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ORIGINAL ARTICLE

The effect of COVID-19 pandemic on emergency department admissions

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Abstract

Background: This study has been conducted to evaluate the emergency department (ED) admissions during the pandemic period.

Methods: The study is a multicentre, retrospective study. ED admissions in two hospitals between April 1st, 2019 and May 31st, 2019 (pre-COVID-19 period); and between April 1st, 2020 and May 31st, 2020 (the period of COVID-19) have been compared.

Results: Among 47888 ED admissions, 22854 (47.7%) females and 25034 (52.3%) males, with a mean age of 40.9±19.6 years have been included in the study. Of all patients, 30.1% (14440) were admitted to the EDs during the pandemic period in 2020. When the processes have been compared, it can be seen that while more laboratory examinations were requested from the EDs in the pre-pandemic period, more radiological examinations were requested during the pandemic period. Patients were consulted approximately 5 times more during the pandemic period than in the previous year. There has been a statistically significant difference between the periods in terms of consultation ($p< 0.001$). When the patients have been evaluated in terms of hospitalization, it can be seen that 5.1% of the patients were hospitalized in pre-pandemic period and 9.7% of the patients in the pandemic period ($p<0.001$).

Conclusions: A significant decrease has been observed in the number of ED admissions during the pandemic in both hospitals. The most important reason for this decrease might be that patients prefer not to apply to the ED in case of an illness that can be resolved with a simple intervention and the restrictions applied due to Covid-19.

Keywords: COVID-19, Pandemic, SARS-CoV-2, Emergency, Admission.

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INTRODUCTION

Emergency departments (ED) are the departments where healthcare service providers are in close contact with the public and have the most interaction with the community. The most important feature of ED is the uninterrupted and prompt delivery of healthcare. For a high-quality ED, in addition to the physical adequacy of the buildings, a trained personnel force is also crucial. Additionally, the proper use of the ED is another important factor to provide a quality service. Improving these conditions can result in an increase in the quality of care and as a result an increase in employee satisfaction can also be achieved (1).

In recent years, due to the rapid population growth and migration, EDs have experienced excessive patient density, which has led to a disruption in the quality of the service in these departments (2, 3). EDs are considered as easily accessible areas where non-appointment-seeking patients can receive immediate healthcare services, easily utilize laboratory services, and have faster access to diagnostic and treatment procedures. As a result, these areas are becoming increasingly crowded and are also being increasingly misused. Recent studies in Turkey have reported that a large proportion of patients who apply to EDs do not have urgent pathologies, and therefore, adequate service cannot be provided to real emergencies (4-6). In the study by Kılıçaslan et al. (1), it has been reported that 47.4% of patients applying to the ED were in the non-urgent category, while in the study by Aydın et al. (7), this percentage has been reported as 62.3%.

During epidemics, such as the COVID-19 pandemic, EDs continue to provide uninterrupted service as they do at other times. They play a critical role in both identifying and managing COVID-19 suspected cases and continuing the diagnosis and treatment process of other medical emergencies. In a period where transmission occurs through droplets, only real emergency patients are expected to apply to the ED. Therefore, our study has been conducted in order to evaluate ED admissions during the pandemic period.

MATERIALS AND METHODS

This study has received ethics committee approval from the Gazi University Ethics Committee (Date and Number: 23.07.2020 – E.78134)

For this study, the applications to Gazi University Hospital ED and Kastamonu Training and Research Hospital ED between April 1st, 2019 and May 31st, 2019 have been compared to the same hospitals' applications between April 1st, 2020 and May 31st, 2020. As the study has been conducted in these two hospitals in two different cities, it can be said that it is a multicentre retrospective study. The Kastamonu Training and Research Hospital is the only state hospital in the province of Kastamonu, which is one of the largest in the Western Black Sea region. Every year, approximately 160000 patients are admitted to the hospital's ED. Gazi University Hospital is one of the largest university hospitals in Ankara, with approximately 70,000 ED visits per year. The number of patients admitted to the EDs in April and May 2020 (during the COVID-19 period) was determined and compared to the number of patients admitted in April and May 2019 (pre-COVID-19 period). In addition to the patients' demographic information, their complaints, ICD-10 diagnoses, tests performed, consultation status, and discharge status were recorded on the data collection form. Only patients aged 18 and over (only trauma patients under 18 have been considered) have been included in the study and patients with incomplete data in electronic and manual records and those with COVID-19 suspicion have been excluded from the study.

