

Evaluation of Emergency Applications Made to Pre-Hospital Emergency Health Services by Schools and Dormitories

Okul ve Yurtlar Tarafından Hastane Öncesi Acil Sağlık Hizmetlerine Yapılan Acil Başvuruların Değerlendirilmesi

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ABSTRACT

The aim of this study is to evaluate the emergency applications made to the pre-hospital emergency health services by schools and dormitories. Material and Methods: This study is a retrospective, descriptive and cross-sectional record review study. The research data were collected by retrospectively reviewing the records of students who applied to Gümüşhane Provincial Ambulance Service Chief Physician from kindergartens, elementary schools, middle schools, high schools and dormitories thereof between 2010 and 2019. A total of 4731 relevant medical record were accessed. Results: Of the emergency applications made to the pre-hospital emergency health services by schools and dormitories, 53,2% were made from high school dormitories, 28,3% from high schools, 15,2% from elementary schools, 3,3% from regional boarding elementary schools, and 0,1% from kindergartens. Conclusion: It was determined that the highest number of emergency applications to the Gümüşhane Provincial Ambulance Service Chief Physician were made in the month of October in 2015 and 2016 and due to trauma-related cases.

Keywords: Emergency Applications, Pre-Hospital Emergency Health, Schools

ÖZ

Bu çalışmanın amacı hastane öncesi acil sağlık hizmetlerine okul ve yurtlar tarafından yapılan acil başvuruların değerlendirilmesidir. Materyal ve Metot: Bu çalışma retrospektif, tanımlayıcı ve kesitsel bir çalışmadır. Araştırma verileri, 2010-2019 yılları arasında Gümüşhane İl Ambulans Servisi Başhekimliğine anaokulu, ilkokul, ortaokul, lise ve yurtlara başvuran öğrencilerin kayıtları retrospektif olarak incelenerek toplandı. Toplam 4731 ilgili tıbbi kayda ulaşıldı. Bulgular: Hastane öncesi acil sağlık hizmetlerine okul ve yurtlar tarafından yapılan acil başvuruların %53,2'si lise yurtlarından, %28,3'ü liselerden, %15,2'si ilköğretim okullarından, %3,3'ü yatılı ilköğretim bölge okullarından ve %0,1'i anaokullarından oluşmaktadır. Sonuç: Gümüşhane İl Ambulans Servisi Başhekimliğine en fazla acil başvurunun 2015 ve 2016 yılı Ekim ayında ve travmaya bağlı olgular nedeniyle yapıldığı belirlendi.

Anahtar Kelimeler: Acil Uygulamalar, Hastane Öncesi Acil Sağlık Hizmetleri, Okullar

Prior to the research, necessary permissions were obtained from the the University Research Ethics Committee (Date: 18 February 2020, Number: 95674917-108.99-E.7081) and the Gumushane Health Directorate Permission Letter (Date: 02 March 2020, Number: 62876282-044).

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BACKGROUND

Approximately 25% to 30% of the applications made to the pre-hospital emergency health services involve pediatric patients. Additionally, approximately 1% to 5% of the applications made to the pre-hospital emergency health services involve pediatric patients who are dealt with in the resuscitation rooms due to the urgent care need associated with these cases.¹ It was reported that 80% of child deaths occur due to emergency medical problems.² Pediatric patients are vulnerable and require special care or intervention techniques given their different anatomical, physiological and psychological structure than adults,^{3,4} which renders the interventions concerning pediatric patients an intense, stressful and challenging process.⁵

According to a report published in the U.S., 17% of all children in the U.S. apply to emergency care at least once, primarily due to fever, cough, nausea, vomiting, abdominal pain, as well as injuries, sprains, viral and respiratory tract infections.^{6,7} The main reasons for seeking emergency care services in the childhood period reported in a wide array of studies available in the literature on emergency situations concerning children include respiratory disorders such as acute shortness of breath, traumas, various neurological disorders such as epilepsy, poisoning, and gastrointestinal diseases.⁸ Another important issue that should be

emphasized is that children lack awareness of environmental hazards. Hence, children are physically vulnerable to traumas such as injuries and accidents. As a matter of fact, environmental hazards are among the main causes of childhood death and morbidity. Additionally, it has been stated that most of these emergency situations occur at home or school.⁹

