



## Evaluation of Recurrent Presentations to the Emergency Department During the COVID-19 Pandemic

### COVID-19 Pandemi Döneminde Acil Servise Yapılan Tekrarlayan Başvuruların Değerlendirilmesi

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#### Abstract

**Objective:** Coronavirus disease-2019 has resulted in changes in healthcare and management services. One of these changes is related to in patient presentation to emergency departments (ED). This study aimed to investigate the rate of recurrent presentations to an ED during the pandemic period compared to the pre-pandemic period.

**Materials and Methods:** Patients that presented to the ED of a tertiary hospital again within 72 hours of their first visit were screened from the hospital information management system for the pre pandemic (June 1-November 30, 2019) and pandemic (June 1-November 30, 2020) periods. So, hospitalization rates were compared between the two periods.

**Results:** In the pre-pandemic period, the number of ED registrations was 67,414, of which 3,463 belonged to recurrent presentations, while in the pandemic period, these numbers were determined as 43,636 and 2,238, respectively. The rate of admission to any hospital ward (n=521, 16.4%) or the intensive care unit (n=56, 1.8%) nearly doubled during the pandemic. Six of these patients died in the ED in the pandemic period, while no death was observed in the pre-pandemic period.

**Conclusion:** Although there was a decrease in the number of both hospital and ED presentations during the pandemic, an increase was observed in the number of patients with recurrent presentations to the ED. As a result of this patient group postponing visits to the hospital for their acute problems due to the fear of being infected, their need for hospitalization and intensive care follow-up increased.

**Keywords:** Pandemic, recurrent presentation, emergency department, COVID-19

#### Öz

**Amaç:** Koronavirüs hastalığı-2019 (COVID-19) sağlık bakım ve yönetim hizmetlerinde değişikliklere neden oldu. Bu değişikliklerden biri de acil servis hasta başvurularında yaşandı. Bu çalışmada pandemi döneminde acil servislere tekrarlayan başvuru oranlarının araştırılması amaçlanmıştır.

**Gereç ve Yöntemler:** Pandemi öncesi dönem (1 Haziran-30 Kasım 2019) ile pandemi döneminde (1 Haziran -30 Kasım 2020) 3. basamak bir hastanenin acil servisine ilk başvuru sonrası 72 saat içerisinde tekrar başvuruda bulunan hastalar hastane bilgi yönetimi sistemi üzerinden taranmıştır. Hastane ve acil servis başvuru sayıları, demografik özellikleri ve hastaneye yatış oranları her iki dönem açısından karşılaştırılmıştır.

**Bulgular:** Pandemi öncesi dönemde acil servis kayıt sayısı 67.414 olup bu hastalar içerisinde 3.463'ü tekrarlayan başvuruyken, pandemi döneminde kayıt sayısı 43.636 olup bunların 2.238'i tekrarlayan başvuruda bulunmuştur. Dönemler arasında istatistiksel olarak yaş ve cinsiyet açısından farklılık tespit edilmemiştir (p=0,143). Ancak tekrar başvuruda bulunan hastalar arasında yatarak takip ve tedavi edilmesi gereken hasta grubunun yaşı pandemi döneminde daha yüksekti. Pandemi döneminde herhangi bir kliniğe (n=521, %16,4) veya yoğun bakım ünitesine yatış (n=56, %1,8) oranlarında yaklaşık iki kat artış oldu. Bu hastalardan 6'sı pandemi döneminde acil serviste ölümlerle sonlanıma sahipken normal dönemde ölümlerle sonlanım görülmemiştir.

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**Sonuç:** Pandemi döneminde hem genel hastane hem de acil servis başvuru sayılarında azalma olmasına rağmen acil servise tekrarlayan başvuruda bulunan hasta sayısında artış olduğu tespit edildi. Bu hasta grubunun enfekte olma korkusu nedeniyle akut gelişen problemlerini ertelemesi karşısında herhangi bir kliniğe yatış ve yoğun bakım ünitesinde takip edilme ihtiyaçlarının arttığı görüldü.

**Anahtar Kelimeler:** Pandemi, tekrarlayan başvuru, acil servis, COVID-19

## Introduction

Coronavirus disease-2019 (COVID-19) pandemic, which has affected the whole world, has resulted in difficulties in healthcare provision and management services, requiring the restructuring of the health system. While focusing on providing the best medical care for people with COVID-19, healthcare services also aimed to protect people that wanted to receive healthcare against this infection (1). This situation reduced patients' demand for outpatient services due to their reservations concerning the risk of transmission, but it also transformed emergency departments (EDs) into areas considered by patients as primary choices in the presence of any medical problem since they provide healthcare service 24 hours a day for seven days a week.

