Research Article / Özgün Araştırma

DOI: 10.4274/cayd.galenos.2023.93446
J Pediatr Emerg Intensive Care Med 2024;11:6-14

Clinical and Demographic Characteristics of Patients Brought to Pediatric Emergency Department by Ambulance

Çocuk Acil Servise Ambulans ile Getirilen Olguların Klinik ve Demografik Özellikleri

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Abstract

Introduction: In this study, clinical and demographic characteristics of cases brought to pediatric emergency department by ambulance were examined. We aimed to determine interventions and diagnoses of the patients, classify cases according to transfer place and type, evaluate appropriateness of referral, and contribute to the efficiency of the referral chain.

Methods: Five hundred forty two cases brought to pediatric emergency department by ambulance were followed up prospectively. Characteristics of cases were recorded from ambulance intervention form, automation system of our hospital, pediatric emergency service examination records and nurse observation records.

Results: 2.54% (n=542) of the cases came to our pediatric emergency department by ambulance. Green field applications were the highest in all months. 4.7% of the patients came from outside the city. 49.4% of the patients were taken from home, 48.8% from another hospital or health institution. 53.2% of the cases were primary cases, the cases brought although the referral was not accepted were 10.5%. The diagnoses of patients were compatible in 79.2%. Body temperature of most of the patients was not measured by the ambulance teams and the respiratory rate was not recorded. Four patients who underwent endotracheal intubation in the emergency department did not undergo endotracheal intubation in the ambulance. While 15.5% of the patients were discharged without need of any observation, the majority (55.7%) were followed up in the emergency observation unit. 89.9% of the patients were discharged with recovery, 1.5% referred, and 0.9% died.

Conclusion: Ambulances use is frequent in our city, emergency care in our hospital is provided to patients coming from within the city and from outside the city. Ambulance teams sometimes do not apply appropriate and necessary intervention to pediatric patients. Recording and interpretation of vital signs is important for timely and effective intervention. Real emergencies should also be recognized and inappropriate ambulance use should be prevented.

Keywords: Child, ambulance, transport, emergency department

Öz

Giriş: Bu çalışmada ambulans ile çocuk acil servise getirilen olguların klinik ve demografik özellikleri incelendi. Amacımız, ambulans ekiplerince ve acil serviste yapılan müdahaleleri ve konulan tanıları belirlemek, olguları transfer edilen yer ve transfer şekillerine göre sınıflamak, sevk uygunluğunu değerlendirmek ve bulgularımızla sevk zincirinin verimliliğini artırmaya katkıda bulunmaktır.

Yöntemler: Hastanemiz çocuk acil servisine ambulansla getirilen 542 olgu ileriye yönelik olarak izlendi. Olguların özellikleri ambulans müdahale formu, hastanemiz otomasyon sistemi, acil servis muayene defteri kayıtları ve hemşire gözlem kayıtlarından elde edildi.

Bulgular: Olguların %2,54'ü (n=542) çocuk acil servisimize ambulans ile gelmişti. Yeşil alan başvurusu tüm aylarda (%71,9-82,9) en fazlaydı. Hastaların %4,7'si şehir dışından gelmişti. Hastaların %49,4'ü evden, %48,8'i başka bir hastane ya da sağlık kurumundan alınmıştı. Transport şekline göre primer olgular %53,2, sevki kabul edilen olgular %36,1, sevki kabul edilmediği halde İl Acil Sağlık Hizmetleri Koordinasyon Komisyonu kararı ile getirilen olgular %10,5 idi. Ambulans ön tanıları ve acil serviste konulan tanılar incelendiğinde %79,2'sinde tanılar uyumluydu. Ambulans ekipleri tarafından hastaların çoğunun vücut sıcaklığının ölçülmediği ve solunum sayısının kaydedilmediği görüldü. Acil serviste endotrakeal entübasyon yapılan dört hastaya ambulansta endotrakeal entübasyon yapılmamıştı. Hastaların %15,5'i gözleme gerek kalmadan acil servisten taburcu edilirken, çoğunluğu (%55,7) acil gözlem ünitesinde takip edildi. Hastaların %89,9'unun şifa ile taburcu olduğu, %1,5'unun sevk olduğu, %0,9'unun eksitus olduğu görüldü.

