

# Evaluation of the patients admitted to the pediatric emergency service: Cross-sectional analysis of the pediatric emergency and trauma clinic of a tertiary training hospital in Turkey

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## ABSTRACT

**BACKGROUND:** This study aims to carry out a cross-sectional analysis of the applications during three months to the Pediatric Emergency Service of İzmir University of Health Sciences, Tepecik Training and Research Hospital and determination of demographical features and distribution of cases in line with provided data and planning the positive changes and innovations in the current service and functioning of the Pediatric Emergency Service.

**METHODS:** The file records of 46038 patients between the ages of 0–18 who applied to the University of Health Science, Tepecik Training and Research Hospital Pediatric Emergency Training Clinic were examined retrospectively in this study.

**RESULTS:** A total of 46038 patients (53.6% male) applied to the emergency service. The average age was 7.07 for both genders. In the application, the average age of the patients with a history of trauma was 9.3, whereas the average age of the patients without a history of trauma is 6.7. While 82.7% of the patients was male with no trauma history, 86.9% was female without a history of trauma. When the application diagnoses were examined, the most common diagnosis was Upper Respiratory Infection (58.5%). More than half of the applications were monitored in the emergency observation unit (62.5%). When the patients were evaluated according to age groups, 49.2% of them were the children aged between 1–6. While 10.5% of the applicants were infants, and 38.7% were game children, it was noteworthy that the number of male patients was higher in the 1–6 age group, with 54.7%. There was no trauma in 49.5% of the cases. 78.3% of the cases were applied directly to the Paediatric Emergency. Secondly, 16.6% were to the Green Area-1 and Green Area-2. 98.2% of the cases were applied to the Emergency Service for ambulatory care. The 48.8% of the applications were made out of working hours. 97.6% of the cases were not hospitalized for the treatment and were addressed to home. The average staying period of the hospitalized cases in the Service was 4.53 days. Among applications, seven cases died.

**CONCLUSION:** Most of the patients admitted to pediatric emergency service for non-urgent reasons which can be managed in primary care services.

**Keywords:** Cross-sectional analysis; pediatric emergency; trauma.

## INTRODUCTION

Emergency Services are the most important departments of the hospitals which the health service are provided for

twenty-four hours without any interruption and with intensive stress for both side and they are the entrance doors and windows of the hospitals which the patients are admitted without any order or any appointment.

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Emergency Service is one of the most exhausting and chaotic units of hospitals concerning working conditions and it needs to continue to provide the best service under these conditions. Especially in training and research hospitals, all medical units have the capacity of serving 24 hours. Moreover, under country conditions, pediatric trauma patients are directly admitted by pediatric emergency service. It is not common for paediatric intensive care and/or paediatric surgery service to be followed and treated within the same hospital. In this sense, our hospital serves as a trauma centre in the Aegean Region as a public hospital that provides the above-mentioned services. As our pediatric emergency service is a training and research hospital, patients are oriented to our hospital for various consultations and medical radiological examination or families apply directly to our hospital with this awareness. Our hospital takes place on the top, in which patients and their relatives can make a positive or negative decision and complaints are concentrated.<sup>[1]</sup> Definition of the emergency case, it should be considered as unusual events which happen suddenly, endangers life and/or impair the quality of life and cannot be resolved by patient relatives in a short time. Only injuries: It causes the death of more than five million people in the world every year and millions of people apply to emergency clinics.<sup>[2]</sup> The number of patients who apply to the paediatric emergency services is increasing even outside working hours. However, because of the non-stop working hours of the emergency services, the patients' relatives may able to see emergency services as a means of receiving fast care in the hospital.<sup>[3-5]</sup> The most important features that affect people who apply to the emergency polyclinics are the sociocultural level of the patients' relatives, the closeness of the emergency services centres, the differences of the working conditions and working hours. The situation in pediatric emergency services is the same as in adult emergency services. The increased anxiety level of pediatric patients, their parents, and clinical, seasonal differences in childhood diseases also increase applications to pediatric emergency services. In recent years, because of the effects of changing sociocultural differences in addition to population growth and internal migration, excessive patient density has been observed in emergency services of training and research hospitals, which may lead to inadequacies in health services.<sup>[6]</sup> When it comes to insufficient service, it should be understood that there are situations will cause patients to wait longer in the emergency room that even more serious patients may have delay in their treatment, decrease in patient satisfaction and decrease in the quality of service and a safe working environment, unwilling-and unavoidable situations, such as inefficiency in staff.<sup>[7]</sup> Knowing the characteristics of the emergency applications, the frequency and density of the cases and the socio-demographic characteristics of the region served will provide resource data for planning effective service delivery.