A recurrent presentation is a patient presenting to an ED with the same or a different complaint within 72 hours after his/her first discharge (2). Recurrent visits have been identified as quality indicators for patient care and safety in EDs across the world (3). Although these presentations generally vary from one country to another and on a regional basis, global data indicate that 3% is an acceptable rate for recurrent ED presentations (4). This generally depends on the demographic characteristics of patients, their comorbidities, course and severity of their existing diseases, adequacy of treatment, and many factors originating from the physician (2,5,6). It is considered that many changes prompted by the pandemic, decreased outpatient services, postponement of scheduled surgical services, ineffective homecare services, and patients and/or their relatives not accepting hospitalization may have increased the number of recurrent presentations to EDs during this period.

This study aimed to investigate the rate and characteristics of recurrent presentations to an ED during the pandemic period compared to the pre-pandemic period.

## Materials and Methods

This study was a retrospective analysis of patients that presented to the ED of a tertiary care hospital during the pandemic period from June 1, 2020, through November 30, 2020, and during the same time one year earlier representing the pre-pandemic period (June 1, 2019-November 30, 2019). Approval for the study was obtained from the Recep Tayyip Erdoğan University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee (decision number: 2021/69, date: 08.04.2021).

## Study Design

This study was planned retrospectively using the data obtained from the hospital information management system (HIMS). The ED where the study was conducted receives 140,000 patient admissions annually and can provide acute care in all specialties. During the pandemic, all the hospitals in the province provided medical care and treatment services for all patients, including those with COVID-19.

## Study Data

Hospital presentations included all consecutive patients that visited the hospital for any reason to receive healthcare. ED visits included patients that presented to ED within 24 hours and were registered in HIMS. Based on the date of March 11, 2020, when the first case of COVID-19 was reported in Turkey, patient presentations to ED from June 01, 2020, through November 30, 2020, were considered as 'pandemic presentations', and those that were made during the same date range one year earlier (June 1, 2019- November 30, 2019) were considered as 'pre-pandemic presentations'. The repeated presentations of the same patients due to any complaint within 72 hours after their first ED visits were defined as 'recurrent presentations' (2). The data of the study population, presentation date, presentation complaint, hospital unit where treatment was provided, and outcomes were recorded in the study form according to the specified study intervals.

## Patient Selection

Among the patients aged 18 years and over who visited ED within the specified date range, those with recurrent presentations applied again within 72 hours after their first presentations were included in the study. Patients that were called for a control following a previous visit and those that were referred by law enforcement officers for procedures, such as examinations, hospitalization, dressing, catheter change, injection, or forensic control were excluded from the study.

## Statistical Analysis

In this study, the distribution of continuous data was evaluated with histogram graphs and the Shapiro-Wilk test. Mean and standard deviation values were reported for parametric data, and median and interquartile range (IQR) values for non-parametric data. For categorical data, number (n) and frequency (%) values were used. For the comparison of data between two independent groups, Student's t-test, Mann-Whitney U test, or Pearson's  $\chi^2$  test was applied. Moreover, odds ratios (OR) with 95%

confidence intervals (95% CI) were calculated to achieve predictive odds of mortality among pandemic and pre-pandemic periods. In all the statistical analyses,  $p < 0.05$  was considered statistically significant, and analyses were performed using R-based Jamovi statistical software [The Jamovi Project (2021), version 2.3].

## Results

The study was conducted with 3,184 patients that met the inclusion criteria. During the pandemic period, there was a 35% decrease in ED presentations. Although there was a 42% decrease in recurrent presentations to ED, 3% of ED presentations in both periods consisted of recurrent presentations (Figure 1).

Considering the gender distribution of the patients with recurrent presentations according to the period, no statistically significant difference was found, although the rate of female patients was lower ( $p = 0.153$ ). The mean age of the patients with recurrent presentations was 51 (IQR: 36-65) years during the pre-pandemic period and 54 (IQR: 37-67) during the pandemic period, indicating a significant difference ( $p = 0.0250$ ).