Sonuç: İlimizde hastaneler arası nakilde ambulans kullanımının sık olduğu, hastanemizin şehir içi ve şehir dışından gelen hastalara acil bakım hizmeti verdiği, ambulans ekipleri tarafından çocuk hastalara bazen uygun ve gerekli müdahalede bulunulmadığı görüldü. Vital bulguların kaydedilmesi, yorumlanması, hastalara zamanında ve etkin müdahale açısından önemlidir. Çocuk hastalarda da gerçek acil durumlar tanınmalı ve uygunsuz ambulans kullanımının önüne geçilmelidir.

Anahtar Kelimeler: Çocuk, ambulans, transport, acil servis

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Received/Geliş Tarihi: 25.07.2023 **Accepted/Kabul Tarihi:** 16.11.2023

Introduction

An emergency is a medical condition that, in the absence of medical intervention, endangers a person's life, causes serious impairment in bodily functions, leads to serious loss of function in any body organ or part, and manifests itself with severe and acute symptoms.[1] Emergency health services (EHS) constitute many emergency care areas including triage, assessment, management and transportation of patients until their arrival to the emergency department, including patient management in the emergency department in cases of injury or illness.[2] Pediatric Emergency Health Services (PEHS) consists of prevention, access to EHS (recognition of the emergency, contacting the emergency system activated by telephone and sending an ambulance), triage and transport to the hospital, stabilization in the emergency department, inter-hospital transport, hospitalization, treatment and rehabilitation steps including trauma centers and pediatric intensive care.[3] Inappropriate use of EHS is one of the most important problems from past to present. It has been observed that ambulance use for non-emergencies may be related to demographic factors such as age, gender, and living in rural areas, as well as factors such as socio-economic level, presence of health insurance, presence of primary health care services, unmet needs in primary health care services, social status of patients and perceptions of urgency by caregivers.[4] Inappropriate use of EHS for children has also been reported and in a study, it was found that 61% of ambulances were used inappropriately.[5] Emergency departments are a vital component of EHS, providing service for 24 hours a day, 7 days a week all over the world for everyone in need.[6] It is the part that connects out-of-hospital health services with hospital health services.[7] Approximately 30% of emergency patients are children. Eighty percent of deaths in the childhood age group are due to emergency medical problems. Health care for these children should be provided by experienced physicians who have received special training for pediatric patients.[8] It is clear that any health problem developing in the pediatric age group will lead to both physiological and psychological damages in the future health of the individual.[9] In this study, our aim was to examine the characteristics of all pediatric patients brought to the pediatric emergency department of our hospital by EHS ambulance, to determine the interventions performed by the ambulance team, to determine the interventions performed in the emergency department, to compare the preliminary diagnoses of the ambulance team with the diagnoses made in the pediatric emergency department, to classify the cases according to the place and manner of transfer, to evaluate the appropriateness of referral, to determine how the patients and our clinic were affected as a result of this transfer, and to shed light on decision makers to increase the efficiency of the referral chain in the light of our findings.

Materials and Methods

In our study, the characteristics of pediatric patients who were brought to the Pediatric Emergency Department, Department of Pediatrics, Necmettin Erbakan University Meram Faculty of Medicine, between August 1, 2019 and December 31, 2019 were examined. The place and method of case selection, the interventions and preliminary diagnoses made by the EHS team, the interventions and preliminary diagnoses made in the emergency department, and the follow-up processes in the hospital were compared. Our study was a descriptive cross-sectional study and all cases were followed prospectively.

A form created by us for the cases participating in the study was filled in during the application. While filling out this form, the EHS Ambulance Intervention Form, our hospital automation system, emergency department's examination file records, and nurse observation records were utilized. Voluntary consent was obtained from the cases included in the study. Patients whose patient information could not be fully accessed or who came to the outpatient clinic by ambulance for another reason (patients who came to the outpatient clinic control by ambulance due to their health status, patients who came for consultation or examination, etc.) were not included in the study.

