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Demographic and Clinical Findings of Refugee COVID-19 Patients Admitted to the Emergency Department

Mehmet Esat Ferhatlar[1], Edip Burak Karaaslan[1], Mücahit Şentürk[1], Yavuzselim Koca[2], Ahmet Demirel[3], Asım Kalkan[1]

[1]University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital, Clinic of Emergency Medicine, İstanbul, Turkey
[2]University of Health Sciences Turkey, Kanuni Sultan Süleyman Training and Research Hospital, Clinic of Emergency Medicine, İstanbul, Turkey
[3]University of Health Sciences Turkey, Basakşehir Çam and Sakura City Hospital, Clinic of Emergency Medicine, İstanbul, Turkey

Abstract

Objective: Turkey is one of the countries hosting the highest number of refugees in the world. The aim of this study was to examine the demographic and clinical data and the hospital costs of refugees who presented at the emergency department (ED).

Methods: The study included 1004 patients aged >18 years who presented at the hospital ED between 1 April 2020 and 31 December 2020. The Mann-Whitney U test was applied to comparisons of two groups and the Kruskal-Wallis test to more than two groups. Categorical variables were compared using the Pearson chi-square, Fisher's Exact chi-square test, or the Fisher-Freeman-Halton test.

Results: The rates of chronic obstructive pulmonary disease (COPD) and cerebrovascular disease (CVD) (40%) were seen to be higher in patients in the intensive care units than in those in the wards. It was observed that the costs of the group hospitalized from the ward to the intensive care unit were higher ($p<0.001$).

Conclusion: Patients with COPD and CVD were seen to have a more severe disease course. There is a need for further studies to be able to better understand how refugees are affected by Coronavirus disease-2019.

Keywords: COVID-19, refugee, SARS-CoV-2, emergency department

INTRODUCTION

In the city of Wuhan in Hubei province, China, a new coronavirus causing Coronavirus disease-2019 (COVID-19) was identified in December 2019 (1). As of 15 September 2021, COVID-19 has infected 225,024,781 people worldwide and caused 4,636,153 deaths (2). In Turkey, as of the same date, 6,710,666 people have been infected, and 60,393 deaths have been recorded (3). For various reasons such as war, violence, oppression, and violation of human rights, approximately 26,400,000 refugees worldwide have had to abandon their homes and journey to other countries (4). The COVID-19 pandemic has negatively affected refugees because of problems experienced in various areas, such as health, education, economic, mental health, and language barriers (5). The ability of states to provide a free, fair, and accessible healthcare service significantly prevents the spread of COVID-19 (6). As the health status of refugees is affected considerably more than that of the average population, the emergency healthcare services presented during the COVID-19 pandemic should not exclude any individuals and should include refugees in addition to all vulnerable groups (7).

Since 2014, Turkey has accepted many refugees, of which approximately 3.7 million are of Syrian origin, and 532,726 live in Istanbul (8). Refugee rights in Turkey are protected by a comprehensive legal infrastructure such as the Law on Foreigners

Address for Correspondence: Mehmet Esat Ferhatlar, University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital, Clinic of Emergency Medicine, İstanbul, Turkey
Phone: +90 506 805 25 33 **E-mail:** dresatferhatlar@gmail.com **ORCID ID:** orcid.org/0000-0002-3497-8547

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and International Protection (2013) and the Temporary Protection Regulation (2014) (9). All refugees in Turkey have free access to health services and have the same rights as Turkish citizens (10). There is no study in the literature examining the clinical data of refugees diagnosed with COVID-19.

The study aimed to examine the demographic and clinical data and the hospital costs of refugees who presented at the emergency department (ED) and were diagnosed with COVID-19 to evaluate the clinical effects and outcomes on refugees of the healthcare policies applied during the COVID-19 pandemic.

METHODS

Study Design

This retrospective study was conducted in the ED of the University of Health Sciences Turkey, Prof. Dr. Cemil Tascioglu City Hospital. Approval for the study was granted by the Local Ethics Committee of University of Health Sciences Turkey, Prof. Dr. Cemil Tascioglu City Hospital in January 2021 (decision no: E-48670771-514.10). The first refugee patient diagnosed with COVID-19 applied to our hospital in April 2020. The electronic health record system of refugee patients who presented at the ED between 1 April 2020 and 1 January 2021 was examined. Our hospital is a training and research hospital with emergency medicine specialists and residents working in the ED pandemic area. Although case numbers have varied from time to time in Turkey, the daily average of patients examined is 500.