When ED outcomes were evaluated, the number of patients that required hospitalization was 284 (14.1%) during the pre-pandemic period and 299 (25.6%) during the pandemic period. Among the patients with recurrent representations, the need for hospitalization nearly doubled during the pandemic ( $p < 0.001$ ). In this patient group, the median age

was 62 (IQR: 45-74) years, while the median age of the discharged patients was 50 (IQR: 35-64) years ( $p < 0.001$ ). No significant difference was found between these two groups in terms of gender.

In the group requiring hospitalization, the need for admission to the intensive care unit was observed in 28 (1.39%) patients in the pre-pandemic period and 34 (2.9%) patients during the pandemic. The rate of intensive care unit admissions nearly doubled among the patients with recurrent presentations during the pandemic ( $p = 0.003$ ). The median age of these patients was 67 (IQR: 55-77.8) years, and the median age of patients without the need for follow-up and treatment in the intensive care unit was 51 (IQR: 36-66) years, with a statistically significant difference being found between these two groups in relation to age ( $p < 0.001$ ). There was also no statistically significant difference between these patients in terms of gender ( $p = 0.008$ ).

Six of the patients with recurrent presentations (0.5%) died in ED during the pandemic period, while no death was observed in ED during the pre-pandemic period ( $p < 0.001$ ). It was determined that the probability of mortality increased 22.6 times in recurrent presentations during the pandemic period (OR: 22.60, 95% CI: 1.27-401). A statistical analysis could not be performed due to the low number of patients that died. However, the patients in this group were of advanced age, with their median age being calculated as 74.5 (IQR: 64.3-82.5) years (Table 1).

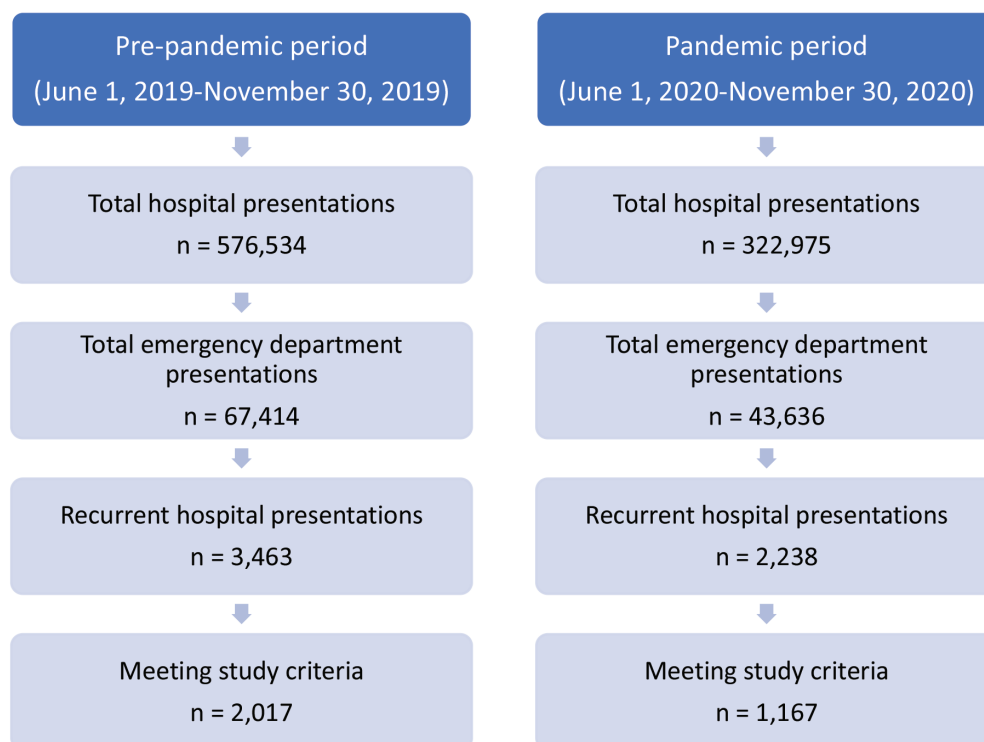


Figure 1. Flow chart of the study

**Table 1. Emergency department outcomes of the patients according to the presentation period**

Period	Pre-pandemic (2019)	Pandemic (2020)	Total	p-value
Age, median (IQR)	51 (36-65)	54 (37-67)	52 (36-66)	0.025
Female, n (%)	972 (48.2)	531 (45.5)	1503 (47.2)	0.153
Male, n (%)	1045 (51.8)	636 (54.4)	1681 (52.8)	
Hospitalization, n (%)	284 (14.1)	299 (25.6)	583 (18.3)	<0.001
ICU admission, n (%)	28 (1.4)	34 (2.9)	62 (1.9)	0.003
Death in ED, n (%)	0 (0.0)	6 (0.5)	6 (0.2)	<0.001