The form created for the cases included data on the patient's age, gender, date of admission, time of admission, where the patient came from (in the city and out of the city), the place where the EHS ambulance picked up the patient (home, another hospital or health institution, school, street and other places), the transfer method of the case (cases picked up from the scene, cases transferred from the scene to a hospital, or cases admitted to an outpatient hospital and interviewed and accepted for referral, cases referred to our hospital while being treated in a hospital and cases referred to us with the decision of the Provincial Emergency Health Services Coordination Commission (ASKOM) although they were not accepted by us), vital signs measured by the EHS ambulance team, interventions performed, preliminary diagnosis, whether the case had forensic characteristics, triage categories, whether the patient had a chronic disease; vital signs measured when the child was admitted to the emergency department, the interventions performed and the preliminary diagnosis made as a result of these interventions, the duration of the patient's stay in the emergency department, the total duration of the patient's stay in our hospital, the department where the patient was followed up, the outcome status in the department where the patient was followed up, and discharge diagnoses.

Statistical Analysis

SPSS 25 (Statistics for Windows, Version 25.0) package program was used for statistical analyses. Descriptive statistics were calculated in line with the characteristics of the variables

in the study. All categorical variables were summarized as number (n) and percentage (%). The Pearson chi-square test was used to compare the differences between categorical variables and the Mann-Whitney U test was used in cases where independent numerical variables were not normally distributed. The significance level was considered as p<0.05 in statistical analyses.

Results

During the study period, 21,806 patients were admitted to the pediatric emergency department of our hospital. Of these patients, 556 (2.54%) were brought by EHS ambulance. The study sample consisted of 542 cases, 286 (52.8%) boys and 256 (47.2%) girls. Fourteen patients with incomplete information were excluded from the study. When the distribution of the cases according to age groups was analyzed, it was seen that the highest rate was in the age range of 28 days-2 years (n=150, 27.7%) and the lowest rate was in the age range of 0-28 days (n=3, 0.6%).

When the time of admission was analyzed according to age groups, it was observed that the highest rate of admission was between 08:00 and 17:00 in all age groups (37.3-66.7%). When the emergency department diagnoses were analyzed according to age groups, it was observed that gastrointestinal system-related diseases in infants aged 0-28 days (n=2, 66.7%), neurological diseases in infants aged 28 days-2 years (n=66, 44%), neurological diseases in children aged 2-5 years (n=43, 30.9%), neurological diseases in children aged 5-11 years (n=58, 43.9%), respiratory system diseases in early adolescents (n=12, 26.8%) and neurological diseases in middle adolescents (n=24, 32.9%) were the most common diagnoses (p<0.001).

When the length of stay in the emergency department was analyzed, it was observed that the number of patients who stayed in the emergency department for 0-12 hours (n=246, 45.4%) was significantly higher than the other groups. However, the number of those who stayed in the emergency department for more than 7 days (n=6, 1.1%) was significantly lower than the other groups (p<0.001). In addition, when the total length of hospital stay of the cases was analyzed, it was seen that those who stayed in the hospital for 0-12 hours (n=152, 28%) and 1-7 days (n=194, 35.8%) were more than the other groups (p<0.001). In addition, the number of those who stayed in the hospital for more than 7 days (n=70, 12.9%) was significantly lower than the other groups (p<0.001).

Patients were evaluated according to triage categories. Four hundred-eleven patients (75.8%) were green, 122 patients (22.5%) were yellow, and 9 patients (1.7%) were red. The highest proportion of patients were significantly in the green triage category every month during the study period (p<0.001) (Table 1).

10.5% of the patients were forensic cases. It was observed that 25 (43.9%) of the forensic cases were male and 32 (56.1%) were female. When forensic cases were analyzed according to age groups, the highest rate (n=21, 36.8%) was in the 2-5 age group (p<0.001). When the application hours of forensic cases were analyzed, the highest rate of application was between 08:00 and 17:00 (n=24, 42.1%) (p<0.05). When the diagnoses of forensic cases in the emergency department were analyzed, it was found that statistically significantly more patients belonged to the group of cases diagnosed with intoxication (n=16, 28%) (p<0.001). Intoxication was followed by corrosive substance ingestion (n=12, 21%) and suicide (n=9, 15.7%).