The three-month cross-sectional analysis of the applications made to the Health Science University, Pediatric Emergency

Clinic of Tepecik Training and Research Hospital within three months is to plan the changes and innovations that can be made positively in the current service and operation in our pediatric emergency clinic.

## MATERIALS AND METHODS

The file records of 46.038 patients between the ages of 0-18 who applied to the Pediatric Emergency Clinic of Tepecik Training and Research Hospital were examined retrospectively in this study. The demographic and medical information of the patients who applied to the pediatric emergency service were obtained retrospectively from the hospital automation system. ICD-10 diagnostic code system was used for diagnoses. Demographic information, types of application to the hospital, application times, medical diagnoses and results of the procedures (observation, hospitalization) of patients who applied to the pediatric emergency service within the specified time interval were evaluated. In our hospital, the cases are coded according to the International Classification of Disease 10=ICD-10 system. All medical and surgical emergencies, trauma and poisoning cases are accepted to the pediatric emergency service. Our hospital has 24-hour uninterrupted service in radiology, biochemistry and microbiology units serving only for emergency clinics. The research type is cross-sectional. All data obtained from the automation system were analyzed using SPSS 24.0 program. Variables indicated by count were summarized by percentage distribution and variables indicated by measurement were summarized by mean standard deviation, median minimum and maximum values. Chi-square test was used for the analysis of variables indicated by count, and a t-test was used for the variable analysis indicated by measurement. The statistical significance level was accepted as  $p < 0.05$ . Categorical data were expressed in numbers (n) and percentages (%).

## RESULTS

According to our records, it was learned that during the last one year, there was an average of 170,000 patient applications to our unit. In a 3-month cross-sectional examination, a total of 46038 patients (53.6% male,  $n=24661$ ) applied to the

**Table 1.** Distribution of the patients attending the pediatric emergency clinic concerning gender and age groups

	n	%
Male	24661	53.6
Female	21377	46.4
Newborn-11 months	2727	5.9
1-6 ages	21703	47.1
7-12 ages	12606	27.4
13-18 ages	9002	19.6
Total	46038	100.0

emergency service. The mean age was 7.07 years for both genders (Table 1).

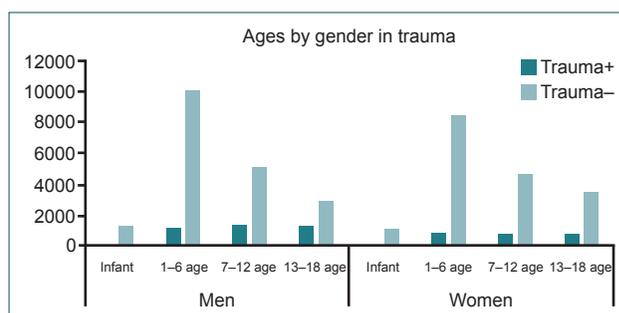
The average age of the patients with a history of trauma in their application was 9.3, while without was 6.7. Among the cases, 82.7% of male cases, and 86.9% of female cases were with no trauma history. The most common diagnosis was Upper Respiratory Tract Infection (58.5%, n=25506) (Table 2). More than half of the applications were monitored in the emergency observation unit (62.5%, n=27270). When patients were examined according to age groups (n=21703), it was determined that 47.1% of the children were 1–6 years old (Table 1).

About the number of cases, n=46038, 10.5% of was infant, n=16891, 38.7% of were children, and in the 1-6 age group, the number of male patients (n=11868, 54.7%) was higher. The patient who was observed and followed up (n=27270, 62.5%), the outpatient was (n=15.352, 35.2%). In 49.5% of these cases, there was no trauma. It was observed that 78.3% of the cases applied directly to the Pediatric Emergency Service, and secondly, 16.6% of the cases was applied to the green field 1–2. 98.2% of the cases were outpatient applications. More than half of the applications (48.8%) were out of the working hours. During the continuing treatment, the hospitalization of the applicants was not considered (n=44954, 97.6%) and sent home. The duration of stay in the hospital of the patients to be of the planned to hospitalize was 4.53 days; 5.8% of the applicants (n=2568,) were trauma patients, 0.001% (n=7), of the cases was decease.

Trauma was not present in 49.5% of these cases. Among the

**Table 2.** Distribution of the patients attending the pediatric emergency clinic concerning major diagnosis

	According to the disease distribution	%
Upper respiratory disease	25506	57.53
Trauma	6790	15.32
Gastroenteritis	2203	4.97
Lower respiratory disease	835	1.88
Newborn	175	0.39
Allergic diseases	314	0.71
Bites	173	0.39
Neurological	149	0.34
Poisoning	137	0.31
Cardiovascular	45	0.10
Urinary system	1536	3.46
Syncope	348	0.78
Skin	484	1.09
Child surgery	48	0.11
Other	5592	12.61



**Figure 1.** Trauma patients according to gender and age groups.

cases, it was observed that 78.3% directly attended paediatric emergency service, while 16.6% of the patients attended green zones 1–2. 98.2% of the cases were outpatients. Almost half of the cases (48.8%) attended the hospital after the working hours. Among the cases (n=44954), 97.6% were not considered for further hospitalization and were discharged. Among the cases that were considered for hospitalization, the average time of staying at the service was 4.53 days. Among the cases who attended the hospital (n=2568), 5.8% of them was trauma patients. Distribution of trauma patients by age and gender groups is shown in Figure 1.

Seven of the cases who attended the hospital (0.001%) died.

## DISCUSSION

The findings suggest that paediatric emergency clinic of our hospital serves a remarkably high number of patients. Our hospital admits pediatric trauma patients to the pediatric emergency service, and it serves as a trauma centre in the Aegean Region on a 24-hour non-stop basis with a multidisciplinary approach. In our pediatric emergency service, which admits 170000 patients on average, experienced nurses are implementing a 3-phase triage system. In our study, 53.6% of the patients was male, while 46.4% was female. This result was similar in studies that were carried out in countries with limited or rich sources.<sup>[8-11]</sup> The findings suggest that boys are more biologically susceptible to diseases and/or more mobile and susceptible to external effects, such as trauma. However, further studies are needed to explain this gender difference and its reasons in the frequency of applications to pediatric emergency services.

More than half of our total patients were monitored in the emergency observation unit. Another study conducted in our country showed that only 1/3 of the patients admitted to pediatric emergency services were monitored in the observation unit.<sup>[1]</sup> This may be because we are the only pediatric trauma centre in our province as a training hospital of Ministry of Health, and due to lack of equipment and specialists, pediatric surgery, pediatric intensive care, pediatric side branches and emergency patients are accepted from surrounding districts. However, according to the data of our hospital from the year 2011, only 10% of pediatric emergency applications were monitored in the emergency observation

unit.<sup>[12]</sup> Although there is no change in the number of patient applications during these years, the increase in the patients who are monitored in the observation unit can be explained by the decrease in patient applications that are not suitable for the emergency service, or the increase in the knowledge and skills of the emergency healthcare professionals to recognize the patients in critical condition or requiring observation.

Comprehensive and multicentre studies are needed to explain these differences. Approximately 1/3 of the patients after first doctor examination and more than half them within 12 hours monitoring period at emergency observation unit have been sent home after followed up and treated. Finally, 97.5% of the patients have been sent home and this finding is an important reality of our study. In our study, admissions from emergency to hospitalization are found lower than the studies conducted in other centres in our country.<sup>[13,14]</sup> Since we have limited bed capacity but intense examination and treatment patients, this situation can be explained with offering daily hospitalization to some of the patients which are planned to hospitalize for a short time at emergency observation unit. When epidemiological data in paediatric emergency submissions are looked into, it can be seen that nearly half of the patients are infants.<sup>[11,15,16]</sup> In our study, our patients comprise of 10.5 infants and 38.7% play children age group which is similar to Atabek et al.'s study.<sup>[17]</sup>

Prospective multicentre studies comparing epidemiological data of our country and child emergency applications of developed or underdeveloped countries may reveal age group differences and reasons in child emergency applications.

Another striking point in our study is that more than half of the applications are concentrated outside working hours in accordance with the literature.<sup>[13,14,18,19]</sup> Reasons, such as working parents, disruptions in the appointment system and fast operation in the emergency room, may be influential in this result. However, in our study, one of the most important factors that constitute overtime patient density is service provided in two emergency green area two clinics located close to the emergency to reduce the patient density of the emergency service. Patients who receive the green code from triage can also receive service at these outpatient clinics during off-hours.

In our study, it was observed that the most common diagnosis in pediatric emergency applications was upper respiratory tract infection, similar to the data of other centres in our country. This shows that more than half of the patients applying to the emergency service can receive services in 1st step health care facilities. Every patient admitted to the pediatric emergency service is regarded as an "urgent patient" until proven otherwise. Therefore, the occupation of emergency services with non-emergency situations causes high costs and increased workload on employees. Trauma, which is one of the most urgent emergencies, was the second most common

pediatric emergency service after upper respiratory tract infections. The Institution, affiliated to the Ministry of Health, being the pediatric emergency clinic that meets the region's most intense and single child trauma patient, when respiratory diseases are most intense in winter, it has caused trauma to take the first place in 'emergencies'. Bulut et al.<sup>[20]</sup> showed that the most common cause of pediatric trauma was the falls, while Gürses et al.<sup>[21]</sup> reported the most common cause of trauma as traffic accidents. In this study, the most common cause of trauma was soft tissue and minor injuries and falls, respectively. On the other hand, inside and outside traffic accidents constituted only 3.7% of all trauma patients. It can be explained that soft tissue traumas and falls constitute the majority in trauma applications, our hospital is easy and centrally located concerning transportation, and patients with minor trauma can easily apply to the pediatric emergency.

