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Evaluation of the Reasons for Admission Before and After COVID-19 in Cases Brought to a Pediatric Emergency Clinic by 112 Ambulances

Bir Çocuk Acil Kliniğinde 112 Ambulansı ile Getirilen Olguların COVID-19 Öncesi ve Sonrası Başvuru Nedenlerinin Değerlendirilmesi

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ABSTRACT

Objective: The reasons for admission of the cases brought to the pediatric emergency clinic in the pre- and post- Coronavirus disease (COVID-19) periods are different. For healthcare professionals, knowing these differences is important in emergency response. This study aimed to evaluate the reasons for admission before and after COVID-19 in cases brought to the pediatric emergency clinic by 112 ambulances.
Methods: This retrospective study was conducted in a pediatric emergency clinic of a public hospital between November 2018 and March 1, 2021. The sample of the study consisted of 400 pediatric patients who applied to the Emergency Service with a 112 ambulance. The data obtained in the study were analyzed using the SPSS (Statistical Package for Social Sciences) for Windows 22.0 software program.
Results: Of the children; 54% were between 6-12 aged, 70% were male. A significant relationship was found between pre- and post-COVID-19 applications and descriptive features (age, gender, airway status, fever, SpO^2, pulse, complaint, triage officer, result) ($p<0.05$). In addition, the increase in the rates of sore throat, muscle and joint pain, seizures, syncope, chest pain, palpitation, bronchitis, difficulty in breathing and allergy, which are the causes of emergency admission in the post-COVID-19 period, was found to be statistically significant ($p<0.05$).
Conclusion: It was determined that in the post-COVID-19 period, children were brought to the emergency unit by 112 ambulances with sore throat, muscle and joint pain, seizures, syncope, chest pain, palpitations, bronchitis, difficulty in breathing, and allergies than previous period. Emergency services are the first units to apply for COVID-19 complaints. Thus, it is necessary to include the reasons for children's admission to emergency units in in-service trainings for all health professionals, to add triage steps to trainings, to follow current changes, to create and implement more comprehensive health protocols and procedures.

ÖZ

Amaç: Çocuk acil kliniğine getirilen olguların COVID-19 öncesi ve sonrası dönemde başvuru nedenleri farklıdır. Sağlık çalışanları tarafından bu farklılıkların bilinmesi acil müdahalede önemlidir. Bu çalışmada; çocuk acil kliniğine 112 ambulansı ile getirilen olguların COVID-19 öncesi ve sonrası başvuru nedenlerinin değerlendirilmesi amaçlandı.
Yöntem: Retrospektif tipte planlanan bu çalışma, bir devlet hastanesi çocuk acil kliniğinde 1 Kasım 2019-1 Mart 2021 tarihleri arasında gerçekleştirildi. Araştırmanın örneklemini; 112 ambulansı ile Acil Servise başvuran 400 çocuk hasta oluşturdu. Araştırmada elde edilen veriler SPSS (Statistical Package for Social Sciences) for Windows 22.0 programı kullanılarak analiz edildi.
Bulgular: Araştırmaya dahil edilen çocukların %54'ü 6-12 yaş aralığında ve %70'i erkekti. COVID-19 öncesi ve sonrası dönem başvuruları ile tanımlayıcı özellikler arasında (yaş, cinsiyet, havayolu durumu, ateş, SpO^2, nabız, şikâyet, triaj görevlisi, sonuç), anlamlı ilişki bulundu ($p<0.05$). Ayrıca COVID-19 sonrası dönemde acile başvuru nedenlerinden; boğaz ağrısı, kas eklem ağrısı, nöbet, senkop, göğüs ağrısı, çarpıntı, bronşit, nefes almada zorluk ve alerji oranları arasındaki artışın istatistiksel düzeyde anlamlı olduğu saptandı ($p<0.05$).

Sonuç: Çocukların COVID-19 sonrası dönemde, öncesine göre daha çok boğaz ağrısı, kas eklem ağrısı, nöbet, senkop, göğüs ağrısı, çarpıntı, bronşit, nefes almada zorluk ve alerji nedenleri ile acil birime 112 ambulansı ile getirildikleri belirlendi. Acil servisler COVID-19 şikayetleriyle başvurulan ilk birimlerdir bu nedenle; tüm sağlık personeline yönelik hizmet içi eğitimlerde çocukların acil ünitelere başvuru nedenlerinin yer alması, eğitimlere triyaj basamaklarının eklenmesi, güncel değişikliklerin takip edilmesi, sağlık protokolleri ve prosedürlerinin daha kapsamlı oluşturulması ve uygulanması gerekmektedir.

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INTRODUCTION

Today, while febrile cases coming to the pediatric emergency room make us think of COVID-19, Covid is still an unknown danger, an epidemic full of question marks, especially in children. Coronaviruses (CoV) belong to the Corona family and are single-stranded zoonotic RNA viruses with a membrane size of 40-60 nm. With the transmission of SARS-CoV-2 virus from symptomatic and asymptomatic infected people to other people through droplets or contact, SARS-CoV-2, which started in the city of Wuhan, spread throughout the world and became a global pandemic in the following days. This clinical disease caused by SARS-CoV-2 was named COVID-19 (Özdemir and Pala, 2020). Data from China has shown that pediatric cases of COVID-19 may be less severe than cases in adults and that children may experience different symptoms than adults (Lu et al., 2020). However, disease characteristics among pediatric patients in the United States have not been identified. When the COVID-19 outbreak began to appear in Turkey in March 2020, there is limited data on SARS-CoV-2 transmission from young children and symptom findings in children, especially in childcare settings (Lopez, 2020). Symptoms of the COVID-19 epidemic in children were detected to be fever, cough, sore throat, runny nose-congestion and flu, muscle pain, abdominal pain, loss of appetite, weakness, palpitation, chest pain, nausea, vomiting, diarrhea, skin rashes, loss of taste and smell in the late period (Başar, 2021).

Emergency departments are the units that provide uninterrupted service 24 hours a day, where all kinds of emergency patients are treated (Öner Şimşek, 2018), and they are the most important departments where pediatric patients are accepted and triage is applied during the pandemic process. For this reason, emergency services should be served by professional teams who can intervene in acute situations at any time and manage the process (Dönmez, Durak, Torun, Köksal, and Aydın, 2017). It is significant for child health that the children symptoms and treatment are evaluated by nurses in the Pediatric Emergency Services. In this context, the study was planned retrospectively with the aim of evaluating the reasons for admission before and after COVID-19 in cases brought to the pediatric emergency clinic by 112 ambulances.

METHODS

Research Design

This is a retrospective descriptive study. The study was carried out to evaluate the reasons for admission before and after COVID-19 in cases brought to the pediatric emergency clinic by 112 ambulances.

Population and Sample

The Sample of the study consisted of the data of a total of 400 pediatric patients, 208 in the pre- COVID-19 period and 192 in the post-COVID-19 period, aged 0-18, who were brought to a State Hospital Pediatric Emergency Clinic in Istanbul between November 2018 and March 1, 2021.

Data Collection

Patient information was analyzed from the hospital's Healthcare Information and Management Systems Society (HIMSS) data system archive.

Data Collection Tools

"Introductory Information Form" and "Child Emergency Unit Triage and Examination Form" consisting of 16 questions and developed by the researchers were used as data collection tools.

Data Analysis

The data obtained in the study were analyzed using the SPSS (Statistical Package for Social Sciences) for Windows 22.0 software program. Number and percentage of descriptive statistical methods were used in the evaluation of the data. Descriptive features and the distribution of admission reasons in the pre-COVID-19 and post-COVID-19 periods were analyzed using chi-square tests.

Ethical Considerations

The study was carried out after obtaining the ethics committee permission from the Ethics Committee of Istanbul Medipol University Non-Interventional Clinical Researches (2021-05-17T02_27_00.xml) and the Ministry of Health Ethics Committee (E-10840098-772.02-2171) and the Ministry of Health Ethics Committee and the institutional permission from the hospital management from which the research data will be obtained.

RESULTS

Of the children; 53.6% were between 6-12 years old and 70% were male in the study. Of them; 27.7% had an airway risk and 56.8% required cardiopulmonary resuscitation. The body temperature was between 35-37.4 C0 for 51% of the children, 37.5-39 C0 for 36.5% of them. SpO2 value of 45% was below 79, and 19.5% of them were in the range of 80-89. Also, 51% of them had a BPM of 100-149, and 64.8% had pain. 7.8% of children were legal cases. Of the children brought to the emergency unit; 29% had fever, 21.8% had pain, and 16.5% had respiratory complaints.54.2% of the children brought to the unit were triaged by nurses, 20.8% by anesthesia technicians, 18.8% by home care technicians, and 6.2% by other personnel (Laboratory technician, operating room technician, etc.). As a result of the procedures performed in the emergency unit, 64.4% of the children were referred to another hospital, 14.2% were admitted to the ward, and 14.0% were given a prescription (Table 1).