Table 1. Triage categories of cases

Months		Green triage	Yellow triage	Red triage	Total	X^{2}*	p
August	**n**	80	25	-	105	95.77	**<0.001**
	%	76.2	23.8	-	100		
September	**n**	66	21	-	87	72.44	**<0.001**
	%	75.9	24.1	-	100		
October	**n**	101	20	1	122	138.71	**<0.001**
	%	82.8	16.4	0.8	100		
November	**n**	69	25	2	96	23.28	**<0.001**
	%	71.9	26	2.1	100		
December	**n**	95	31	6	132	94.34	**<0.001**
	%	72	23.5	4.5	100		
Total	**n**	411	122	9	542		
	%	75.8	22.5	1.7	100		

*: Obtained with the chi-square test

When the cases with chronic diseases were analyzed, it was seen that the highest rate (n=116, 44.4%) belonged to the group of cases diagnosed with neurological diseases (p<0.001). When the rates of admission according to the place of origin were analyzed, the rates of out-of-town admissions ranged between 2.3% and 8%. The rates according to the months of admission did not show a statistically significant difference (Table 2). A total of 253 patients (46.6%) were referred from 37 different hospitals. The highest rate of referrals was from Ereğli State Hospital (n=24, 9.5%), Konya Training and Research Hospital (n=18, 7.1%) and Karaman State Hospital (n=18, 7.1%) (p<0.001). When the locations of the cases were evaluated, it was seen that the majority of the cases were taken from the scene of the incident (47.9-57.5%) in all months (p<0.05).

Although not admitted by us, 57 patients were admitted to the emergency department with the decision of ASKOM. Classification of the cases according to transportation methods is given in Table 3. When the preliminary diagnoses

Table 2. Places where 112 ambulance team picks up the patient

Age range	August		September		October		November		December	
	n	%	n	%	n	%	n	%	n	%
Another hospital or health institution	49	46.7	37	42.5	53	43.4	49	51	66	50
Home	52	49.5	47	54.0	62	50.8	43	44.8	64	48.5
School	-	-	1	1.1	1	0.8	2	2.1	1	0.8
Street	1	1	-	-	3	2.5	-	-	-	-
Other	3	2.9	2	2.3	3	2.5	2	2.1	1	0.8
Total	105	100	87	100	122	100	96	100	132	100

Table 3. How cases are brought by 112 ambulance teams by month

Months	Case type	n	%
December 2019	Cases taken from the scene	69	52.3
	Cases transferred from the scene to a hospital or admitted to an outpatient hospital and accepted for referral after consultation	36	27.3
	Cases referred to our hospital while being treated in another hospital	3	2.3
	Cases referred to us even though they were not accepted by ASKOM decision	24	18.2
	Total	132	100
November 2019	Cases taken from the scene	46	47.9
	Cases transferred from the scene to a hospital or admitted to an outpatient hospital and accepted for referral after consultation	39	40.6
	Cases referred to our hospital while being treated in another hospital	2	2.1
	Cases referred to us even though they were not accepted by ASKOM decision	9	9.4
	Total	96	100
October 2019	Cases taken from the scene	68	55.7
	Cases transferred from the scene to a hospital or admitted to an outpatient hospital and accepted for referral after consultation	36	29.5
	Cases referred to our hospital while being treated in another hospital	6	4.9
	Cases referred to us even though they were not accepted by ASKOM decision	12	9.8
	Total	122	100
September 2019	Cases taken from the scene	50	57.5
	Cases transferred from the scene to a hospital or admitted to an outpatient hospital and accepted for referral after consultation	33	37.9
	Cases referred to our hospital while being treated in another hospital	2	2.3
	Cases referred to us even though they were not accepted by ASKOM decision	2	2.3
	Total	87	100
August 2019	Cases taken from the scene	56	53.3
	Cases transferred from the scene to a hospital or admitted to an outpatient hospital and accepted for referral after consultation	37	35.2
	Cases referred to our hospital while being treated in another hospital	2	1.9
	Cases referred to us even though they were not accepted by ASKOM decision	10	9.5
	Total	105	100