When one-year data of the previous study from the same centre were examined, it was observed that trauma applications were again at the second place with 12.6% after upper respiratory tract infections.<sup>[12]</sup> In the same study, the most common trauma application month was reported as July. As this study examined applications within the 3-month winter season, our rates of high energy trauma and traffic accidents may be low. There are some limitations in our study. One of the most important limitations is that this study is retrospective and there are deficiencies in some records and at least one year of data that could reveal the seasonal characteristics of the applications are not received. Diagnosis and demographic data of patients who were followed up in the observation and hospitalized in intensive care and service were not examined.

## Conclusion

Most patients admitted to pediatric emergency service for non-urgent reasons which can be managed in primary care services. Multicentre pediatric emergency epidemiological research is needed to produce healthy solutions to the problems of emergency room operation in our country.

**Ethics Committee Approval:** Approved by the local ethics committee.

**Peer-review:** Internally peer-reviewed.

**Authorship Contributions:** Concept: A.P.; Design: D.O.; Supervision: A.P.; Fundings: D.O.; Materials: E.B.; Data: D.O.; Analysis: A.P.; Literature search: E.B.; Writing: A.P.; Critical revision: E.B.

**Conflict of Interest:** None declared.

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## ORJİNAL ÇALIŞMA - ÖZET

### Çocuk acil servise başvuran hastaların gözden geçirilmesi: Türkiye’deki bir üçüncü basamak hastane çocuk acil eğitim kliniğinin kesitsel analizi

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**AMAÇ:** Bu çalışmada, S.B. İzmir Tepecik Eğitim ve Araştırma Hastanesi Çocuk Acil Servisi’ne son üç ayda başvuran hastaların kesitsel analiz çalışması ile travma olgularının değerlendirilmesi amaçlanmıştır.

**GEREK VE YÖNTEM:** İzmir S.B.Ü. Tepecik Eğitim ve Araştırma Hastanesi Çocuk Acil Eğitim Kliniği’ne başvuran 0–18 yaş arası 46.038 hastanın dosya kayıtları geriye dönük olarak incelendi.

**BULGULAR:** Toplam 46.038 hasta (%53.6 erkek) acil servise başvurmuştur. Ortalama yaş her iki cinsiyet içinde 7.07 olarak saptandı. Başvurusunda travma öyküsü olguların yaş ortalaması 9.3 iken travma öyküsü olmayan olguların yaş ortalaması 6.7 olduğu görüldü. Hastaların %82.7’sini travma öyküsü olmayan erkek olgu oluştururken %86.9’unu travma öyküsü olmayan kız olgular oluşturmaktadır. Başvuru tanıları incelendiği zaman en sık görülen tanı üst solunum yolu enfeksiyonudur (%58.5). Başvuruların yarısından fazlası acil gözlem ünitesinde izlenmiştir (%62.5). Hastalar yaş gruplarına göre değerlendirildiğinde, %49.2’sini 1–6 yaş grubu çocukların oluşturduğu saptandı. Başvuran olguların %10.5’i infant ve %38.7’si oyun çocuğu iken, 1–6 yaş grubunda %54.7 ile erkek hasta başvuru sayısı fazla olduğu dikkat çekmektedir. Bu olguların %49.5’inde travma yoktu. Olguların %78.3’ünün direkt çocuk acile, ikinci sıklıkla %16.6 ile yeşil alan 1 ve yeşil alan 2’ye başvurduğu görülmektedir. Olguların %98.2’si ayaktan acil servise başvurmuştur. Başvuruların %48.8’inin mesai saati dışında olduğu görülmektedir. Başvuran olguların %97.6’sının tedavisinin devamı amacıyla yatışı düşünülmemiş ve gönderilmiştir. Yatışı planlanan olguların ise ortalama serviste kalış zamanı 4.53 gündür. Başvuran yedi olgu hayatını kaybetmiştir.

**TARTIŞMA:** Hastaların çoğunluğu birinci basamak sağlık hizmetlerinde yönetilebilen acil olmayan nedenlerle çocuk acil servise başvurmuştur.

**Anahtar sözcükler:** Kesitsel analiz; pediatrik acil; travma.

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