The high frequency of applications made to emergency services by pediatric patients and the fact that the time spent at school constitute a majority of children's time render the studies to be conducted in this field important. It is seen that the studies on pediatric emergency cases in schools usually cover the last 20 years and were generally carried out with small sample sizes.¹⁰ Despite the topicality of the problem, the studies on emergency admissions to pre-hospital emergency health services involving school-age pediatric population or school/dormitory school children are scarce. The aim of this study is to evaluate the emergency applications made to the pre-hospital emergency health services by schools and dormitories. This study has a high originality value since that it is the first study conducted in the relevant field in the Gümüşhane province and that it is thus expected to contribute to the SWOT analysis studies reported on a province-based basis.

MATERIAL and METHODS

Design And Sample

This study is a retrospective, descriptive and cross-sectional record review study. It was carried out as a periodic research design in order to determine the trends in the data obtained from the secondary sources. It is also an explanatory study as it is a study that investigates the relationships between variables and defines the phenomena through causality.¹¹

The population of the study comprised 4731 emergency cases pertaining to the students who applied to Gümüşhane

Provincial Ambulance Service Chief Physician from kindergartens, elementary schools, middle schools, high schools and dormitories thereof.

Data Collection Tools

The research data were collected by retrospectively reviewing the records of students who applied to Gümüşhane Provincial Ambulance Service Chief Physician from kindergartens, elementary schools, middle schools, high schools and dormitories thereof between 2010 and 2019. In this regard, the relevant data covering a

10-year period between 2010 and 2019 were received in physical and digital environments from the Gümüşhane Provincial Health Directorate, in accordance with the permissions obtained.

Ethical Aspect of Research

For the research, "Ethics Committee Approval" from the University Ethics Committee and "Institution Permission" from the institution where the research was conducted.

Statistical Analyses

The data analysis consisted of two stages. Accordingly, the demographic characteristics were analyzed using the SPSS 25 software package, whereas the temporal variations of data were analyzed based on the time series method using the EViews 10 software package. Categorical data were expressed in numbers and percentiles, whereas numerical data were expressed in mean and standard deviation values. Correlation and regression analysis methods were used to determine the relationship between variables. Jarque-Bera test was used for the normality test, Breusch Godfrey test was used for autocorrelation,

Breusch Pagan Godfrey test was used for varying variance and Ramsey-Reset test was used for model building. A dummy variable was used given that instability was detected in the CUSUM and CUSUMSQ graphs, which are used to assess the stability level of the residuals of the coefficients in the estimated least squares (ESL) regression model, and that the model was not normally distributed. The Newey-West HAC (heteroskedasticity and autocorrelation consistent) kernel estimator which is resistant to autocorrelation and varying variance, was applied in the model.

In this study, the research data pertaining to the period between the 1st month of 2010 and the 12th month of 2019 were analyzed using the ESL method. Accordingly, the effects of variables, e.g., the time elapsed till leaving the scene of the incident, total distance covered by the emergency health services team, and the travel time, that is, the time it takes for the ambulance to leave the station and arrive at the scene, on the response times were analyzed based on the respective temporal changes.

RESULTS AND DISCUSSION

Study Findings Related To Demographic & Clinical Variables

The population of the study comprised 4731 emergency cases pertaining to the students who applied to Gümüşhane Provincial Ambulance Service Chief Physician from kindergartens, elementary schools, middle schools, high schools and dormitories thereof between 2010 and 2019. Of these cases, 71.3% (n=3372) were in 15-20 age group, 28.3% (n=1341) in the 6-14 age group, and 0.4% (n=18) in the 0-5 age group. 54.2% (n=2564) of the cases included in the study were female and 45.8% (n=2167) were male. Of the emergency applications made to the pre-hospital emergency health services by schools and dormitories, 53.2% (n=2516) were made from high school dormitories, 28.3% (n=1338) from high schools, 15.2% (n=717) from elementary schools, 3.3% (n=155) from

regional boarding elementary schools, and 0.1% (n=5) from kindergartens.