Table 1. Descriptive Features (N=400)

Groups		Before COVID-19 2019		After COVID-19 2020-2021		Total	
		N	%	n	%	n	%
Age	**0-6**	34	16.3	23	12.0	57	14.2
	6-12	125	60.1	89	46.4	**214**	**53.6**
	12-18	49	23.6	80	41.6	129	32.2
Gender	**Female**	52	25.0	68	35.4	120	30.0
	Male	156	75.0	124	64.6	**280**	**70.0**
Airway status	**Open**	47	22.6	72	37.5	**119**	**29.8**
	Risky	53	25.5	58	30.2	111	27.7
	Closed	108	51.9	62	32.3	170	42.5
Circulatory system	**Normal**	85	40.9	88	45.8	173	43.2
	CRP required	123	59.1	104	54.2	**227**	**56.8**
Fever	**35-37.4** C^0	134	64.4	70	36.5	**204**	**51.0**
	37.5-39 C^0	59	28.4	87	45.3	146	36.5
	39.1- 41C^0	15	7.2	35	18.2	50	12.5
SpO^2	**95-100**	6	2.9	96	50.0	102	25.5
	90-94	17	8.2	23	12.0	40	10.0
	80-89	44	21.2	34	17.7	78	19.5
	Under 79	141	67.8	39	20.3	**180**	**45.0**
Heart beat	**Over 200 beat/min**	21	10.1	3	1.6	24	6.0
	150-199 beat/min	23	11.1	5	2.6	28	7.0
	100-149 beat/min	104	50.0	100	52.1	**204**	**51.0**
	80- 99 beat/min	17	8.2	67	34.9	84	21.0
	61-79 beat/min	11	5.3	6	3.1	17	4.2
	Under 60 beat/min	32	15.3	11	5.7	43	10.8
Legal case	**Yes**	21	10.1	10	5.2	31	7.8
	No	187	89.9	182	94.8	**369**	**92.2**
Complaint	**Fever**	37	17.8	79	41.1	**116**	**29.0**
	Pain	43	20.7	44	23	87	21.8
	GIS	5	2.4	7	3.6	12	3.0
	Metabolic	13	6.2	6	3.1	19	4.8
	Neurological	7	3.4	3	1.6	10	2.5
	Cardiovascular	39	18.8	2	1.0	41	10.2
	Respiratory	34	16.3	32	16.8	66	16.5
	Urological	4	1.9	5	2.6	9	2.2
	Visual	2	1.0	2	1.0	4	1.0
	Legal Case	21	10.1	10	5.2	31	7.8
	Other	3	1.4	2	1.0	5	1.2

Triage Officer	**Nurse**	142	68.3	75	39.1	217	54.2
	Anesthesia technician	14	6.7	69	35.9	83	20.8
	Home care technician	47	22.6	28	14.6	75	18.8
	Other (Laboratory technician, operating room technician, etc.)	5	2.4	20	10.4	25	6.2
Operation result	**Prescription**	8	3.8	48	25.0	56	14.0
	Service admission	37	17.8	20	10.5	57	14.2
	Ex	16	7.7	7	3.6	23	5.8
	Referral	142	68.3	116	60.4	**258**	**64.5**
	Treatment rejection	5	2.4	1	0.5	6	1.5

GIS: Gastrointestinal system; CRP: Cardiopulmonary resuscitation; SpO2: peripheral oxygen saturation; min: minute; Ex: Exitus

A significant relationship ($p<0.05$) was found between the pre- and post-COVID-19 periods and the age, gender, airway status, fever, SpO2, heartbeat rate, complaints at the ED, the title of triage officer and the outcome of the procedure (Table 2).

When the descriptive features of children were compared with the periods before and after COVID-19, the rate of children aged 12-18 coming to the emergency department in the pre- COVID-19 period was 23.6%, while it was 41.6% in the post-COVID-19 period. In this process, it was observed that the arrival rates of girls (pre-COVID-19; 25.0%; post-COVID-19 35.4%) increased more than boys. The rate of children with risky airway was 25.5% before COVID-19 and 30.2% after COVID-19. During the disease process, the rates of bringing the children to the emergency room with a temperature between 37.7-39 ^{0}C (28.4% before COVID-19; 45.3% after COVID-19) and children with a temperature between 39.1-41^{0}C (7.2% before COVID-19; 18.2% after COVID-19) were significantly higher than in the pre-disease period. While the proportion of children with SpO2 values in the range of 90-94 was 8.2% before COVID-19, it was 12.0% after COVID-19. Considering the heart rate of the children, an increase was determined in the rates of children whose heart rate was between 100-149/min (50.0% before COVID-19; 52.1% after COVID-19) and 80-99/min (8.2% before COVID-19; 34.9% after COVID-19). While the rates of hospitalization of children without forensic cases (10.1% before COVID-19; 5.2% after COVID-19) decreased significantly during the COVID-19 process, the rates of bringing children to the emergency unit with fever (17.8% before COVID-19; 41.1% after COVID-19), pain (20.7% before COVID-19; 23% after) and respiratory complaints (16.3% before COVID-19; 16.8% after COVID-19) increased (Table 2).

