

ORIGINAL RESEARCH

CORONA EXPERIENCE

COVID-19 at the emergency department

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Abstract

Background & objectives: The ongoing COVID-19 pandemic has effected the emergency departments of Turkish healthcare system as adversely as elsewhere. There was a huge influx of patients as well as their presentations, and the outcomes. This study intended to document the predicted general information about COVID-19 and patient characteristics.

Methodology: All admitting COVID-19 assumed cases were included from March 1, 2020 to December 31, 2020, at the adult emergency departments of Sakarya Training and Research Hospital.

Results: A total of 92161 patients presumed to have COVID-19 presented to the emergency room. Out of these, 51719 (56.1%) patients were male, the mean age was 40 y, inpatients' mean age was 63 y; the mean age the patients who died was 74 y. Majority of them [90382 (98.1%)] was Turkish citizens, and 1779 (1.9%) were foreign nationals. Of all patients, 87914 (95.4%) reached the emergency room by their private means, and 4247 (4.6%) arrived by an ambulance. A total of 6154 (6.7%) patients were hospitalised; a meaningful relationship was found between the patients' age and hospitalisation status ($p = 0.001$). The mortality within the emergency service was 126 (0.1%). The real-time polymerase chain reaction (RT-PCR) tests result were positive of 28,847 (31.3%) patients.

Conclusion: Approximately 1/3rd of the patients with COVID-19 symptoms had a positive test result, making emergency departments important places for managing the pandemic. To prevent too many patients from presenting to the emergency departments, that may be beneficial to refer patients who have COVID-19 symptoms to units other than the emergency department.

Key words: Emergency room; COVID-19; Pandemic

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1. Introduction

A Coronavirus outbreak named COVID-19 pandemic was announced throughout the initial months of 2020.¹ Communities have been seriously affected both mentally and physically by this pandemic inescapably.² The healthcare sector has been massively influenced by the severe acute respiratory syndrome–coronavirus-2 (SARS-CoV-2), which was initially detected in China's Wuhan Province and spread to other nations rapidly.³ During this period, the existing healthcare capacity was frequently inadequate

to deal with the condition; furthermore, the healthcare workers attending to the COVID-19 cases were negatively affected physically also mentally. Undoubtedly, the emergency departments, which were among the first places patients arrived, were affected by the risen workload.^{4,5}

Emergency rooms have converted one of the frontlines in the fight against COVID-19 since the pandemic's early days. These departments have been displayed units which cases with a wide range of clinical findings present. Their first treatments were originated, real-time polymerase chain reaction (RT-PCR) swabs were

taken, and hospitalisation or discharge decisions were made.^{6,7} In some emergency rooms, patients assumed COVID-19, and other cases were cared for unitedly.⁷

Since the pandemic's early days, planning emergency departments according to the pandemic and taking specific precautionary measures, have grown crucial points.⁸ For this purpose, actions such as restricting visitors, providing protective equipment and education for healthcare workers, treating patients who needed respiratory supporting in a separate area, establishing emergency inpatient rooms where patients can be followed up for varying periods, and at the hospital entrance practising triage have been recommended.^{5,7,9}

Only restrained research has emphasised that patients were presenting to the emergency room. This study proposes contributing to contemporary literature by conferring recognised but not documented findings by exposing emergency room patients for an extended period. In this research, the demographic characteristics, numbers, distribution by months, and hospitalisation status of the COVID-19 suspected patients presented to the emergency room were investigated throughout the pandemic furthermore, how they reached the emergency department was investigated. Thus the performance of emergency departments throughout pandemic can be explained more efficiently.

2. Methodology

This study was a retrospective, analytical, cross-sectional research study. Approval for the study was obtained from the Ministry of Health on 15.01.2021, and from SEAH Chief Physician on 15/01/2021.

The data were retrospectively scanned from the hospital automation system and patient files. The study included all patients 18 y of age or more, who presented with COVID-19 symptoms between 01.03.2020 and 31.12.2020 at the adult emergency departments of Sakarya Training and Research Hospital (SEAH). If the patients' complaints, histories, or tomography findings were consistent with COVID-19, they were included in the study. Patients under the age of 18, pregnant women, and cases referred to other hospital units were not registered in the emergency room, and those with missing patient file data were excluded from the study.

According to patients' nationalities, they were divided into two groups: citizens of the Republic of Turkey and those who were not. All asylum-seekers, migrants, and tourists who were not citizens of the Republic of Turkey were included in the latter group.

To better evaluate the patients' age distribution, the patients' ages were divided into six groups: 0–19, 20–39, 40–59, 60–79, 80–99, and 100–119 years.

Only patients who died at the diagnosis or treatment stage during their stay in the emergency department were included in the mortality numbers. Those who died after hospitalisation or during outpatient follow-up were not included.

Patients reached the emergency department by ambulances or were transferred from another hospital by an ambulance were included in the group "arrived by ambulance." Patients arrived utilising any vehicle except an ambulance were included in the group as "arrived by their means."

The repeated admissions of patients in the same month were filtered, and one patient was counted only once within a month.

After the RT-PCR sample was taken from patients suspected of COVID-19 whose general condition was good and eligible for outpatient follow-up, they were sent for home isolation without waiting for the result. On the other hand, after the RT-PCR sample was taken at the emergency department from patients suspected of COVID-19 who required admission in the ward or intensive care, they were taken to the respective areas reserved for such patients without waiting for the result.

Statistical analysis: For comparison of the categorical data, the Chi-square test was used, and those with $p < 0.05$ were considered statistically notable. Skewness and Kurtosis values were required to be in the range of $-2/+2$ for the data to be normally distributed.¹⁰ The independent t-test was used to compare the independent parameters within this range, and those with $p < 0.05$ were considered statistically significant.

3. Results

A total of 92161 suspected COVID-19 patients presented to SEAH adult emergency room throughout the study period. Of these cases, 40442 (43.9%) were women, and 51719 (56.1%) were men.

Table 1: Distribution of age groups by hospitalization, death, and nationality

Age group	Hospitalization status		Mortality		Nationality	
	Outpatient	Inpatient	Survived	Died	Turks	Foreigners
0-19 ²	3120 (3.4)	23 (0.0)	3143 (3.4)	0 (0)	3076 (3.3)	67 (0.1))
20-39	48875 (53)	638 (0.7)	49511 (53.7)	2 (0.0)	48269 (52.3)	1244 (1.4)
40-59	25498 (27.7)	1602 (1.7)	27085 (29.4)	15 (0.0)	26748 (29)	352 (0.4)
60-79	7618 (8.3)	2876 (3.1)	10436 (11.3)	58 (0.1)	10386 (11.3)	108 (0.1)
80-99	892 (1)	1013 (1.1)	1854 (2)	51 (0.1)	1897 (2.1)	8 (0.0)
100-119	4 (0.0)	2 (0.0)	6 (0.0)	0 (0)	6 (0.0)	0 (0)
Total	86007 (93.3)	6154 (6.7)	92035 (99.9)	126 (0.1)	90382 (98.1)	1779 (1.9)

¹ Shows the percentage of this age group among all patients.

² Those <18 years of age were not included in the study.

Dara given as n (%)

Table 2: Frequency of covid-19 RT-PCR test positive patients with Covid-19 symptoms presenting to the emergency medicine according the months

Month	Tests done n (%)	Positive RT-PCR n ¹ (%) ²
March ³	593 (0.6)	136 (22.9)
April	4792 (5.2)	1195 (24.9)
May	2821 (3.1)	439 (15.6)
June	3281 (3.6)	538 (16.4)
July	1797 (2)	379 (21.1)
August	5378 (5.8)	1337 (24.9)
September	7699 (8.4)	1875 (24.4)
October	14130 (15.3)	4248 (30.1)
November	35149 (38.1)	13743 (39.1)
December	16521 (17.9)	4957 (30)
Total	92161 (100)	28847 (31.3)

¹ Number of patients with a positive COVID-19 RT-PCR test result among those who presented to the emergency department in that month.

² Percentage of patients with positive RT-PCR test among all patients presenting to the emergency department with COVID-19 symptoms in that month.

³ The first RT-PCR positive case was found on March 19, 2020.

Data presented as n (%)

The patients' mean age was 40 ± 16 y; the median age was 36. However, the inpatients' mean age was 63 ± 17 y; moreover, the mean age of the patients who died was 74 ± 13 y. A statistically meaningful variation was observed between the patients' nationalities according to their age [t(1879)=18.7, p = 0.001]. According to the Independent t-test, the age of foreign nationals

(mean= 33.8, SD= 13.5) was younger than the age of Turkish citizens (mean= 39.9, SD= 16.1). The patients' age groups distribution is shown in Table 1.

Of the 90382 (98.1%) cases were Turkish citizens, and 1779 (1.9%) were foreign nationals. There was a statistically notable difference between the patients' nationalities and their genders (x² =45.4, SD=1, p = 0.001). While only 56% of the patients with Turkish citizenship were men, 64% of the foreign nationals were men.

While 87914 of the patients (95.4%) arrived at the emergency department by their means, 4247 (4.6%) reached by ambulance. A statistically meaningful relation was also ascertained between the patients' age and how they arrived at the hospital [t(4539)= -90.3, p = 0.001]. Accordingly, it was noticed that patients who arrived at the hospital by ambulance were older (mean= 63.8, SD=17.9) than those admitted to the hospital with their vehicles (mean=38.6, SD=15). It was perceived that ambulance usage increased with age.

Of the total patients, 86007 (93.3%) were managed by an outpatient setting; furthermore, 6154 (6.7%) were hospitalised. There was a significant association between the patients' age and their hospitalisation status [t(6838)=-113, p=0.001]. The hospitalised patients' age was (mean=63, SD=16.8) younger than the outpatients' age (mean=38.1, SD=14.6). There was a significant relationship between how patients came to the hospital and their hospitalisation status (x²=

Table 3: Months-wise frequency of patients with covid-19 symptoms treated as inpatients/outpatients

Month	Outpatient n (%) ¹	Inpatient n (%) ¹	Total n (%) ²	p-value ³
March ⁴	176 (29.7)	417 (70.3)	593 (0.6)	0.001
April	3344 (69.8)	1448 (30.2)	4792 (5.2)	
May	2135 (75.7)	686 (24.3)	2821 (3.1)	
June	2885 (87.9)	396 (12.1)	3281 (3.6)	
July	1539 (85.6)	258 (14.4)	1797 (2)	
August	5121 (95.2)	257 (4.8)	5378 (5.8)	
September	7444 (96.7)	255 (3.3)	7699 (8.4)	
October	13704 (97)	426 (3)	14130 (15.3)	
November	34151 (97.2)	998 (2.8)	35149 (38.1)	
December	15508 (93.9)	1013 (6.1)	16521 (17.9)	
Total	86007 (93.3)	6154 (6.7)	92161 (100)	

1 The percentage of patients presented to the emergency department in that month.

2 The percentage of patients presenting to the emergency department with COVID-19 symptoms in study period.

3 Result of the comparison of the hospitalization status of the patients according to the months.

4 The first RT-PCR positive case was found on March 19, 2020.

Data presented as n (%)

15851, SD=1, p=0.001). Hence, 53.8% of the patients arrived by ambulance were hospitalised, while barely 4.4% reached the hospital by their means were hospitalised.

Considering the mortality rate, that was ascertained, 126 patients (0.1%) died in the emergency room; unfortunately, all of them were Turkish citizens. A meaningful connection was unearthed between the patients' age and their mortality status [$t(125.5) = -29.5$, $p = 0.001$]. The patients' ages who died (mean=74.1, SD=13.1) were older than those who survived (mean=39.7, SD=16).

Of the 92161 cases whose nasopharyngeal and oropharyngeal swabs were collected, a total of 28847 (31.3%) RT-PCR tested positive for COVID-19. The mean age was 41 years (± 16), and the median age was 36 years for the RT-PCR positive patients. Of these patients, 15106 (52.4%) were men, and 13741 (47.6%) were women. The monthly RT-PCR positivity rate was the lowest in May (15.6%) and the highest in November (39.1%). The number of applications to the emergency department and RT-PCR positivity rates was shown in Table 2 and Table 3.

4. Discussion

Several research types have analysed the emergency rooms' measures, their system, and healthcare professionals' conditions during the pandemic.

Melissa James et al. explored the demographic patterns of the COVID-19 patients who presented to a hospital's emergency room in a total of 634 patients. They affirmed that the patients' mean age was 38.6, 59.4% were male, 11.8% of all patients died in the emergency department, 30.7% tested positive for COVID-19, 62.1% reached the hospital by their means, and 83.6% were discharged from the emergency service.¹¹

Of the patients participating in our study, 95.4% arrived at the hospital by their means. It resembles that a point needs to be considered here: Of the all symptomatic patients, 31.3% had a positive RT-PCR test; furthermore, they were mostly followed up by outpatient. This situation may increase the spreading infection possibility to the community while transferring to the hospital by public transport. The positive testing rate of 30.7% found in the study by

Melissa James et al., and that most of the patients were followed up on an outpatient basis is consistent with the present study's findings. City administrators should conduct a study on the transfer of patients with COVID-19 symptoms to the hospital.

In another study, Martín-Sánchez et al. examined 1379 COVID-19 patients presenting to a Spanish hospital's emergency department. They reported that demographically, the patients' mean age was 62 years, 53.5% were men, 74.6% were hospitalised, and the 30-day mortality rate of the hospitalised patients was 15.7%.¹²

Upon reviewing the data, it may be recognised that men present to the emergency departments more frequently than women. The patients' mean age in the study by Melissa James et al., and those in our study are similar. However, they are different from the mean age of the patients in the study by Martín-Sánchez et al. While the hospitalisation rate of the patients in the recent study was as high as 74.6%, this rate remained at 16.4% in the study by Melissa James et al. In our study, this rate was only 6.7% in all 92161 patients, which is lower than the rates reported in all other studies. This observation may be since people very massively use the emergency departments even during regular periods. Moreover, non-urgent patients also regularly present to the emergency departments in Turkey. According to the Ministry of Health, 91.991.243 emergency examinations were performed at the state hospitals' adult emergency departments in 2017, which corresponded to 24.71% of all examinations.¹³ The outpatients were the majority cause for the emergency rooms to be used excessively. Establishing polyclinics that serve as an alternative to emergency rooms may decrease the workload of such departments.

On the other hand, the patients' high mean age in the Martín-Sánchez et al.' research might have resulted in a high hospitalisation rate. It has already been noted that age has a prognostic value in COVID-19 patients.¹² In the present study, although the patients' total hospitalisation rates were low, it supports the study mentioned above in terms of the significant surge in the hospitalisation rates as the age increases.

Similarly, the mortality rate of 11.8% reported in Melissa James et al. is high compared with our study. Sousa et al. examined 2070 COVID-19 patients and

found the 14-day mortality rate to be 6.3%.¹⁴ In the present study, the mortality rate was 0.1%. It appears that there are two reasons for our low rates. First, the patients who presented to the emergency department were evaluated only according to the symptoms of COVID-19, and a positive RT-PCR test result was not required. