









ORIGINAL PAPER

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## The Impact of ‘Stay At Home’ Orders on Emergency Room Admissions

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### ABSTRACT

**Introduction.** The 2019-novel-coronavirus (2019-nCoV) outbreak has become a common problem for the whole world.

**Aim.** To investigate the impact of the 2019-nCoV pandemic period in our country on emergency room admissions.

**Materials and methods.** The study was designed as a retrospective cohort. The first case of pneumonia infected with nCoV in our country was diagnosed on March 11, 2020. Considering the date of March 11, 2020, emergency room admissions for two periods of 7 days were investigated, pre-COVID-19 and COVID19. Demographic data, admission diagnosis, vital findings, stay times in emergency room, terminations and emergency department mortality examined. A group of ‘geriatric’ patient populations were created to examine the admission characteristics of patients aged-65 and over.

**Results.** The 3466 patients included in the study. The average number of daily admissions was significantly higher in the pre-COVID-19 period ( $350.4 \pm 54.5$ ), compared to the COVID-19 period ( $144.7 \pm 20.2$ ,  $p=0001$ ). While the proportion of cardiac-caused admissions increased during the COVID period, the proportion of gastrointestinal-induced admissions decreased ( $p<0001$ ). Hospitalization rates for both adult and geriatric patients increased during the COVID period ( $p<0001$ ).

**Conclusion.** Despite all the negativity caused by the outbreak, this period has been one in which the public is aware of unnecessary emergency room which has been subsequently lessened.

**Keywords.** Covid-19, emergency visits, geriatric patients

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## Introduction

The first case of pneumonia caused by the 2019 novel coronavirus (2019-nCoV), which has affected the world, was detected in Wuhan, China in December 2019.<sup>1</sup> The most frequent onset symptoms in this clinical picture of coronavirus-infected pneumonia caused by this viral factor are fever, cough and dyspnea.<sup>2</sup> In the clinical course of the disease, the clinical picture of pneumonia can become severe and result in organ dysfunction (e.g. shock, acute respiratory distress syndrome [ARDS], acute cardiac injury, and acute kidney injury) and even death.<sup>3</sup> The virus has shown a rapid spread in China. As of January 2020, cases infected with 2019-nCoV have started to be detected in countries other than China, with the first case in Thailand.<sup>4</sup> The first case of pneumonia infected with 2019-nCoV in Turkey was diagnosed on March 11, 2020. On the same day, the World Health Organization announced '2019-nCoV pandemic' and it was stated that this was the first pandemic due to coronavirus.<sup>5</sup>

Since the detection of the first 2019-nCoV case in Turkey, strict measures have been taken to prevent the spread of the virus. The Turkish Ministry of Health used internet and media outlets to inform the public about the epidemic and ways of transmission. Warnings were made in order to reduce unnecessary admissions to health institutions. In the first stage, 'stay at home' calls were made to people with comorbid diseases and to people 65 years and older. As of March 21, 2020, a formal curfew has been imposed for people aged 65 and over. Patients in the risk population were notified to call the hotline before reaching the health institutions, and the public was informed about making referrals by ambulance.<sup>6</sup>

Emergency services continue to serve as the most important step of the health system during the 2019-nCoV pandemic process, as with all mass incidents. Although there are significant changes in other patient care units, emergency services are battling the 2019-nCoV pandemic, while on the other hand they continue to function routinely.

## Aim

In this study, we aimed to investigate the effect of the process after the first definitive 2019-nCoV case detected in our country on patient admissions to our emergency medical clinic. We examined the changes in emergency room admissions after the 'stay at home' calls by the Turkish Republic Ministry of Health.

## Materials and methods

This study was planned as a retrospective cohort study. Based on the date of 11 March 2020, when the 2019-nCoV case was first confirmed in Turkey; subsequent 7-day patient admissions were examined.

Patient data evaluated in Erzurum, Turkey were obtained from system records of patients aged 18 and over who applied to the emergency department of a 3<sup>rd</sup> Grade university hospital. The cases examined during this period were grouped as COVID-19 period. As a check period, patient admissions on this date and on the 7-day period before it were examined. The cases examined during this period were grouped as pre-COVID-19 period.