IQR: Interquartile range, ICU: Intensive care unit, ED: Emergency department

## Discussion

In this study, despite the decrease in both general hospital and ED presentations during the COVID-19 pandemic, it was observed that the need for hospitalization and follow-up in the intensive care unit increased with the increase in recurrent ED presentations. In the management of the COVID-19 pandemic, the healthcare system attempted to provide the best medical care for those that contracted the disease while at the same time focusing on protecting other people that wanted to receive healthcare services without the risk of being infected (1). However, despite the need for acute medical assistance, there was a decrease in hospital presentation rates and patients were less willing to be treated in hospitals due to their fear of contracting the virus (7-9). The use of EDs as a primary option in the face of any health problem led to an increase in recurrent presentations. According to the literature, a global rate of 3% is acceptable for recurrent ED presentations (4). In the current study, although general hospital and ED presentations decreased in both pre-pandemic and pandemic periods, the rates of recurrent presentations were consistent with the global data.

In terms of service quality and efficiency, the number of patients and their characteristics are seen as a reflection of general in-hospital health services. In particular, in the last decade, the increase in the rate of recurrent presentations together with the increase in ED presentations has been the cause of overcrowded ED environments and has become a separate research topic for healthcare professionals (10). The clinical status of patients during their recurrent presentation is at a more critical level compared to their first presentation and is very important for both patient and physician safety. Similarly, in the current study, when the ED outcomes were evaluated, the need for inpatient follow-up in any clinic or intensive care unit was observed to double during the pandemic period, especially among the patients with recurrent presentations. The mean age of the patient group requiring inpatient follow-up and treatment during this period was also higher compared to the pre-pandemic period. Consistent with our findings, in a study conducted by Tangkulpanich et al. (11), recurrent ED presentations within 48 hours were examined, and it was observed

that the likelihood of recurrent presentations increased as patient age increased. In addition, in our study, no mortality was observed during the pre-pandemic period, but six patients died during the pandemic period. Considering that the patients with mortality were all male and at an advanced age can be interpreted as an indication that these patients kept their medical support needs in the background due to the risk of contracting COVID-19. These findings are an indication of the absolute necessity of including recurrent presentations in the evaluation of the quality and efficiency of ED services.

When the patients with recurrent presentations were evaluated according to gender, it was determined that male gender was predominant both in the pandemic and pre-pandemic periods. However, in studies conducted in the pre-pandemic period in the literature, it was reported that female patients were more likely to revisit EDs (12,13). This discrepancy may be due to differences in the social characteristics, age, and existing chronic diseases.

## Conclusion

In this study, we aimed to evaluate the effects of the current pandemic period on recurrent presentations by evaluating the number of patients and outcomes and to reveal how these data were affected as indicators of ED quality. The increase in the need for hospitalization and intensive care and mortality being observed in ED during the pandemic period demonstrate the negative effects of increased hospital density due to the pandemic on the effective operation of ED. The lack of similar studies published in the literature also shows that there is a need for many detailed studies to be conducted with larger populations in order to elucidate changes in recurrent patient presentations during the pandemic period.

The most important limitation of our study is that we did not separately evaluate patient complaints, examinations requested and their results, consultations made to other departments, and diagnoses among the patients with recurrent presentations. Therefore, we were not able to determine factors that could cause patients to revisit the hospital. Further comprehensive and detailed studies on this subject can be guiding.

## Ethics

**Ethics Committee Approval:** Approval for the study was obtained from the Recep Tayyip Erdoğan University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee (decision number: 2021/69, date: 08.04.2021).

**Informed Consent:** Retrospective study.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: M.A., Concept: M.A., Ö.B., Ö.Y., Design: M.A., Ö.B., M.AL., Data Collection or Processing: M.A., G.E., Analysis or Interpretation: M.A., G.E., Ö.Y., Literature Search: M.A., M.AL., Writing: M.A., Ö.B., G.E., M.AL.

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

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