ASKOM: Provincial Emergency Health Services Coordination Commission

reported by the ASKOM teams and the diagnoses made in the emergency department were analyzed, it was seen that the diagnoses of 43 (75.4%) patients were compatible, while the diagnoses of 14 (24.6%) patients were not compatible. When the emergency department and hospitalization durations of the patients who came with the decision of ASKOM were compared with other patients, no statistically significant difference was found between the emergency department and hospitalization durations. 10.5% of the patients who were admitted with the ASKOM decision were hospitalized in the intensive care unit, this rate was significantly higher than the other patients (p<0.05).

In the preliminary diagnoses reported by the EHS teams, neurologic diseases (28.7-38.5%) were the most common diagnoses in all months with statistical significance (p<0.05). Similarly, neurologic diseases (24.1-42.6%) were the most common diagnoses made in the emergency department (p<0.05). When the compatibility of the preliminary diagnoses of the patients before the emergency department and the diagnoses made in the emergency department was analyzed, it was observed that the diagnoses of 429 (79.2%) cases were compatible and 113 (29.8%) cases were incompatible.

The rates of evaluation of vital signs in the ambulance by the EHS teams are given in Table 4. When the interventions performed in the ambulance were compared with the interventions performed in the emergency department, it was observed that there was no significant difference between the rates of oxygen administration and cardiopulmonary resuscitation (p>0.05), whereas the rates of interventions such as intravenous access (p<0.001), monitoring (p<0.001), administration of fluids (p<0.001), administration of drugs (p<0.001) and intubation (p=0.045) were significantly higher in the emergency department (Table 5).

When the departments where the patients were followed up after diagnosis in the emergency department were analyzed, it was observed that the majority of the patients were followed up in the emergency inpatient observation unit (n=302, 55.7%). Only one patient with suicide attempt was referred to another hospital without being admitted to the emergency observation unit. When the discharge diagnoses of the patients were analyzed, neurologic diseases (n=195, 36%) and respiratory diseases (n=123, 12.7%) constituted the highest rates (p<0.001). When the final status of the patients after follow-up was analyzed, 89.9% were discharged, 7.7%

Table 4. Distribution of vital signs measured by 112 ambulance teams

Vital signs		n	%
Body temperature	Measured	167	30.9
	Not measured	374	69.1
Pulse	Measured	365	67.3
	Not measured	177	32.7
Respiration	Measured	120	22.2
	Not measured	421	77.8
Blood pressure	Measured	183	33.9
	Not measured	359	66.1
SpO_2	Measured	342	63.2
	Not measured	199	36.8
GCS	Measured	421	77.7
	Not measured	121	22.3

Table 5. Comparison of interventions in ambulance and emergency department

Interventions		Ambulance		Emergency service		X^2*	p
		n	%	n	%		
Oxygen administration	Yes	152	28.0	138	25.6	2.025	0.363
	No	390	72.0	404	74.5		
Vascular access	Yes	167	30.8	461	85.1	327.19	**<0.001**
	No	375	69.2	81	14.9		
Monitoring	Yes	144	26.6	473	87.3	407.21	**<0.001**
	No	398	73.4	69	12.7		
Giving fluid	Yes	19	3.5	460	84.9	731.17	**<0.001**
	No	523	96.5	82	15.1		
Administration of medication	Yes	25	4.6	320	59	370.01	**<0.001**
	No	517	95.4	222	41		
Intubation	Yes	0	0	4	0.7	4.02	**0.045**
	No	542	100	538	99.3		
Cardiopulmonary resuscitation	Yes	0	0	1	0.1	1.00	0.317
	No	542	100	541	99.9		

*: Obtained with the chi-square test

were discharged voluntarily, 1.5% were referred to another hospital and 0.9% were exitus (p<0.001).

Discussion

EHS ambulances are one of the most important parts of the health system, especially outside of a health institution, where patients with life-threatening conditions are first evaluated by a health personnel, necessary interventions and first treatments are made, saving lives and providing rapid transfer of patients. It is very important that the EHS ambulance is used appropriately for the most efficient continuation of EHS.