Demographic data of patients, diagnosis at admission (International Classification of Diseases, version 10), vital findings, stay times in the emergency room (minutes), terminations (hospitalization or discharge) and emergency department mortality were examined. Admission complaints for each patient were first recorded separately. Then complaints were categorized as cardiovascular (chest pain, palpitations), respiratory (shortness of breath), neurological (loss of strength, sudden loss of consciousness, seizure), environmental (trauma, traffic accident, assault, intoxication, allergic reaction, burn), gastrointestinal (abdominal pain, nausea/vomiting, diarrhea, stomach pain), nonspecific (headache, dizziness, weakness, myalgia) and other (ear nose, eye, genitourinary system). In addition, a group of 'geriatric' patients was formed to examine the admission characteristics of patients aged 65 and over.

Only data from the first admission of the patients were included in the study. The ethics committee approval for the study has been made by the institution where the work was carried out.

## Statistical analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA). Normal distribution was tested with the Kolmogorov-Smirnoff test. Percentages and frequencies for categorical variables and mean ( $\pm$  standard deviation) values for continuous variables were determined. The Student's *t*-test was used for two continuous group comparisons. The Pearson's  $\chi^2$ -test was used for categorical variables. A P value of 0.05 was considered significant.

## Results

The total number of patients included in the study was 3466, and the gender distribution was 1666 (48.1%) female, and 1800 (51.9%) male. The average age was  $47.1 \pm 18.8$ . There were 1013 admissions in the COVID-19 period and 2453 in the pre-COVID-19 period. For these two periods of 7 days, the average number of daily admissions was significantly higher in the pre-COVID-19 period ( $350.4 \pm 54.5$ ), compared to the COVID-19 period ( $144.7 \pm 20.2$ ) ( $p < 0.001$ ). There was no significant difference between patients admitted in two periods in terms of average age and gender distribution ( $p > 0.05$ ).

Demographic characteristics and distributions of vital findings according to the admission period are specified in Table 1.

**Table 1.** Demographics, Vitals and Laboratory Findings of the Patients According to the Application Periods

Characteristics	Pre-COVID-19	COVID-19	
Sex, n (%)			
-Male	1279 (52.1%)	521 (51.4%)	p>0.050
-Female	1174 (47.9%)	492 (48.6%)	
Age (years), mean	44.9±18.5	52.5.3±18.4	p>0.0001
Vital signs			
-SBP(mmHg), mean	127.2 (70-250)	127.0(82-200)	
-DBP(mmHg), mean	78.2 (45-160)	77.1 (60-125)	
-HR (beat/min), mean	87.1 (50-145)	86.2 (75-135)	
-O <sub>2</sub> Saturation (%), mean	93.6 (60-99)	94.1 (70-99)	p=0.040
-Body temperature (°C), mean	36.0 (36-39)	36.6 (36-39)	
ED Outcomes			
-Length of stay(min), mean	152.4 ±101.3	123.4±90.6	p=0.018
-ED Mortality, n (%)	4 (57.1%)	3 (42.9%)	p>0.050

Values expressed as number(%) or mean ± standard deviation

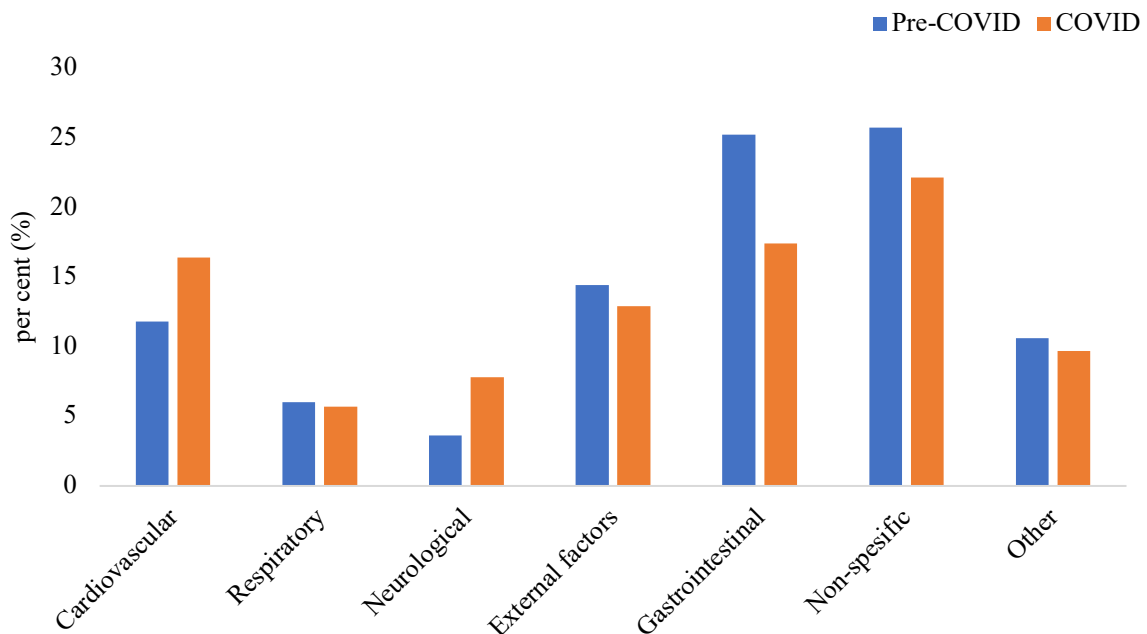
DBP: Diastolic blood pressure; ED: Emergency department; HR: Heart rate; SBP: Systolic blood pressure