According to Table 1, most of the cases were conscious, gave normal pupillary response, and had normal respiratory and skin status. In terms of pre-diagnosis, trauma cases (22.1%) were the most and poisoning (1.2%) cases were the least common. 91.5% (n=4331) of the cases were urban and 8.5% (n=400) were rural. Distribution of cases by months and years revealed that the highest number of emergency cases were recorded in 2015 and 2016 (14.8%) and in October (15.0%), whereas the least number of emergency cases were recorded in 2010 (3.0%) and in June (2.2%). There were no cases recorded in July and August, since the children were on summer holiday during that timeframe. 91.4% (n=4324) of the cases were transferred to the hospital, 6.1% (n=290)

refused to be transferred, and 2.5% (n=116) were intervened onsite.

Tablo 1. Distribution of Demographic & Clinical Characteristics of the Emergency Cases (n=4731)

Variable	Distribution	n	%	Variable	Distribution	n	%	
Age Group	0-5 years	18	0,4	Gender	Female	2564	54,2	
	6-14 years	1341	28,3		Male	2167	45,8	
	15-20 years	3372	71,3	State of Consciousness	Conscious	4716	99,7	
Educational Institution of Relevance	High School Dormitory	2516	53,2		Unconscious	5	0,1	
	Regional Boarding	155	3,3		Clouded	7	0,1	
	Elementary School	717	15,2	Confused	3	0,1		
	Elementary School/Middle School			Pupillary Response	Normal	4706	99,5	
	High School	1338	28,3		Dilated	1	0,0	
Kindergarten	5	0,1	Miotic		23	0,5		
Respiratory Status	Normal	4705	99,5	Mydriatic	1	0,0		
	Shallow	1	0,0	Skin Status	Normal	4671	98,7	
	Dyspneic	5	0,1		Pale	37	0,8	
	Rapid	11	0,2		Sweaty	4	0,1	
Irregular	9	0,2	Hyperemic		4	0,1		
Month	January	350	7,4	Damp	13	0,3		
	February	388	8,2	Cyanotic	2	0,0		
	March	636	13,4	Pre-Diagnosis	Trauma	10,44	22,1	
	April	528	11,2		Gastrointestinal Diseases	856	18,1	
	May	468	9,9		Neurological Disorders	583	12,3	
	June	103	2,2		Psychiatric Disorders	622	13,1	
	September	199	4,2		Genitourinary Diseases	77	1,6	
	October	711	15,0		Medical Problems	455	9,6	
	November	662	14,0		Respiratory Disorders	626	13,2	
	December	686	14,5		Cardiovascular Diseases	109	2,3	
	Year	2010	144		3,0	Gynaecological Disorders	90	1,9
		2011	224		4,7	Infection	211	4,5
2012		289	6,1		Poisoning	58	1,2	
2013		481	10,2	Urban/Rural Type of Intervention	Urban	4331	91,5	
2014		511	10,8		Rural	400	8,5	
2015		698	14,8	Type of Intervention	Transferred to Hospital	4324	91,4	
2016		701	14,8		Refused to be Transferred	290	6,1	
2017		581	12,3		On-site intervention	116	2,5	
2018		586	12,4		Transferred for medical-examination	1	0,0	
2019		516	10,9					

Study Findings Related to Time Series

The observation interval of the sample used was 120 months. The travel time (TT) variable represents the time it takes for the ambulance to leave the station and arrive at the scene. The mean and maximum values of the TT variable were determined as 379.35 and 1775.460 seconds, respectively. Time elapsed till leaving the scene of the incident (TLSI) variable represents the time elapsed after the ambulance arrives at the scene until it leaves the scene. The mean and maximum values of the TLSI variable were determined as 1010.10 and 2759.254 seconds, respectively. The distance covered (DC) variable represents the total distance covered by the emergency health services

team per emergency case, that is, the difference between the odometer reading recorded at the time the ambulance has left the station and the odometer reading recorded at the time the ambulance has returned to the station. The mean and maximum values of the DC variable were determined as 10.79 and 35.466 km, respectively. The call time (CT) variable represents the hour the incident occurred. The mean and maximum values of the CT variable were determined as 13.33 and 19.200, respectively.