In studies conducted in our country, the rate of children transported to emergency departments by 112 ambulance has been reported as 2.15-3.2%.[10-12] In our study, 2.54% of the cases admitted to the pediatric emergency department of our hospital were transported by 112 ambulance. Different results have been reported about the use of EHS according to gender. In a study investigating the use of EHS according to age groups and genders, the rate of ambulance use by male gender varied between 46.5% and 58.6%.[13] In another study, the rate of male patients was reported as 49.8%.[14] In pediatric studies conducted in our country, ambulance use in male patients was reported as 57.7% and 51.1%.[10,12] In our study, 52.8% male and 47.2% female patients came by ambulance and no significant difference was found between genders. In studies on ambulance transport of pediatric patients, no clear age was used in the literature for the distinction between pediatric and adult patients. In one study, it was observed that ambulance was used in transportation to hospital with a rate of 4.2% in 0-2 years, 37.4% in 2-8 years and 58.4% in 8-14 years.[15] In a study conducted in our country, it was reported that patients aged 15-24 years had the highest rate of being brought to hospital by ambulance among pediatric patients.[16] In a study similar to our study, it was shown that 57% of pediatric patients aged 10-17 years were brought to the hospital by ambulance.[10] In our study, in contrast to these findings, the highest rate was 27.7% in children aged between 28 days and 2 years. We think that the fact that trauma cases are not admitted to the pediatric emergency department of our hospital and that trauma cases are mostly seen in the adolescent period may account for this difference.

In studies, ambulance use was examined according to the hours of the day and it was observed that it varied although there was no specific standard. In a study conducted in our country, it was observed that ambulance was most frequently used between 18:00 and 20:00.[16] In a pediatric study conducted in Adana, it was reported that 44.4% of the patients were admitted to the emergency department between 08:00 and 17:00, 43% between 17:00 and 24:00, and 12.6% between 24:00 and 08:00 by EHS ambulance.[11] Similarly, in our study, 77.6% of the patients were brought by ambulance between 08:00 and 24:00.

In a study of three thousand people including all age groups in our country, it was reported that the distribution according to triage evaluation was very urgent for 16.5%, urgent for 21.2% and non-urgent for 62.3%.[17] In a study conducted in Lithuania, it was reported that 78.2% of the patients were not urgent and 21.8% needed emergency care. In the same study, although 38.8% of the parents reported that they came to the emergency department because of the need for emergency care and deterioration of the child's health, emergency service specialists stated that this rate was only one fifth.[7] In a study conducted in our clinic in 1998, it was reported that 52% of the children brought to the pediatric emergency department were true emergency cases.[18] In our study, patients in the green field category were the most common with a rate of 71.9-82.9% in all months. This high rate indicates that the majority of the patients who came to the pediatric emergency department of our hospital by ASH ambulance were not real emergency patients. Some of the reasons for this high rate of ambulance use include the fact that families do not have private vehicles, they think that they can reach the hospital faster and be examined and treated faster with the EHS ambulance, they do not want to wait in the queue for examination in outpatient clinics during working hours, they want to benefit from EHS free of charge, they think that their children's condition is urgent even if it is not a real emergency and they are worried.

In our study, 10.5% of the patients brought by ambulance were forensic cases. In a previous one-year study conducted in our hospital, it was reported that 1.71% of the patients admitted to the pediatric emergency department were forensic cases.[19] In a study conducted in our country with 486 forensic cases, the most common reason for presentation in non-traumatic forensic cases (153 cases) was accidental drug ingestion with the rate of 13.8%. This was followed by suicide, food poisoning and carbon monoxide poisoning.[20] In another study, intoxications were most common in children aged 0-4 years (64%), traffic accidents were most common in the 5-9 age group (48%), battery was most common in the 10-14 age group (47%) and penetrating sharp instrument injuries were most common in children aged 15 years and above (93%).[21] In our study, the most common intoxications were observed between the ages of 28 days and 2 years (36.8%), the most common intoxications were observed between the ages of 2 and 5 years (33.3%), and corrosive substance ingestion (28.5%) ranked second. Between the ages of 12 and 14 years (80%) and over 14 years (62.5%), suicide was the most common. In a study conducted in our country, 53.8% of forensic cases were reported in the 0-59 months age group, and in another study, the most common age of

non-traumatic forensic cases was reported to be between 1 month and 4 years with a rate of 29.4%.[20,22] Similarly, in our study, the highest proportion of forensic cases was in the age group of 2-5 years with the rate of 36.8%, and the second most common age group was 28 days-2 years with the rate of 33.3%. The fact that children in these age groups are active, curious and interested in the environment may explain the high rate of forensic cases in this age group.