Table 2. Relationship Between Descriptive Features and Before and After COVID-19 Period (N=400)

Groups		**Before COVID-19 2019 (n=208)**		**After COVID-19 2020-2021 (n=192)**		**Total**		**P**
		n	**%**	**N**	**%**	**n**	**%**	
Age	0-6	34	16.3	23	12.0	57	14.2	**X^2=15.013**
	6-12	125	60.1	89	46.4	214	53.6	**p=0.001**
	12-18	**49**	**23.6**	**80**	**41.6**	129	32.2	
Gender	Female	**52**	**25.0**	**68**	**35.4**	120	30.0	**X^2=5.159**
	Male	156	75.0	124	64.6	280	70.0	**p=0.015**
Airway status	Open	47	22.6	72	37.5	119	29.8	**X^2=17.312**
	Risky	**53**	**25.5**	**58**	**30.2**	111	27.7	**p=0.000**
	Closed	108	51.9	62	32.3	170	42.5	
Circulatory system	Normal	85	40.9	88	45.8	173	43.2	X^2=1.004
	CRP required	123	59.1	104	54.2	227	56.8	p=0.184
Fever	35-37.4 C^0	134	64.4	70	36.5	204	51.0	**X^2=32.861**
	37.5-39 C^0	**59**	**28.4**	**87**	**45.3**	146	36.5	**p=0.000**
	39.1- 41C^0	**15**	**7.2**	**35**	**18.2**	50	12.5	
SpO2	95-100	6	2.9	96	50.0	102	25.5	**X^2=138.976**
	90-94	**17**	**8.2**	**23**	**12.0**	40	10.0	**p=0.000**
	80-89	44	21.2	34	17.7	78	19.5	
	Under 79	141	67.8	39	20.3	180	45.0	
Heart beat	Over 200 beat/min	21	10.1	3	1.6	24	6.0	**X^2=66.104**
	150-199 beat/min	23	11.1	5	2.6	28	7.0	**p=0.000**
	100-149 beat/min	104	50.0	100	52.1	204	51.0	
	80- 99 beat/min	17	8.2	67	34.9	84	21.0	
	61-79 beat/min	11	5.3	6	3.1	17	4.2	
	Under 60 beat/min	32	15.3	11	5.7	43	10.8	
Legal case	Yes	21	10.1	10	5.2	31	7.8	

	No	**187**	**89.9**	**182**	**94.8**	369	92.2	X^2=3.336 p=0.050
Complaint	Fever	**37**	**17.8**	**79**	**41.1**	116	29.0	**X^2=56.847**
	Pain	**43**	**20.7**	**44**	**23**	87	21.8	**p=0.000**
	GIS	5	2.4	7	3.6	12	3.0	
	Metabolic	13	6.2	6	3.1	19	4.8	
	Neurological	7	3.4	3	1.6	10	2.5	
	Cardiovascular	39	18.8	2	1.0	41	10.2	
	Respiratory	**34**	**16.3**	**32**	**16.8**	66	16.5	
	Urological	4	1.9	5	2.6	9	2.2	
	Visual	2	1.0	2	1.0	4	1.0	
	Legal case	21	10.1	10	5.2	31	7.8	
	Other	3	1.4	2	1.0	5	1.2	
Triage officer	Nurse	142	68.3	75	39.1	217	54.2	**X^2=70.418**
	Anesthesia technician	**14**	**6.7**	**69**	**35.9**	83	20.8	**p=0.000**
	Home care technician	47	22.6	28	14.6	75	18.8	
	Other (Laboratory technician, operating room technician, etc.)	**5**	**2.4**	**20**	**10.4**	25	6.2	
Operation result	Prescription	**8**	**3.8**	**48**	**25.0**	56	14.0	**X^2=41.877**
	Service admission	37	17.8	20	10.5	57	14.2	**p=0.000**
	Ex	16	7.7	7	3.6	23	5.8	
	Referral	142	68.3	116	60.4	258	64.5	
	Treatment rejection	5	2.4	1	0.5	6	1.5	

Chi-Square Analysis; GIS: Gastrointestinal system; CRP: Cardiopulmonary resuscitation; SpO2: peripheral oxygen saturation; min: minute; Ex: Exitus

Significant relationship ($p<0.05$) was determined between the period when children brought to the emergency unit come to the unit and sore throat, earache, stomachache, muscle and joint pain, nausea, vomiting, diarrhea, not sucking, seizure, syncope, chest pain, palpitation, bronchitis, difficulty breathing, nosebleed, navel bleeding, burns, and allergies (Table 3).