Participants

The study included patients aged >18 years with refugee status, who presented at the ED pandemic area of our hospital and had COVID-19 infection confirmed with real-time reverse transcriptase-polymerase chain reaction (rt-PCR) test. Patients under the age of 18, negative rt-PCR test, missing data in their electronic health records, and exposure to trauma (traffic accident, fall, assault, etc.) were not included.

Collection of Data

Data were retrieved from the hospital's electronic health records in respect of demographic and clinical data including age, gender, nationality, complaints on admission, history of chronic diseases, laboratory test results, thorax computed tomography reports, and the length of stay in the ward, length of stay in ICU, treatment results, and costs. The data were evaluated by two emergency medicine specialists. The calculation of costs included laboratory tests, radiological imaging, drug and bed costs. Costs were obtained from the hospital's information management system. The exchange rate used was fixed as 1 USD =8.50 TL.

Statistical Analysis

Data obtained in the study were analyzed statistically using SPSS for Windows vn. 21.0 software (IBM Corp., Armonk, NY, USA). The conformity of the data to a normal distribution was assessed using the Shapiro-Wilk test. According to the normality test results, continuous variables were presented as median (minimum: maximum) values and categorical variables as number (n) and percentage (%). The Mann-Whitney U test was applied to the comparisons between two groups, and the Kruskal-Wallis test to comparisons of more than two groups. Multiple comparison procedures were performed using the Dunn-Bonferroni approach to identify different group or groups after the Kruskal-Wallis test. The Pearson chi-square, Fisher's Exact chi-square, or the Fisher-Freeman-Halton test was used in the comparisons of categorical variables. A value of $p<0.05$ was considered statistically significant.

RESULTS

Within the defined study period, a total of 133,289 patients presented at the ED pandemic area. Three thousand four hundred eighty-six patients were in refugee status. Of these, 2096 had a negative rt-PCR test result, 114 had been exposed to trauma, and the electronic health records of 272 were incomplete. One thousand-four patients were included in the study. The patients included in the study were separated into two groups those treated as outpatients with the recommendation for home quarantine and hospitalized patients. The in-patients were divided into three groups those admitted to wards, those transferred to the ICU from wards, and those admitted directly to the ICU (Figure 1).

The patients included in the study comprised 47.41% females and 52.59% males with a median age of 33 years (range, 18-86 years). The median age of hospitalized patients [48 years (range, 22-85 years)] was seen to be statistically significantly higher than that of discharged patients [31 years (range, 18-86 years)] ($p<0.001$). The discharged patients comprised 44.81% females and 55.19% males, and the hospitalized patients comprised 61.54% females and 38.46% males. The difference between discharged and hospitalized patients in respect of gender was statistically significant ($p<0.001$) (Table 1).

In the examination of the symptoms of patients, the complaint of fever was determined in 45.52%. The rate of fever in hospitalized patients (58.97%) was found to be statistically and significantly higher than in discharged patients (42.92%) ($p<0.001$). Shortness of breath was determined in 27.29% of all the patients, at a statistically significantly higher rate in

hospitalized patients than in discharged patients (64.10% vs. 20.52%) (p<0.001) (Table 1).

The median cost of the patients was 128 TL (range, 75-126,908 TL). These costs were found to be statistically significantly higher for hospitalized patients (median 5690 TL; range, 170-126,908 TL) than for discharged patients (median 120 TL; range,75-1608 TL) (p<0.001) (Table 1).

In comparing the groups of patients admitted to wards, those transferred to ICU from wards, and those admitted directly to ICU, a statistically significant difference was determined regarding age (p=0.001). The median age of patients transferred to the ICU from the ward (58 years; range, 24-80 years) was statistically significantly higher than that of patients on the ward (41 years; range, 22-85 years). No significant difference was determined between the groups regarding gender or the rate of hospitalized pregnant patients (p=0.738, p=0.756, respectively) (Table 2).

A statistically significant difference was determined between the hospitalized patient groups in respect of the presence of chronic obstructive pulmonary disease (COPD) and cerebrovascular disease (CVD) (p=0.016, p=0.002, respectively). The rates of COPD and CVD were higher in the patients in ICU than in those on the wards (Table 2).