In a study conducted in Adıyaman in our country, chronic diseases were reported in 17.3% of patients brought to the emergency department by ambulance.[23] In our study, the rate of children with chronic diseases was 48.1% and 44% of these were neurologic diseases and 22.6% were diseases related to the respiratory system. The fact that our hospital is a tertiary university hospital, an important center for pediatric neurology and the only center for pediatric pulmonology in our province causes the number of patients followed up in these fields to be high and our hospital is the first choice of 112 teams when emergency healthcare services are required for our patients under follow-up.

During our study period, 4.7% of our patients were admitted from outside the city and came from neighboring cities. When the places where pediatric patients were picked up by 112 ambulance teams in our country were examined, it was observed that 42.9% of the patients were picked up from the street, 30% from home, and 4.3% from another hospital or healthcare institution in a study similar to our study.[10] In another study, 53% of the patients were taken from home and workplace and 24.6% from another health institution.[23] In our study, 49.4% of patients were taken from home, while 48.8% were taken from another hospital or health institution. It is seen that the use of EHS in inter-hospital transportation is quite high in our province.

When we examined the studies conducted in our country, we could not find a study on the mode of transportation of children using 112 EHS. In this respect, we think that our study is the first. When the cases brought by 112 were classified according to the mode of transport, the majority of the cases were primary cases taken from the scene with 289 cases (53.2%), but 196 cases (36.1%) accepted for transport also constituted a significant portion of our patients. In the five-month follow-up, 57 (10.5%) of the children brought by ambulance were brought with the decision of ASKOM even though they were not accepted by us. Since it takes time to arrange a place for these patients who come with the decision of ASKOM, there may be disruptions in the treatment of these patients. This rate increases to 18.2% especially in December when the number of patients is the highest. Like many hospitals, these are periods when our emergency and inpatient wards are completely full, emergency wards are extremely busy, and we cannot admit patients because we cannot provide them with the care they need. In order for patients to benefit from healthcare services in the best way possible in such situations, 112 healthcare teams should assess whether patients need emergency healthcare services at the scene, whether they need to be transported by ambulance, and whether they need to apply to the emergency department. Patients who can be treated at the scene should be provided with the care they need, patients who do not need tertiary care should be taken to other centers, and patients who are referred from other centers should be cared for in the hospital where they are present with consultations to the extent possible until a suitable place is arranged in our hospital. With this functioning, we believe that all pediatric patients will receive the quality EHS care they need.

In one of the pediatric studies, gastrointestinal emergencies were the most common and neurological emergencies were the third most common after trauma in pediatric patients brought by ambulance.[11] In another study, it was reported that the most common diagnoses were upper respiratory tract diseases, the second most common were febrile convulsions and epilepsy, and the third most common were lower respiratory tract infections.[12] In our study, when the emergency department diagnoses of the patients were evaluated, neurologic diseases were found to be the most common (36.7%), respiratory system diseases were the second most common (20.1%) and gastrointestinal system diseases were the third most common (19%). In a study conducted in our country, when 112 pre-diagnoses and emergency department diagnoses were compared, there was compatibility.[10] In our study, when 112 pre-diagnoses and emergency department diagnoses were examined, it was observed that the diagnoses of 79.2% of the cases were compatible, whereas the diagnoses of 29.8% of the cases were not compatible.