The rate of children brought to the emergency unit with sore throat was 23.6% in the pre- COVID-19 period and 32.8% after COVID-19. The rate of children presenting with muscle and joint pain (1.4% before COVID-19; 37.0% after COVID-19) was significantly higher than in the previous period. The rates of seizures (17.8% before COVID-19; 26.6% after COVID-19) and syncope (8.7% before COVID-19; 17.2% after COVID-19) were also significantly different compared to the previous period. The rate of being brought to the emergency unit with chest pain was 23.6% in the pre- COVID-19 period, 34.9% after COVID-19, and the rate of children presenting with palpitations was 23.6% before COVID-19 and 34.9% after COVID-19. Considering the reasons for bringing to the emergency department for respiratory problems, it has been determined that the incidence of bronchitis in the pre-COVID-19 period (17.8%) was higher (35.4%) compared to the post-COVID-19 period, and there was an increase in the rates of children who had difficulty breathing (30.3% before COVID-19; 51.6% after COVID-19). Also, there was a significant increase in the rates of children applying for allergic reasons (7.7% before COVID-19; 13.5% after COVID-19) (Table 3).

Table 3. Findings Related to the Comparison of Reasons for Emergency Admission Before and After COVID-19 (N=400)

Groups		**Before COVID-19 2019 (n=208)**		**After COVID-19 2020-2021 (n=192)**		**Total**		**p**
		n	**%**	**n**	**%**	**n**	**%**	
Sore throat	**Yes**	**49**	**23.6**	**63**	**32.8**	112	28.0	**X^2=4.242**
	No	159	76.4	129	67.2	288	72.0	**p=0.026**
Earache	**Yes**	33	15.9	0	0.0	33	8.2	**X^2=33.201**
	No	175	84.1	192	100.0	367	91.8	**p=0.000**
Stomachache	**Yes**	37	17.8	0	0.0	37	9.2	**X^2=37.635**
	No	171	82.2	192	100.0	363	90.8	**p=0.000**
Muscle-joint pain	**Yes**	**3**	**1.4**	**71**	**37.0**	74	18.5	**X^2=83.624**
	No	205	98.6	121	63.0	326	81.5	**p=0.000**
Nausea-vomiting	**Yes**	67	32.2	0	0.0	67	16.8	**X^2=74.290**
	No	141	67.8	192	100.0	333	83.2	**p=0.000**
Diarrhea	**Yes**	29	13.9	0	0.0	29	7.2	**X^2=28.862**
	No	179	86.1	192	100.0	371	92.8	**p=0.000**

Not sucking	**Yes**	5	2.4	0	0.0	5	1.2	**X^2=4.674**
	No	203	97.6	192	100.0	395	98.8	**p=0.037**
Neonatal jaundice	**Yes**	9	4.3	3	1.6	12	3.0	X^2=2.622
	No	199	95.7	189	98.4	388	97.0	p=0.091
Attack	**Yes**	**37**	**17.8**	**51**	**26.6**	88	22.0	**X^2=4.479**
	No	171	82.2	141	73.4	312	78.0	**p=0.023**
Syncope	**Yes**	**18**	**8.7**	**33**	**17.2**	51	12.8	**X^2=6.536**
	No	190	91.3	159	82.8	349	87.2	**p=0.008**
Chest pain	**Yes**	**49**	**23.6**	**67**	**34.9**	116	29.0	**X^2=6.233**
	No	159	76.4	125	65.1	284	71.0	**p=0.008**
Palpitation	**Yes**	**49**	**23.6**	**67**	**34.9**	116	29.0	**X^2=6.233**
	No	159	76.4	125	65.1	284	71.0	**p=0.008**
Bronchitis	**Yes**	**37**	**17.8**	**68**	**35.4**	105	26.2	**X^2=16.026**
	No	171	82.2	124	64.6	295	73.8	**p=0.000**
Asthma	**Yes**	62	29.8	50	26.0	112	28.0	X^2=0.702
	No	146	70.2	142	74.0	288	72.0	p=0.234
Difficulty in breathing	**Yes**	**63**	**30.3**	**99**	**51.6**	162	40.5	**X^2=18.751**
	No	145	69.7	93	48.4	238	59.5	**p=0.000**
Burning in urine	**Yes**	29	13.9	19	9.9	48	12.0	X^2=1.548
	No	179	86.1	173	90.1	352	88.0	p=0.138
Bloody urine	**Yes**	7	3.4	8	4.2	15	3.8	X^2=0.178
	No	201	96.6	184	95.8	385	96.2	p=0.436
Side pain	**Yes**	37	17.8	24	12.5	61	15.2	X^2=2.160
	No	171	82.2	168	87.5	339	84.8	p=0.091
Eye redness itching	**Yes**	1	0.5	0	0.0	1	0.2	X^2=0.925
	No	207	99.5	192	100.0	399	99.8	p=0.520
Nose bleeding	**Yes**	28	13.5	10	5.2	38	9.5	**X^2=7.910**
	No	180	86.5	182	94.8	362	90.5	**p=0.004**
Navel bleeding	**Yes**	7	3.4	0	0.0	7	1.8	**X^2=6.577**
	No	201	96.6	192	100.0	393	98.2	**p=0.010**
Burn	**Yes**	39	18.8	15	7.8	54	13.5	**X^2=10.228**
	No	169	81.2	177	92.2	346	86.5	**p=0.001**
Allergy	**Yes**	**16**	**7.7**	**26**	**13.5**	42	10.5	**X^2=3.635**
	No	192	92.3	166	86.5	358	89.5	**p=0.040**
Foreign body ingestion	**Yes**	3	1.4	5	2.6	8	2.0	X^2=0.688
	No	205	98.6	187	97.4	392	98.0	p=0.319
Foreign body in nose	**Yes**	0	0.0	2	1.0	2	0.5	X^2=2.178
	No	208	100.0	190	99.0	398	99.5	p=0.230