Statistically significant differences were determined between the groups regarding leukocyte and neutrophil values (p=0.018, p=0.008, respectively). The median leukocyte and neutrophil values of the ICU patients were higher than those of the patients in the wards. The hemoglobin and lymphocyte values were determined to be statistically significantly higher in the ICU patients compared to the patients in the wards (p=0.010, p<0.001, respectively) (Table 2).

The C-reactive protein (CRP), urea, Hs troponin I, and ferritin values were statistically significantly lower in the patients in the wards compared to the patients transferred to ICU and those admitted directly to ICU (p<0.001). The median procalcitonin and D-dimer values were statistically significantly higher in the ICU patients than in the patients in the wards and those transferred to ICU from the wards (p<0.001) (Table 2).

The difference between the groups regarding costs was statistically significant (p<0.001). The median costs of the patients in the wards were lower than those of patients transferred to the ICU and those admitted directly to ICU. The

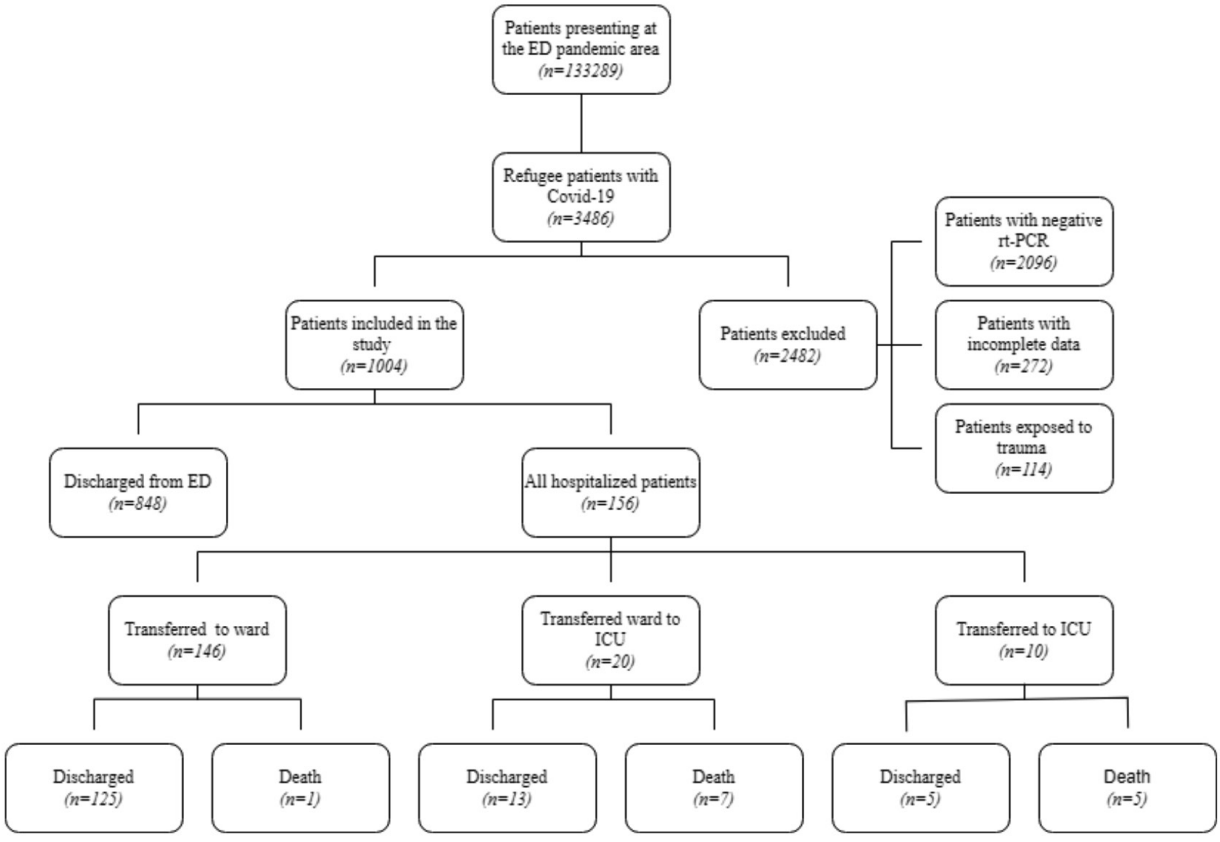

Figure 1. Patient selection flow chart

ED: Emergency department, ICU: Intensive care unit, COVID-19: Coronavirus disease-2019, rt-PCR: Reverse transcriptase-polymerase chain reaction

median total length of stay in the hospital was statistically significantly longer in the patients transferred from the ward to ICU than for patients on the ward and those admitted directly to ICU (p<0.001) (Table 2).

A statistically significant difference was determined between the groups regarding prognosis (p<0.001). The mortality rate of patients in the ICU and transferred to the ICU was higher than those of patients in the wards. In the comparisons of the other data presented in the table, there was no statistically significant difference (p>0.05) (Table 2).

DISCUSSION

In this study, the demographic and clinical data of refugee patients with COVID-19 were examined, and it was determined that as age increased, so the probability of admission to the hospital increased. This finding supported a study by Verity et al. (11) in which increased age was determined to increase hospital admission. This was attributed to more comorbidities and underlying health conditions in patients of an older age. In the current study, there was also seen to be an increase in comorbidities as age increased. In the study of Elmoheen et al. (12) patients who died were more

Table 1. Characteristics of the patients included in the study

	All patients (n=1004)	**Home quarantine (n=848)**	**Hospitalised (n=156)**	**p value**
Age (years)	33 (18:86)	31 (18:86)	48 (22:85)	**<0.001***
Gender				
Female	476 (47.41%)	380 (44.81%)	96 (61.54%)	**<0.001****
Male	528 (52.59%)	468 (55.19%)	60 (38.46%)	
Nationality				
Syria	724 (72.11%)	618 (72.88%)	106 (67.95%)	**0.006****
Iraq	90 (8.96%)	74 (8.73%)	16 (10.26%)	
Iran	40 (3.98%)	28 (3.30%)	12 (7.69%)	
Afghanistan	98 (9.76%)	78 (9.20%)	20 (12.82%)	
Other	52 (5.18%)	50 (5.90%)	2 (1.28%)	
Symptoms				
Fever	456 (45.42%)	364 (42.92%)	92 (58.97%)	**<0.001****
Cough	580 (57.77%)	490 (57.78%)	90 (57.69%)	0.983**
Shortness of breath	274 (27.29%)	174 (20.52%)	100 (64.10%)	**<0.001****
Loss of sense of taste	98 (9.76%)	86 (10.14%)	12 (7.69%)	0.344**
Nausea	42 (4.18%)	26 (3.07%)	16 (10.26%)	**<0.001****
Vomiting	38 (3.78%)	28 (3.30%)	10 (6.41%)	0.062**
Abdominal pain	34 (3.39%)	28 (3.30%)	6 (3.85%)	0.730**
Diarrhea	32 (3.19%)	16 (1.89%)	16 (10.26%)	**<0.001*****
Myalgia	74 (7.37%)	48 (5.66%)	26 (16.67%)	**<0.001****
Headache	42 (4.18%)	28 (3.30%)	14 (8.97%)	**0.001****
Sore throat	36 (3.59%)	28 (3.30%)	8 (5.13%)	0.260**
Listlessness	148 (14.74%)	110 (12.97%)	38 (24.36%)	**<0.001****
Syncope	20 (1.99%)	18 (2.12%)	2 (1.28%)	0.755***
Hemoptysis	10 (1.00%)	6 (0.71%)	4 (2.56%)	0.055***
Pregnancy	34 (3.39%)	20 (2.36%)	14 (8.97%)	**<0.001****
Costs	128 (75:126908)	120 (75:1608)	5690 (170:126908)	**<0.001***
Thorax CT				
Not taken	614 (61.16%)	574 (67.69%)	40 (25.64%)	**<0.001****
Findings present	288 (28.69%)	174 (20.52%)	114 (73.08%)	
Findings absent	102 (10.16%)	100 (11.79%)	2 (1.28%)	

Data are expressed as n (%), median (minimum: maximum), *Mann-Whitney U test, **Pearson chi-square test, ***Fisher's Exact test, CT: Computed tomography

Table 2. Findings of hospitalised patients according to the unit where they were treated					
	Total hospitalized (n=156)	**Ward (n=126)**	**From ward to ICU (n=20)**	**ICU (n=10)**	**p value**
Age (years)	47.50 (22:85)	41 (22:85)[a]	58 (24:80)[b]	57 (44:64)[a,b]	**0.001*****
Gender					
Female	96 (61.54%)	76 (60.32%)	14 (70%)	6 (60%)	0.738**
Male	60 (38.46%)	50 (39.68%)	6 (30%)	4 (40%)	
Pregnancy	14 (8.97%)	12 (9.52%)	2 (10.00%)	0	0.756**
Hypertension	36 (23.08%)	26 (20.63%)	6 (30%)	4 (40%)	0.244**
Diabetes mellitus	38 (24.36%)	28 (22.22%)	8 (40%)	2 (20%)	0.239**
Chronic obstructive lung disease	16 (10.26%)	10 (7.94%)[a]	2 (10%)[a,b]	4 (40%)[b]	**0.016****
Coronary artery disease	21 (14.10%)	18 (14.29%)	2 (10%)	2 (20%)	0.814**
Cerebrovascular disease	10 (6.41%)	6 (4.76%)a	0a	4 (40%)[b]	**0.002****
Chronic kidney disease	10 (6.41%)	6 (4.76%)	2 (10%)	2 (20%)	0.074**
Malignancy	8 (5.13%)	6 (4.76%)	2 (10%)	0	0.458**
Leukocyte (10^3/µL)	7.26 (0.97:24.99)	7.15 (0.97:23.12)[a]	7.31 (3.91:22.23)[a,b]	11.71 (2.35:24.99)[b]	**0.018*****
Hemoglobin (g/L)	128 (63:164)	131 (63:164)[a]	119.5 (92:146)[b]	120 (104:142)[b]	**0.010*****
Neutrophil count (10^3/µL)	5.46 (0.81:24.05)	5.04 (0.81:19.82)[a]	6.19 (2.34:20.45)[a,b]	10.74 (1.48:24.05)[b]	**0.008*****
Lymphocyte count (10^3/µL)	1.13 (0.47:3.44)	1.22 (0.47:3.44)[a]	0.96 (0.54:2.20)[b]	0.69 (0.48:1.28)b	**<0.001*****
Platelet count (10^3/µL)	212 (19:623)	206 (19:623)	225 (72359)	272 (60:354)	0.780***
C-reactive protein (mg/L)	45.97 (0.05:294.23)	26.65 (0.05:259.33)[a]	103.88 (33.81:230)[b]	188.57 (125.05:294.23)[b]	**<0.001*****
Alanine aminotransferase (U/L)	20 (6:202)	21 (6:157)[a,b]	15 (6:39)[a]	27 (8:202)[b]	**0.026*****
Aspartate transaminase (U/L)	30.50 (12:475)	29 (12:234)	28 (20:79)	46 (23:475)	0.088***
Urea (mg/dL)	26 (7:169)	23 (7:117)[a]	41 (18:169)[b]	56 (17:150)[b]	**<0.001*****
Creatinine (mg/dL)	0.75 (0.24:3.85)	0.72 (0.29:3.85)	0.76 (0.24:2.50)	0.99 (0.37:1.95)	0.329***
HS troponin I (ng/L)	5 (1.20:723)	4 (1.20:21)[a]	12.25 (3.30:723)[b]	17.70 (5.60:532.80)[b]	**<0.001*****
Procalcitonin (µg/L)	0.06 (0.02:100)	0.04 (0.02:1.38)[a]	0.09 (0.04:1.53)[a]	0.31 (0.14:100)[b]	**<0.001*****
D-dimer (µg/L)	586 (100:51300)	547 (100:28100)[a]	823 (200:27900)[a]	21800 (1440:51300)[b]	**<0.001*****
Ferritin (µg/L)	211.10 (6.10:25583)	188 (6.10:2731)[a]	428.70 (93.30:2097)[b]	1326.60 (433.70:25583)[b]	**<0.001*****
Thorax CT					
Not taken	40 (25.64%)	32 (25.40%)	2 (10%)	6 (60%)	0.058**
Abnormal	114 (73.08%)	92 (73.02%)	18 (90%)	4 (40%)	
Normal	2 (1.28%)	2 (1.59%)	0	0	
Costs (TL)	5690 (170:126908)	4562 (170:44675)[a]	17328 (2423:126908)[b]	7944 (4517:115361)[b]	**<0.001*****
ICU length of stay	7 (2:42)	-	9 (2:42)	4 (3:27)	0.859*
Total hospital length of stay	8 (1:44)	7 (1:32)[a]	17.50 (6:44)[b]	4 (3:27)[a]	**<0.001*****
Prognosis					
Discharged	143 (91.67%)	125 (99.2%)[a]	13 (65%)[b]	5 (50%)[b]	**<0.001****
Exitus	13 (8.33%)	1 (0.8%)[a]	7 (35%)[b]	5 (50%)[b]	

Data are expressed as n (%) and median (minimum: maximum), *: Mann-Whitney U test, **: Fisher-Freeman-Halton test, ***: Kruskal-Wallis test, length of stay in ICU was compared between the groups transferred to ICU from the wards and those admitted directly to ICU, ICU: Intensive care unit, CT: Computed tomography

likely to be elderly and had a median length of hospital stay of seven days. In our study, the median length of hospital stay was eight days.