When the average stay times of the patients in the emergency room was examined, it was observed that it was 152.4 ±101.3 minutes during the pre-COVID period and 123.4±90.6 minutes during the COVID period. The difference was statistically significant (p=0.018).

When both periods are examined together, the most common causes of admission are chest pain with 392/3466 patients (11.3%) and abdominal pain in 346/3466 patients (10%). Significant changes were not observed (p>0.05) between the admissions caused by chest pain in the pre-COVID (10.8%) and in the COVID period (12.5%). During COVID period (8%), admissions for abdominal pain significantly reduced (p=0.012) compared to pre-COVID period (10.8%).

When examined from the perspective of categorized admission complaints, cardiac-led admissions were numerically 290/2453 (11.8%) in the pre-COVID period and 166/1013 (16.4%) in the COVID period. The distribution of neurological-caused admissions was 89/2453 (3.6%) in the pre-COVID period and 79/1013 (7.8%) in the COVID period. Both of these proportional increases were statistically significant (p<0.001). Admissions for gastrointestinal reasons were 290/2453 (25.2%) in the pre-COVID period and 166/1013 (17.4%) in the COVID period. This numerical and proportional reduction in the number of admissions was statistically significant. Distribution of admission complaints in categories for all patients was specified in Figure 1.

The rate was 10.3% when at the hospitalization status of patients for all periods is considered. Hospitalization rates were 7.9% in the pre-COVID period, and 15.9% in the COVID period and the increase was found to be significant (p<0.001). While the average age of the patients who were hospitalized during pre-COVID period was 52.1±19.2, it was 45.7±17.3 in the COVID period (the mean difference: 6.37, 95% CI: 2.57-10.2; p=0.001). From the point of view of vital findings, a significant difference was detected only in oxygen saturations. While the average oxygen saturation of pa-



**Fig. 1.** Categorical distribution of application diagnoses during both pre-COVID and COVID periods

tients hospitalized during the pre-COVID period was  $92.5 \pm 4.8$ , it was  $94.2 \pm 2.8$  during COVID period (the mean difference: 1.83, 95% CI: 2.64-1.02;  $p < 0.001$ ). The reasons for the admission of the hospitalized patients were examined according to the periods. A significant increase was detected only in the frequency of patients admitted with sore throat complaints. While there were no patients admitted with sore throat complaints, in the Pre-COVID period, the ratio was 6.2% ( $p < 0.001$ ) in the COVID period.

Proportion of patients aged 65 and over to all patients was 863/3466 (24.9%). 507 Geriatric patients (58.7%) applied in the pre-COVID period and 356 (41.3%) in the COVID period. The number of geriatric patient admissions decreased during the COVID period. However, the proportion of geriatric admissions to all admissions was 20.7% in the pre-COVID period and 35.1% in the COVID period. This difference between the admission rates was statistically significant ( $p < 0.001$ ). Chest pain was the most common causes of admission for all periods in the geriatric population (14.9%) shortness of breath (11.8%) in terms of pre-COVID and COVID periods, no significant changes were seen in these admission complaints. The rate of hospitalization in the geriatric population was 11.4% in the pre-COVID period, compared to 16.3% during the COVID period. This increase in hospitalization rates was statistically significant ( $p = 0.040$ ). The most common reasons for admission for all periods in the geriatric population were chest pain (14.9%) and shortness of breath (11.8%). When examined in terms of pre-COVID and COVID periods, there was no significant change in these admission complaints. Hospitalization rate in geriatric population in the pre-COVID period was 11.4% and 16.3% in the COVID period. This increase in hospitalization rates was statistically significant ( $p = 0.040$ ).