Statistical analysis

The data is summarized, and graphs are drawn by using the MS Office Excel program. By using SPSS 26 software, it is determined that the data do not follow a normal distribution. Since the aim of the study is to compare ED admissions in the pre-pandemic (2019) and pandemic (2020) periods, there is no continuous dependent variable, and therefore parametric statistical methods cannot be used. Cross-tabulations are created by using SPSS 26 software, where the dependent and independent variables can be continuous or categorical, for the most frequently observed ICD diagnoses and procedures requested by physicians, and these findings are described in the result section.

RESULTS

Among 47888 ED admissions, 22854 (47.7%) females and 25034 (52.3%) males, with a mean age of 40.9±19.6 years have been included in the study. Of the patients included

in the study, 30.1% (14,440) visited the ED during the pandemic period in 2020, while 69.9% (33,448) visited the ED in the pre-pandemic period in 2019. The basic characteristics of the patients are presented in Table 1. The mean age of patients visiting the ED is 39.8±19.8 years in the pre-pandemic period, while the mean age of those visiting during the pandemic is 43.5±18.9 years (p<0.005). A detailed comparison of the two periods is presented in Table 1. When the procedures are compared, it can be seen that while more laboratory tests were requested in the pre-pandemic period, more radiological tests were requested during the pandemic, and patients were consulted with other departments approximately five times more than in the previous year.

Table 1. Main Characteristics of The Patients and A Comparative Summary of The Pre (2019) and During Pandemic (2020) Periods

	Feature	N(%)	Pre-pandemic (n=33448)	Pandemic (n=14440)	p
Gender (n, %)	Female	22854 (47.7)	16276 (48.7)	6668 (46.2)	<0.001
	Male	25034 (52.3)	17262 (51.3)	7772 (53.8)	
Hospital (n, %)	Kastamonu Training and Research Hospital	32008 (66.8)	22907 (68.5)	9101 (63.0)	<0.001
	Gazi University Hospital	15880 (33.2)	10541 (31.5)	5339 (37.0)	
Requests (n, %)	Laboratory examination	29231 (61)	25819 (77.2)	3412 (23.6)	<0.001
	Radiological examination	10908 (22.8)	6530 (19.5)	4378 (30.3)	<0.001
	Consultation	4320 (9)	1290 (3.9)	3030 (21.0)	<0.001
Outcome (n, %)	Discharge	44436 (92.8)	31562 (94.3)	12894(89.3)	<0.001
	Hospitalization	3110 (6.5)	1713 (5.1)	1397 (9.7)	<0.001
	Referral to another centre	96 (0.2)	48 (0.1)	48 (0.3)	<0.001
	Exits	213 (0.4)	116 (0.3)	97 (0.7)	<0.001
	Withdrawal from treatment	13 (0.0)	9 (0.0)	4 (0.0)	0.961

During the pre-pandemic period, 88.5% of patients were discharged from the ED. On the other hand, during the pandemic period, 76.2% were discharged from the ED. When the patients are evaluated in terms of hospitalization rates, it is seen that the hospitalization was determined to be 5.1% in the pre-pandemic period and 9.7% in the pandemic period (p<0.05). Similarly, a statistically significant difference has also been found between the laboratory and radiology requests of physicians in the 2019 and 2020 periods (p<0.001).

The most common diagnosis upon presentation was R51 (headache) in both periods. However, during the pandemic period, there was an increase in the percentage of diagnosis codes R10 (abdominal and pelvic pain), R52.9 (pain, unspecified), and W19 (unspecified fall) compared to the previous year. There has been a statistically significant difference in the most commonly observed ICD diagnoses between the periods (p<0.001). The comparison of the most common ICD diagnoses by year is presented in Table 2.

Table 2. The Comparison of The Pre (2019) and During Pandemic (2020) Periods in Terms of ICD-10 Codes