The patients in the current study were primarily Syrian, including pregnant refugee patients. In a study by Çelik et al. (13) examining the demographic and clinical data of refugees giving birth in hospitals in Turkey, Syrians were the most common refugees. This can be explained by the greater number of Syrian refugees living in Turkey because of the war in Syria.

The most frequently seen symptoms of all the patients in this study were cough and fever, which is consistent with the findings of other studies in the literature (14,15). However, the most common symptom in the hospitalized patients of the current study was shortness of breath. The symptoms of fever, cough, nausea, diarrhea, myalgia, headache, listlessness, and hemoptysis were determined more in the hospitalized patients of the current study than in those who were discharged. These results demonstrate that the clinical condition at the time of presentation was more severe in the refugee patients who were hospitalized than in those who were discharged.

The most common laboratory test abnormalities seen in this study were lymphopenia and elevated CRP. These results were supported by the findings of other studies in the literature. The reason for lymphopenia in these studies could have been the cytokine storm caused by the severe acute respiratory syndrome-coronavirus-2 virus (14,15).

The patients in this study with stable vital signs and no comorbidities were discharged with the recommendation of home quarantine. In hospitalized patients, the most common comorbidities were hypertension and diabetes mellitus. Although other studies in the literature have also shown these to be the most common comorbidities, the rates of hypertension and diabetes mellitus in the current study patients were lower than in other studies in the literature (16-18). The reason for the low rate in the current study could have been the unavailability of the previous electronic health records for some refugees and that some of the refugees themselves were not aware that they had a chronic disease.

The median costs of the patients in this study were found to be 14.1 USD (120 TL) for outpatients and 669.4 USD (5690 TL) for hospitalized patients. In a study by Gulacti et al. (19), the mean costs of Syrian refugees presenting at ED were reported to be 19.3 USD for outpatients and 509.3 USD for hospitalized patients. The higher healthcare costs in the current study can be attributed to the longer length of stay in the wards and in the ICU.

Studies in Germany and the USA on the mortality rates of patients hospitalized with COVID-19 have reported rates of 14% and 21% respectively (16,20). The current study's mortality rate was 8.33%, which was lower than the rates in Germany and the USA, but similar to the rate in another study in a different center in Turkey (18). The reason for this could be that in Turkey, healthcare services are free for refugees and they have the same rights as Turkish citizens in this respect.

Study Limitations

As the study was retrospective, patients with incomplete data in the hospital information system were excluded from the study, and this could have caused a selection bias. There were no data on pediatric patients with COVID-19 because the pandemic area of the ED where the study was conducted only accepted adult patients. The data used in the study were the data of the refugee patients at the time of presentation at ED, and therefore, any change in the clinical condition and laboratory parameters during the hospitalization period could affect the results. The lack of data on factors that directly affect the health of refugees, such as the living environment, transportation costs, and socioeconomic status, may have affected the results of the study.

CONCLUSION

The results of this study showed that patients with COPD and CVD had a more severe disease course. In Turkey, access to emergency healthcare services is free for refugees. It can be considered that the data obtained in this study will be of guidance for healthcare policies directed at refugees in Turkey and throughout the world. There is a need for further studies to be able to better understand how refugees are affected by COVID-19.

Ethics

Ethics Committee Approval: This retrospective study was conducted in the ED of University of Health Sciences Turkey, Prof. Dr. Cemil Tascioglu City Hospital. Approval for the study was granted by the Local Ethics Committee of University of Health Sciences Turkey, Prof. Dr. Cemil Tascioglu City Hospital in January 2021 (decision no: E-48670771-514.10).

Informed Consent: Retrospective study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: M.E.F, E.B.K., M.Ş., Concept: M.E.F., E.B.K., A.K., Design: A.D., Data Collection or Processing: M.E.F., Y.K., E.B.K., M.Ş., Analysis or Interpretation: M.E.F., A.D., Literature Search: M.Ş., E.B.K., Writing: M.E.F., M.Ş., Y.K.

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