28.2
Obtaining a PTS is time-consuming	19.4	80.6
PTS is useful for determining trauma severity	75.7	24.3
PTS is useful for choosing diagnostic tests	51.5	48.5
Patients with lower PTS have higher mortality and morbidity	73.8	26.2
Patients with lower PTS generate higher trauma costs	62.1	37.9

Table III. Physicians' Perception on Statements About Pediatric Trauma Costs

Statements	Agree (%)	Disagree (%)
Pediatric trauma generates higher costs because the health care is expensive	68	32
Useless diagnostic tests increase trauma costs	95.1	4.9
Difficulties in diagnosis of pediatric trauma increases the costs	91.3	8.7
Legal commitments leading physicians to further evaluations increase costs	96.1	3.9
Pediatric traumas generate higher costs because they are more severe than adult traumas	89.3	10.7

stay was reported to range between US\$1900-US\$5300 in high income countries⁶. Trauma cost per patient was reported as US\$377 in Turkey, and it has been suggested that this striking difference was related with the lower health care costs in Turkey⁷.

Several studies have examined the cost of pediatric trauma and aimed to reveal the determinants of trauma costs. However, in studies about cost factors in pediatric trauma reflecting the burden of trauma in one particular trauma center, trauma cost was found to be significantly correlated with trauma scores, age and body site of injury^{3,7}. Gürses et al.⁷ reported that type of treatment and type of accident also correlated with trauma cost in their single-center survey.

Although physicians working in the area of pediatric trauma constitute the primary trauma care, their perception and attitudes regarding trauma cost have not been evaluated previously. This is the first study evaluating the attitudes of physicians regarding pediatric trauma care and their perception of trauma cost. Although we enrolled a limited number (n:103) of physicians in our study, our study population consists of a wide range of physicians from different clinical disciplines (Pediatrics, Pediatric Surgery and Emergency Care Specialists) who worked in different trauma centers in Turkey. Most of the participants were residents (47%) and young practitioners (n: 72). Furthermore, physicians from different health care centers, including University, Public, and Research Hospitals, were included in the study.

Falls are the leading cause of non-fatal injuries seen in hospital emergency rooms². Physicians also reported that falls (58.1%) were the most common type of injury in their practice. In the initial assessment, the majority of physicians considered consciousness, blood pressure, respiratory rate, heart rate, vomiting, fractures, wound, type of trauma, and age of the patients to estimate trauma severity. However, the patient's weight, which is an important parameter of PTS, was considered by only 58.3% of physicians in severity assessment.

Physicians use different diagnostic tests including radiological investigations in head, abdominal and genitourinary traumas (as listed in Table I). However, while 76.7% of physicians perform routine radiological evaluations in all trauma

patients, only 56.3% of them use laboratory tests routinely in diagnosis. Interestingly, most of the physicians (66%) reported that radiologic evaluations constitute the largest part of trauma cost in pediatric trauma care. When we evaluated the physicians' perception of pediatric trauma cost, they reported that useless diagnostic tests (95.1%) and difficulties in diagnosis in pediatric trauma (91.3%) increase the cost of trauma. According to these findings, we can suggest that while most of the physicians assume that higher trauma costs may be related with diagnostic tests, they tend to use routine investigations to achieve an accurate diagnosis.

The PTS is proposed to help practitioners in decision-making on the initial assessment of patients in emergency care. It has been suggested that trauma scores may be a predictor of trauma cost^{3,7}. A negative correlation between cost of trauma and PTS was detected⁷. In this questionnaire, the physicians' perception of PTS and its impact on trauma cost was also investigated. Most of the participants believed that PTS should be evaluated in all patients. However, while 75.7% of physicians use PTS for estimating the trauma severity, almost half of them use scoring for choosing diagnostic tests. According to physicians' perception, patients with lower PTS have higher mortality and morbidity (73.8%) and higher trauma costs (62.1%). In addition to these findings, participants reported that severity of trauma is the most important factor influencing the trauma cost.

Gürses et al.⁷ reported that they did not find any correlation between trauma cost and age. Consistent with the former study, physicians (64.1%) in the current study believed that age had the least effect on trauma cost. Although it has been accepted that pediatric trauma is less costly than adult trauma, physicians participating in this study suggested that pediatric traumas are more severe and have higher costs than trauma cases in adults⁸. When compared to developed countries, health care costs are significantly lower in Turkey⁷. However, most of the participants (62%) in this survey believed that higher trauma costs are related with expensive health care in Turkey.

When physicians' self-perception of pediatric trauma knowledge was evaluated, 87.4% of participants considered their overall trauma

knowledge to be efficient. However, physicians found their knowledge of trauma diagnosis and treatment as less efficient. Furthermore, male participants considered their knowledge about pediatric trauma treatment to be efficient at a higher rate than females. Not surprisingly, specialists reported their self-perception of pediatric trauma knowledge as efficient more than residents in “overall” and “diagnosis of pediatric trauma” categories. There was no significant difference in self-perception of “trauma treatment” knowledge between residents and specialists. Although residents and specialists have a similar perception of PTS, residents believed that lower PTS scores did not predict higher trauma costs.

In this study, we investigated the physicians’ perception of pediatric trauma costs and their attitudes towards pediatric trauma care. Since national data about the burden of pediatric trauma is lacking, it is difficult to evaluate the impact of physicians’ perception and attitudes on trauma cost. However, we can only conclude that most of the physicians are aware of cost factors in trauma. Nevertheless, they did not consider trauma costs in their diagnosis and management. We suggest that pediatric trauma

guidelines based on controlled clinical trials should be developed to standardize trauma care in children.

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