		2019 (n=33448)	2020 (n=14440)	p
ICD-10 codes (10 most common) (n, %)	1.R51 (Headache)	23271 (69.6)	5765 (39.9)	<0.001
	2.R07.0 (Sore throat)	2088 (6.2)	894 (6.2)	0.830
	3.R10 (Abdominal and pelvic pain)	1562 (4.7)	1115 (7.7)	<0.001
	4.R52.9 (Pain, unspecified)	992 (3.0)	547 (3.9)	<0.001
	5.W19 (Fall, unspecified)	406 (1.2)	448 (3.1)	<0.001
	6.T11.9 (Unspecified injury of upper extremity, level unspecified)	489 (1.5)	227 (1.5)	0.362
	7.T13.9 (Unspecified injury of lower extremity, level unspecified)	573 (1.7)	187 (1.3)	<0.001
	8.R05 (Cough)	394 (1.2)	397 (2.7)	<0.001
	9.M54 (Dorsalgia)	379 (1.1)	174 (1.2)	0.499
	10.R11 (Nausea and vomiting)	274 (0.8)	242 (1.7)	<0.001

DISCUSSION

In the literature, there are various publications on the misuse of EDs in Turkey and in the world. In situations with high infectivity with droplets like COVID-19, only real emergency patients are expected to apply to the ED. In our study, a significant decrease is observed in the number of ED admissions during the pandemic in both hospitals. The reasons for this decrease might be unnecessary admissions to the ED in the pre-pandemic period as well as the restriction measures applied during the pandemic and patients' fear of COVID-19 transmission during a hospital visit.

In our study, an increase in consultation and hospitalization rates has been observed compared to the pre-pandemic period. Additionally, it is seen that during the pandemic period, emergency physicians required less laboratory examinations and more radiological examinations. In a study conducted in Thailand, in which pandemic and pre-pandemic applications have been evaluated, an increase in hospitalization rates is found to be decreased in ED admissions (8). In another study conducted in the USA, it is determined that hospitalizations increased during the pandemic period, consultation rates for infectious diseases increased, and other departments mostly remained the same (9).

In this study, when ED patients are evaluated according to their gender, it has been observed that the rate of male patients that applied to the ED is 52.3%. In another study conducted by Aydın et al., it has been determined that 51.5% of ED patients are male (7). Although the difference between the genders has been statistically significant in both periods, it is not clinically significant.

In various studies conducted in Turkey, the average age of patients admitted to the ED has been reported as 40-42 years, while according to the data from the United States in 2020, it has been 35.6 years (1, 7, 10). The average age of the patients included in our study has been determined as 40.9±19.6, and a statistically significant difference is found between the periods in terms of age. However, this difference is not at a level to change the patient management.

After the declaration of COVID-19 as a pandemic by World Health Organization (WHO), the admission rates to ED in many hospitals around the world have significantly decreased. In the early stages of the pandemic, ED visits in the US decreased by 42% compared to the same period in the previous year (March-April), with the biggest drop observed in April 2020 (11). The same study has reported a significant decrease in the number of patients applying to the hospital for reasons such as otitis media, superficial cuts, and muscle pain. This is thought to be because non-emergency cases might have been managed at home. Additionally, some studies have reported that patients might have neglected going to the hospital

when experiencing symptoms of a possible myocardial infarction (11-13). In a study conducted by Li-Heng Tsai et al. at the ED of the third largest hospital in Taiwan, it has been found that the daily number of ED visits decreased by 33.45% compared to the pre-pandemic period, but there has been no significant decrease in the number of critical patients (14). In a study by Butt et al., it has been reported that there has been a significant decrease in the number of confirmed cardiac patients compared to the previous year during the pandemic period (12).

During pandemic period, there was an increase in the percentage of diagnosis codes R10 (abdominal and pelvic pain), R52.9 (pain, unspecified), and W19 (fall, unspecified) compared to the previous year, while the percentage of diagnosis code R51(Headache) decreased. There could be many different reasons for this. Patients with conditions which could be treated with simple interventions at home might have preferred to visit the hospital less. Moreover, there might have been concerns about going to the hospital due to the risk of infection and strict quarantine measures and lockdowns (15, 16).

In conclusion, the lower rates of hospitalization, consultation, and death rate (relatively) in the pre-pandemic period suggest that unnecessary ED visits are made more frequently in the pre-pandemic period. The most important reasons are probably that patients prefer not to visit the ED in cases of illness that can be resolved with a simple intervention, the restrictions applied due to Covid-19 and patients' fear of COVID-19 transmission during a hospital visit. The decrease in ED admissions during the pandemic period has had a positive effect on the emergency professionals' response to real emergencies. However, it is important to provide the necessary warnings and medical referrals in order to prevent the delay in the admission of patients who need critical intervention to the hospital for the aforementioned reasons.

Declaration

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This study has been approved by Gazi University Ethics Committee (Approval Date: 23.07.2020, Approval Number: E.78134)

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