The correlation matrix, which indicates the correlation between the variables and whether there is any multicollinearity problem in this correlation, is given in Table 2. Accordingly, a positive correlation was

found between the variables. In addition, no multicollinearity problem was detected in

the correlation.

Table 2. Correlation Matrix

Variables	Mean	Standard Deviation	1	2	3	4
1. TLSI	1010.10	583.361	-			
2. CT	13.33	6.260	0.782	-		
3. DC	10.79	6.433	0.655	0.747	-	
4. TT	379.35	237.028	0.780	0.718	0.637	-

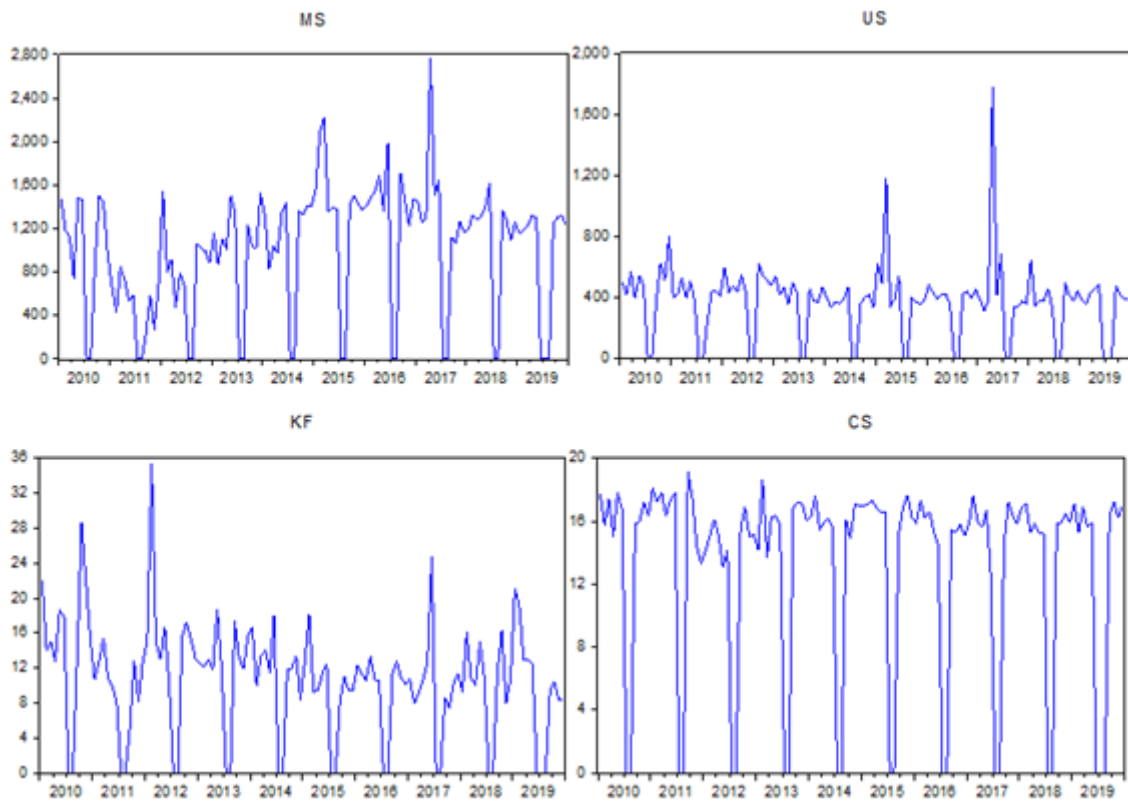


Figure 1. Time Series Graph of Variables

The seasonal variation graph of the variables used in the study is given in Figure 1. There were no cases in July and August, since the educational institutions were on summer holiday. Therefore, the minimum values for all variables were observed in July and August in all years investigated within the scope of the study. According to Figure 1, the maximum values of the TLSI and TT variables were observed in the 4th month of 2017, and the maximum value of the DC variable was observed in the 2nd month of 2012.