Chi-Square Analysis

DISCUSSION

When the children brought to the emergency unit in the pre- and post-COVID-19 period are evaluated within the scope of the research, it is seen that 12-18 age group children came more in the post-COVID-19 period while children in the 6-12 age group constituted the majority group in both periods. In the study conducted in the USA, the median age of all 2.572 COVID-19 cases in children younger than 18 years was 11 (range 0-17). Approximately one-third (813; 32%) of reported pediatric cases were children aged 15-17 years, followed by children aged 10-14 years (682; 27%) (Table 1). It has been reported that the disease was seen in 15% of children <1 year of age, 11% of children aged 1-4 years, and 15% of children aged 5-9 years (Bialek, Gierke, Hughes, McNamara, Pilishvili and Skoff, 2020). Although the rate of children brought to the emergency unit was high in **boys**, it is seen that there was a higher increase in the rate of girls when compared to the pre-COVID-19 period. In the analysis of US pediatric COVID-19 cases, the majority (57%) of patients were reported to be male (Bialek et al., 2020). A few studies have reported the majority of COVID-19 cases among men (Lu et al., 2020). According to the study conducted in China, 56.6% of pediatric patients were male, and no difference was found between both genders (Dong et al., 2020). In the post- COVID-19 period, an increase was observed in the values of children whose airway status was in the risk group (30.2%) and children whose SpO^2 was between 90-94 (12.0%) (Table 2). Respiratory involvement is the main cause of morbidity and mortality in COVID-19 infection. The clinical picture varies from a simple upper respiratory tract infection to pneumonia causing ARDS and can be fatal (Çiftçi, 2020). The literature information shows that COVID-19 also affects the respiratory tract in children supports the study result.

Upper respiratory tract infection is 19.3% in the report from China (Lu et at. 2020). Acute respiratory dysfunction caused by coronavirus 2 (SARS-CoV-2) was originally noted by doctors in Wuhan, China and it was later

revealed that it rapidly worsened to acute respiratory distress syndrome (ARDS) with high mortality in complicated patients, causing severe endemic and epidemic pneumonia (Jeng, 2020). In one study low oxygen saturation was found below 92% in four (2.3%) of 171 children. It should be noted that some COVID-19 publications describe low oxygen saturation as 93% or below 94% (Lu et al., 2020).

The rate of children brought to the emergency unit with a temperature in the range of 37.5-39 C^0 was 45.3%, and the rate of those with a temperature between 39.1-41 C^0 is 18.2%. According to the results of the study conducted in China, the rate of fever in children was 41.5% and 56% (CDC) in children in the US report (Lu et al., 2020). In a systematic review the top three symptoms of confirmed COVID-19 cases were fever (43.9%), cough (22.0%), and shortness of breath (45.6%) (Rodriguez-Morales et al., 2020).