Assessment of vital signs is a critical part of the evaluation and care of pediatric patients in the prehospital setting.[24] In our study, it was observed that body temperature was not measured in 69.1%, respiratory rate was not checked in 77.8% and blood pressure was not measured in 66.1% of the patients by 112 teams during transportation. In the emergency department, body temperature was measured in 85% of the patients, respiratory rate was not checked in 90.6%, and blood pressure was not measured in 73.6%. It was found that body temperature was measured more frequently in the emergency department and other vital signs were measured more frequently by 112 teams. Respiratory rate and blood pressure measurements were low in both. This suggests that the importance of vital signs in the evaluation of children is still not fully understood and that the training of the relevant health personnel is inadequate in this regard. In

a study conducted in pediatric patients under 18 years of age, it was shown that pulse oximetry was performed in 19.8% of patients, cardiac monitoring was performed in 14.8%, blood glucose analysis was performed in 8.8%, and intravenous access was opened in 24% of patients.[25] In another study, 52.7% of the patients received intravenous access, while 14.1% received oxygen. In the same study, when the interventions in the emergency department were analyzed, 61.3% of the patients were given intravenous access and 53.7% were given oxygen.[23] In our study, it was observed that 30.8% of the patients had intravenous access, 26% were monitorized, 19% were given intravenous fluids, and 4.6% were administered medication by the 112 team. In the emergency department of our hospital, it was observed that 85.1% of the patients were intravenously accessed, 84.9% were given intravenous fluids and 59% were administered medication. In addition, there were four pediatric patients who were brought by 112 teams without endotracheal intubation and intubated in our emergency department. The reasons for this situation may be that 112 teams did not realize the seriousness of the clinical conditions of pediatric patients and there were no trained personnel to perform intubation in pediatric patients. In addition, an intra-osseous route was not opened in a patient presenting with shock. Considering that our patient with shock was exitus, intra-osseous access may be life-saving in cases where intravenous access is not possible.

One of the parameters indicating inappropriate use of ambulances and emergency departments is the length of stay of patients in the emergency department.[26] In our study, the rate of patients staying in the emergency department for 0-12 hours was 45.4%. Some of these patients were hospitalized in the wards. When we examined the length of hospital stay, 28% of the patients stayed in the hospital for 0-12 hours. In the light of this information, we can think that ambulances are used inappropriately in our province. It has been reported that one of the criteria for inappropriate use of ambulances is the discharge rate.[26] In a study conducted in our country, 16.8% of the patients were discharged after examination and treatment in the emergency department, while this rate was 62.6% in another study.[10,23] In our study, 15.5% of the patients were discharged without the need for observation after being evaluated in the emergency department, 28% of the patients left the hospital within the first 12 hours, and a high rate of 75.8% was evaluated as green triage area. All parameters should be evaluated together when assessing inappropriate use of ambulances. More studies on this issue are needed especially in pediatric patients. In our study, 89.9% of the patients were discharged with recovery, 7.7% were discharged voluntarily, 1.5% were referred and 0.9% were exitus.

Conclusion

As a result of this study, it was determined that in addition to the patients taken from the scene, the use of EHS ambulance in inter-hospital transportation in our province is very frequent, our hospital provides emergency care services to patients coming from the city and out of the city, and sometimes appropriate and necessary intervention is not provided to pediatric patients by ambulance teams. Recording and interpretation of vital signs in pediatric patients and appropriate training of healthcare personnel in this regard are important for timely and effective intervention in pediatric patients. Real emergencies should be recognized in pediatric patients and inappropriate ambulance use should be prevented.

***Information:** This article is excerpted from Gülüzar Gürhan's specialty thesis titled "Clinical and Demographic Characteristics of Cases Brought to Pediatric Emergency Department by 112 Ambulance".

Ethics

Ethics Committee Approval: Permission was received for our study from Necmettin Erbakan University Meram Faculty of Medicine Non-Drug and Medical Device Research Ethics Committee (decision no: 2019/2003).

Informed Consent: Informed consent was obtained from the patient's relatives and patients.

Authorship Contributions

Concept: G.G., F.A., Design: G.G., F.A., Data Collection or Processing: G.G., F.A., A.Y., E.T., A.O.K., A.A., Analysis or Interpretation: G.G., F.A., A.Y., E.T., A.O.K., A.A., Literature Search: G.G., F.A., Writing: G.G., F.A., A.A.

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

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

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