As can be seen in Table 3, TLSI and CT variables were not found to be stationary at level according to the ADF unit root test, whereas other variables were found to be stationary at level according to both tests. Given that structural breaks are not taken into account in traditional unit root tests, unit root analysis may provide erroneous results. Therefore, the stationarity of the series was analyzed using the Dickey-Fuller min-t test with structural breaks, which takes structural shocks into account. Given that the stationarity of the time series could not be fully determined based on the results of

the ADF and PP unit root tests, the Dickey-Fuller min-t test with structural break, which takes into account structural shocks, has

been used to determine the stationarity of the time series.

Table 3. ADF and PP Unit Root Tests

	ADF				PP			
	w/Constant		w/Constant+Trend		w/Constant		w/Constant+Trend	
	Level	Difference (Δ)	Level	Difference (Δ)	Level	Difference (Δ)	Level	Difference (Δ)
TLSI	-1.170	-5.933***	-1.125	-5.926***	-6.555***	-48.943***	-6.605***	-49.790***
TT	-8.544***	-9.699***	-8.540***	-9.633***	-8.682***	-63.087***	-8.638***	-62.883***
DC	-7.999***	-9.560***	-8.315***	-9.557***	-7.001***	-21.332***	-7.058***	-21.189***
CT	-1.121	-27.655***	-1.445	-27.552***	-6.550***	-27.896***	-6.526***	-28.904

*** indicates that p value is <0.01.

Automatic Newey-West bandwidth method and the constant + trend assumption were used in the unit root test analyses. “Δ” is the difference operator.

As can be seen in Table 4, the F and Wald test results confirmed that the predicted model was significant as a whole. The results of the ESL regression analysis revealed that the effect of DC, that is, the odometer reading difference, on TLSI, that is, the time elapsed till leaving the scene of

the incident, was insignificant, whereas that the effect of CT, that is the hour the incident occurred, and of TT, that is, the time it takes for the ambulance to leave the station and arrive at the scene on on TLSI was positive and significant.

Table 4. ESL Regression Analysis

TLSI is the dependent variable						
Variables	B	Std. Error	t	p		
Constant	-32.822	35.682	-0.919	0.359		
CT	38.631	10.969	3.521	0.000***		
DC	7.631	9.530	0.800	0.424		
TT	1.059	0.116	9.125	0.000***		
Dummy	144.304	77.427	1.863	0.064		
R ²	0.724	Jarque-Bera Prob.	5.679			
F-Statistic	75.721***	Breusch Godfrey (χ ²)	35.041***			
Prob. (F-Statistic)	0.000	Breusch Pagan Godfrey (χ ²)	5.890***			
Wald-F Test (χ ²)	260.808***	Ramsey Reset [1]	0.958			

*** indicates that p value is <0.01.

The results of this study indicate that the emergency calls were made the most due to trauma and the least due to poisoning. In comparison, in a study by Yuknis et al. (2018), in which the rates of pediatric cases that required transfer by ambulance were investigated, it was found that the most common causes of emergency transfers were respiratory distress, psychiatric conditions and seizures.¹² In a study conducted by Knight et al. to identify the school-related cases that required emergency health care services, it was determined that the most common cause of emergency cases was difficulty in breathing (18.4%) followed by seizures (16%) and other diseases (12.3%).¹³ The data on the causes of emergency calls were found to be comparable to a significant

extent with minor differences which may be attributed to the minor differences between the targeted groups and methods used in these studies.

Of the emergency applications made to the pre-hospital emergency health services by the schools and dormitories investigated within the scope of this study, it was determined that 53.2% were made from high school dormitories, 28.3% from high schools, 15.2% from elementary schools, 3.3% from regional boarding elementary schools, and 0.1% from kindergartens. In comparison, in a study carried out to determine school-related accidents in Italy, the mean frequency of accidents was found to be 1.99% in kindergartens, 1.61% in

elementary schools, 1.48% in middle schools, and 0.71% in high schools.¹⁴ Further studies are needed to obtain more conclusive results on this subject.