A meta-analysis of eight studies of Chinese cases with a total of 46 248 infected patients showed that the most common clinical symptoms were fever (91% ± 3%, 95% CI, 86%–97%), cough (67% ± 7%, 95% CI, 59%–76%), fatigue (51% ± 0%, 95% CI, 34%–68%), and dyspnea (30% ± 4, 95% CI, 21%–40%) (Yang et al., 2020). Fever is the most common initial symptom in children, followed by a dry cough. Respiratory, gastrointestinal, musculoskeletal, and other symptoms of fatigue have all been reported (Jeng, 2020). Chiu et al. (2005) stated that mean maximum temperature (±SD) was 39.3°C ± 0.9°C for 12 children with fever and mean total fever duration (±SD) for all children is 2.6 ± 1.2 days (range, 1-5 days) Lu et al. (2020) found that 41.5% of the children had fever at any time during the illness, and 58.5% (100) of the children had a fever above 37°C.

The rate of children with heart rate in the range of 100-149/min was significantly higher than in the pre-COVID-19 period, and Lu et al. (2020) who obtained similar results, found the tachycardia rate of 42.1% in their study in which they investigated the epidemiological characteristics of 171 children.

The rate of children brought to the emergency unit with complaints of fever, pain and respiratory system was significantly higher than the pre-COVID-19 period (Table 2). It has been determined by the CDC that 56% of pediatric patients with knowledge of each symptom reported fever, 54% cough, and 13% shortness of breath (Bialek et. al., 2020).

Children are the main population affected by infectious diseases, especially acute respiratory infections (Xie and Gu, 2016). This set of conditions greatly increases the difficulty of the preview and triage required for epidemic prevention and control (Zhang, Yu and Chen, 2020). 39.1% of the children brought to the emergency unit of the hospital where the study was conducted were triaged by nurses, 35.9% by anesthesia technicians, 14.6% by home care technicians and 10.4% by other personnel (laboratory technician, operating room technician, etc.) (Table 1). While the majority of triage practices were performed by nurses in the pre-epidemic period, during the epidemic period, with the increase in the need for nurses in intensive care units, inpatient treatment units and filiation teams, triage practices were carried out by other health personnel. Effective preview and triage can screen and identify possible and suspected cases in the shortest possible time, increasing the working efficiency of medical staff (Chen, Wang and Wang, 2020) achieves the goals of early detection, early isolation, and early reporting, and plays a key role in the acceptance and treatment of patients (Tian, Zhu, Li, Chen, Ting, Liu, and Xiao, 2016).

Therefore, staff performing triage requires consistent training and assessment to be competent in appropriate screening standards and to accurately and quickly identify every child with the epidemiological history and clinical manifestations of a suspected case (Zhang et al., 2020).

Although most cases of COVID-19 in children are not severe, severe COVID-19 disease resulting in hospitalization is still seen in this age group. Of the children brought to the emergency unit after COVID-19 within the scope of the study, 25% were sent with a prescription, 10.5% were hospitalized, 3.6% died, 60.4% were referred to another hospital, and 0.5% refused treatment. The reason for the lowest percentage of COVID-19 in children despite the immaturity of their immune systems has been explained by numerous arguments. One of these hypotheses is the reduced number and immaturity of ACE2 receptors in children compared to adults. Indeed, SARS-CoV-2 uses the ACE2 receptor and the cellular protease TMPRSS2. However, the innate immune response, which is the first line of defense, appears to be more active in children. Thymus is present and CD8 T cells are more efficient at participating in virus lysis. Finally, children have fewer comorbidities and are also less exposed to cigarettes than adults (Kammoun and Masmoid, 2020).

It is reported by the CDC COVID-19 Response Team in the USA that of 749 (29%) children under 18 years of age with COVID-19, 147 (estimated range=5.7%–20%) were hospitalized and 15 (0.58–2.0%) were admitted to the intensive care unit (Bialek et al., 2020). It is stated by Lu and others (2020) that 5.7% of all pediatric patients in the USA or 20% of those with known hospitalization status were hospitalized.

In the study, which included 48 COVID-19 patients hospitalized in pediatric intensive care units in the United States and Canada, the hospital mortality rate was reported as 4.2%, and this finding supported the positive outcomes

of children compared to adults (Devrim and Bayram, 2020). In a review of 45 relevant scholarly articles and letters by Ludvigsson (2020), children have been shown to make up 1-5% of COVID-19 cases ever diagnosed, they usually have milder illnesses than adults, and deaths are extremely rare. Dong et al. (2020) in the most comprehensive pediatric study in China, reported that only 5.2% had severe illness, 0.6% had a critical illness and had a case fatality rate of less than 0.1%.