## Discussion

In this study, we found that the call to 'stay at home' since the date of the first 2019-nCoV case in our country caused a significant decrease in the number of patients admitted to the emergency room. We also observed significant changes in the number of admissions and hospitalization rates. In our study, we examined the changes in the health care system through COVID pandemics from an emergency room perspective. Despite all its negativity, we found that this process gave useful results in public awareness and preventing unnecessary emergency room use. In our study, even during the COVID period, we found a reduction of about 50% in the number of patients admitted to the emergency department daily. Guo H et al. found a 38% reduction in dental emergency room admissions during the epidemic in China in their study.<sup>6,7</sup> We think this is mostly about people staying at home and avoiding going to health care institutions that are carry a high risk

of infection during the pandemic process. In addition, during the COVID period, patient stays in the emergency room was significantly shortened. We think that the main reason for this situation is that in crowded units where the risk of transmission is high, such as emergency services, there is an effort to shorten the wait time both in the hospitalization and discharge processes.

The emergency room admission diagnoses are divided into two according to the seriousness as emergent and non-emergent. Admissions with emergent diagnoses make up about 40% of total admissions.<sup>8</sup> Cardiac-caused admissions, especially chest pain, are the first among emergent emergency room admissions and account for 5% of all emergency admissions.<sup>9,10</sup> On the other hand, when non-emergent admissions are considered, the most common diagnoses are gastrointestinal system related conditions, especially abdominal pain. In our study, there was no significant change in chest pain-related admissions compared to pre-COVID period during COVID. When we categorically examined the reasons for the admissions, we did not see a numerically significant change in cardiac-related admissions. However, the proportion of cardiac-related admissions for all admissions increased significantly during the COVID period.

In the COVID period, we found a significant numerical and proportional reduction in gastrointestinal system related admissions. This showed us that not only the number of patients during the COVID period, but also non-emergent admissions decreased. However, it did not happen as we had feared during the COVID period, and the rates of emergency service admissions for patients with emergent emergencies were routinely continuing. We believe that the proportional increase in the number of these patients is due to a decrease in other admissions.

In a study examining patients admitted to emergency departments, it was noted that hospitalization rates decreased by years, but were around 6% to 9%.<sup>11</sup> In our study, hospitalization rates during the pre-COVID period were in line with the literature. However, during the COVID period, we found that hospitalization rates was double the normal rates. We believe this is associated with a decrease in non-emergent admissions. We also found changes in some of the characteristics of patients hospitalized in COVID period. We found that in these patients there was a decrease in the average age and increase in average oxygen saturations. The number of patients who were hospitalized with a non-emergent admission diagnosis such as sore throat had increased. We believe that this is due to the effect of the current pandemic on hospitalization criteria even in the early stages.

Approximately 20% of emergency room admissions are made up of the patient group who are 65 years and older. Admissions in this patient population are quite common and are often associated with more se-

rious medical conditions.<sup>12</sup> Older adults are most frequently admitted to the emergency department due to complaints related to cardiac conditions.<sup>13</sup> Again, hospitalization rates are high for this patient population and are 2.5-4.6 times as much as normal.<sup>14</sup> In our study, the pre-COVID period was consistent with the literature in terms of the frequency of patient applicants aged 65 years and older. There was no increase in the number of geriatric patients admitted during COVID period. However, the rate of geriatric patients for all patient admissions increased significantly during the COVID period. In both periods, the most common cause of admission was chest pain, and hospitalization rates increased during COVID period. In our country, there was no reduction in the admission rates of geriatric patients during the pandemic period with real urgent complaints, and patients who applied were often hospitalized in the services. This indicates that; in terms of the geriatric population who are thought to be affected by the pandemic both directly and indirectly there was no deterioration in the functioning of the emergency department at the early stage.

### Limitations

In our study, a total of 14 days of patient data for pre-COVID and COVID period were retrospectively examined. The short time frame covered by our study is one of the most fundamental limitations. However, the large number of patients admitted during this period has enabled us to achieve statistically significant results. In addition, the shortness of this process creates limitations in terms of discharge and mortality data. We believe that these limitations can be resolved by planning a similar study that examines data for admissions over a wider period of time.

### Conclusion

As a result, the 2019-nCoV pandemic has caused significant changes in emergency room admissions, both numerically and in terms of quality, since the day of the first case in our country. One of the most important factors affecting this process of change is raising public awareness about the concept of 'isolation at home'. In this way, unnecessary emergency room admissions were prevented and real emergency patient care continued without disruption despite the pandemic.

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