It was found in this study that most of the emergency calls from schools and dormitories were made in the months of October, November and December. Similarly, Knight et al. found that the school-related emergency health service incidents most commonly occurred at the beginning of the school year.¹³ Further studies are needed to determine the reasons for the higher frequency of emergency health service incidents during the said time frame.

Furthermore, the findings of this study revealed that the distance covered (DC) by the emergency health services team per emergency case did not have a significant effect on the time elapsed after the ambulance arrives at the scene until it leaves the scene (TLSI). The process of receiving the call and responding to the event by the Emergency Health Services teams is called the engagement process. In a different study, it was found that the response time of the

emergency teams to an emergency call increased as the distance between the place of incident and the ambulance station increased.¹⁵ Hence, further studies are needed to explain the discrepancy between these results.

It was found as a result of this study that as the mean call time (CT) and the travel time to arrive at the scene of incident (TT) decreased, so did the time elapsed after the ambulance arrives at the scene until it leaves the scene (TLSI). As a matter of fact, as the cities expand, people started to move away from the city center to the outskirts of cities. In a study conducted in the U.S., it was concluded that the increase in urban sprawl and the delays in the arrival of ambulances to the scene of incident were related.¹⁶ As the findings of this study and the relevant literature data suggest the increase in transportation times due to increasing distances caused by the expansion of cities and to the increasing traffic caused by urban sprawl directly affect the time that the emergency health services spend on each case.

CONCLUSION AND RECOMMENDATIONS

In conclusion, based on the findings of this study, it was determined that the highest number of emergency applications to the Gümüşhane Provincial Ambulance Service Chief Physician were made in the month of October in 2015 and 2016 and due to trauma-related cases. Additionally, it was determined that the least number of emergency applications to the Gümüşhane Provincial Ambulance Service Chief Physician were made in the month of June in 2010 and due to cases of poisoning. Necessary measures should be taken by the authorities of the educational institutions primarily before and during the month of October, which is the month that the emergency cases were determined to be the most common. Students and the personnel should be trained by health personnel about trauma and first aid.

The findings of this study revealed the status of emergency pediatric incidents in

educational institutions in a province of Türkiye. Nevertheless, taking into consideration that the province in which the study was conducted has characteristics that can be representative of overall Turkey, the findings of this study may also be used as a guide in policy-making work that concern larger populations. First, focusing on preliminary preparation in educational institutions is important in terms of reducing the number of emergency cases from a risk management aspect. Secondly, structural arrangements to be made within the educational institutions, to determine the needs of infirmary and health personnel, to identify students with life-threatening diseases, and carrying out the preliminary preparations in coordination with the emergency health services teams are all measures that would help reduce the number

emergency cases originated from educational institutions. More specifically;

- Necessary measures should be taken by the authorities of the educational institutions primarily before and during the month of October, which is the month that the emergency cases were determined to be the most common,
- Students and the personnel should be trained by health personnel about trauma and first aid,
- Awareness should be raised to call 112 without wasting any time so that the emergency cases can be reached and intervened as soon as possible,
- Institutional and individual emergency care plans should be made,
- Efforts to reduce school-related accidents and injuries should be detailed in institutional plans for emergencies, and their implementation should be ensured as soon as possible,
- The infirmary needs of the educational institution in relation to first aid and emergency aid should be met,
- Necessary preparations should be carried out within the scope of both occupational health and safety measures and relevant regulations in relation to structural problems that may pose a threat to students within the educational institution,
- Most frequently occurred emergencies should be identified and addressed with a view to reduce such emergencies, and
- R&D studies on relevant subjects should be given weight and due diligence should be exercised to conduct these studies based on risk reduction.