In the post-COVID-19 period, a decrease was observed in the rates of earache, abdominal pain, nausea, vomiting, diarrhea, inability to suck, and umblical bleeding in children (Table 3). This decrease is considered to be related to the overall reduction in the number of children brought to the emergency room, particularly those in the 0–6 age group and especially infants aged 0–1 year. Dan et al. (2020) reported that the reason may be a reduction in school-related stress (headache and abdominal pain) and non-emergency conditions (neonatal feeding problems, vasovagal attacks) in children during the pandemic period and parents who are afraid to come to the emergency unit decide to stay at home. Lu et al. (2020) investigated the epidemiological characteristics of 171 children and found that 8.8% had diarrhea and 6.4% had vomiting. In a study, they found the rate of nausea to be 10% in their study, they reported the rates of vomiting, diarrhea and abdominal pain as 8%, 18% and 28%, respectively (Posfay-Barbe et al., 2020).

In the post-COVID-19 period, there was a significant increase in children who were brought to the emergency unit with the complaints of sore throat (32.8%) and muscle and joint pain (37.0%) (Table 3). In late April 2020, the CDC added six symptoms believed to be associated with COVID-19, including chills, muscle aches, headache, sore throat, and loss of taste and/or smell to symptoms of fever (91-100%), cough (43-80%), and rhinitis (33-60%) previously described by Zimmermann and Curtis (2020). Posfay-Barbe et al. (2020) reported the rate of joint pain as 18%, muscle pain as 33%, and sore throat as 36% in their study.

The rate of coming to the emergency department with syncope was 17.2% and the rate of seizures was 26.6%. Syncope is a common emergency in children and adolescents, including Neural Mediated Syncope (NMS), cardiac syncope, and unexplained syncope. Recurrent syncope can seriously affect children's quality of life and mental health. It is difficult for children with syncope to receive medical treatment or clinical follow-up during the epidemic. Syncope is not a common symptom of COVID-19, but can occur in this context and in some cases may be a presenting symptom (Wang, Xiao, Xu and Wang, 2020).

In our study, the rate of coming to the emergency department with chest pain in children was 34.9%. Also, the rate of palpitation among children diagnosed with COVID-19 was 34.9%. Posfay-Barbe et al. (2020) reported the rate of chest pain as 5% in their study. In one study reported the rate of palpitation among persistent symptoms as 3.8%, approximately 6 months after the diagnosis of COVID-19 (Buonsenso et al., 2021). In Ludvigsson's (2021) study, in the report on 5 Swedish children by their parents, it was stated that all children had fatigue, shortness of breath, heart palpitations or chest pain, and four had headaches, difficulty concentrating, muscle weakness, dizziness, and sore throat.

The incidence of bronchitis in the post-COVID-19 period (35.4%) of children brought to the emergency unit is significantly higher than in the pre-COVID-19 period (Table 3). Lu et al. (2020) reported the rate of pneumonia as 64.9%, Posfay-Barbe et al. (2020) reported the rate of obstructive bronchitis as 5% and pneumonia as 5% in their study.

Coronaviruses are known to cause severe respiratory distress and respiratory failure, as well as coagulation disorders, multisystem organ failure, and death (Zimmermann and Curtis, 2020). Similarly, as a result of the study, it has been determined that the rates of difficulty in breathing (51.6%) increased in children in the post-COVID-19 period (Table 3).

It is considered that the decrease in nosebleeds and burns in the post-COVID-19 period is related to the decrease in the child accident rates seen in this period in children brought to the emergency unit. Dan et al. (2020) stated that injuries, scalding, ingestion and foreign bodies may be less common in children brought to the emergency unit due to less outdoor activities and more parental supervision (Dann, Fitzsimons, Gorman, Hourihane, and Okafor, 2020).

It has been determined that COVID-19, which affects the respiratory system, affects children with allergic bodies and creates a significant difference on the rates of admission to the emergency unit (13.5%) compared to the pre-COVID-19 period. In the demographic analysis of 16 children with asthma and COVID-19, the rate of allergic asthma/allergic rhinitis was found to be 87.5% (Tosca et al., 2021).

CONCLUSIONS

Emergency services are the first units to be applied with COVID-19 complaints. Knowing the cases that come to the ED most enables the triage system to detect the diseases that may develop secondary in the pandemic period and to start the treatment immediately and it was understood that children's triage should be organized according to the most frequent cases, and its importance for correct and effective tracing was seen in in-service triage trainings. For this reason, nurses should be trained on syndromes that may occur after COVID-19, triage steps should be added to in-service training, current changes should be followed, health protocols and procedures should be created more comprehensively, and their implementation should be supported. Studies on the subject should be supported and encouraged.

Author Contributions

Concept and design: B.Ş., A.KD., O.A., S.K. Data collection: B.Ş., A.KD., O.A., S.K. Data analysis and interpretation: B.Ş., A.KD., O.A., S.K. Writing manuscript : B.Ş., A.KD., O.A., S.K. Critical review: B.Ş., A.KD., O.A., S.K.

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