KAYNAKLAR

1. Owens, P.L, Barrett, M.L, Gibson, T.B, Andrews, R.M, Weirnick, R.N. and Mutter, R.L. (2010). "Emergency Department Care in the United States: A Profile of National Data Sources". *Annals of Emergency Medicine*, 56 (2), 150-165. <https://doi.org/10.1016/j.annemergmed.2009.11.022>
2. Pediatric Emergency Medicine and Intensive Care Association. (2008). "Child Emergency Situation and Well in Turkey and in the World". Erişim adresi: http://cayd.org.tr/gorseller/files/raporlar/TURKIYE_ve_DUNYA_COÇUK_ACIL.pdf (Erişim tarihi: 05.03.2020).
3. Phattharapornjaroen, P, Sittichanbuncha, Y, Atiksawedparit, P. and Sawanyawisuth, K. (2021). "Characteristics of Pediatric Emergency and Risk Factors For Life-Saving Interventions". *Global Pediatric Health*, 8, 1-4.
4. Günhan, G. (2020). Çocuk Acil Servisine 112 Ambulansı ile Getirilen Vakaların Klinik ve Demografik Özellikleri. Uzmanlık Tezi. Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi Dahili Tıp Bilimleri Çocuk Sağlığı ve Hastalıkları Anabilim Dalı, Türkiye/Konya.
5. Lutz, N, Vandermensbrugghe, N.G, Dolci, M, Amiet, V, Racine, L. and Carron, P.N. (2014). "Pediatric Emergencies Admitted in the Resuscitation Room of a Swiss University Hospital". *Pediatric Emergency Care*, 30 (10), 699-704.
6. Moore, B.J, Stocks, C. and Owens, P.L. (2017). "Trends in Emergency Department Visits, 2006–2014". Agency for Healthcare Research and Quality, Rockville, MD. Erişim adresi: <https://hcup-us.ahrq.gov/reports/statbriefs/sb227-Emergency-Department-Visit-Trends.pdf> (Erişim tarihi: 07.03.2020).
7. Wier, L.M, Yu, H, Owens, P.L. and Washington, R. (2013). "Overview of Children the Emergency Department, 2010. Healthcare Cost and Utilization Project (HCUP) Statistical Brief # 157;1-12". Agency for Healthcare Research and Quality. Erişim adresi: <https://www.ncbi.nlm.nih.gov/books/NBK154386/> (Erişim tarihi: 07.03.2020).
8. Silbereisen, C. and Hoffmann, F. (2015). "Pediatric Emergencies in the Emergency Medical Service". *Der Anaesthesist*, 61 (1), 73-84. <https://doi.org/10.1007/s00101-014-2383-y>
9. Bruce, B.S. and McGrathi, P.J. (2005) "Group Intervention for the Prevention of Injuries in Young Children: A Systemic Review". *Injury Prevention*, 11, 143-147.
10. Catherine, A.T. and Olympia, R.P. (2016). "EMS Activations for School-Aged Children From Public Buildings, Places of Recreation or Sport, and Health Care Facilities in Pennsylvania". *Pediatric Emergency Care*, 32 (6), 357-363.
11. Coskun, R, Altunısık, R. and Yıldırım, E. (2017). "Research Methods in Social Sciences (SPSS Applied)". Adapazarı: Sakarya Bookstore.
12. Yuknis, M.L, Weinstein, E, Maxey, H, Price, L, Vaughn, S.X, Arkins, T. and Benneyworth, B.D. (2018). "Frequency of Pediatric Emergencies in Ambulatory Practices". *Pediatrics*, 142 (2), 1-7. <https://doi.org/10.1542/peds.2017-3082>
13. Knight, S, Vernon, D.D, Fines, R.J. and Dean, N.P.A.J.M. (1999). "Prehospital Emergency Care for Children at School and Nonschool Locations". *Pediatrics*, 103 (6), 1-5.
14. Pagano, A, Cabrini, E, Anelli, M, Bernuzzi, S, Lopiccoli, S. and Fischer, P. (1987). "Accidents in the School Environment in Milan, A Five Year Survey". *European Journal of Epidemiology*, 196-201.
15. Breen, N, Woods, J, Bury, G, Murphy, A.W. and Brazier, H. (2000). "A National Census of Ambulance Response Times to Emergency Calls in Ireland". *Emergency Medicine Journal*, 17 (6), 392-395.
16. Trowbridge, M.J, Gurka, M.J. and O'connor, R.E. (2009). "Urban Sprawl and Delayed Ambulance Arrival in the US". *American Journal of Preventive Medicine*, 37 (5), 428-432. <https://doi.org/10.1016/j.amepre.2009.06.016>.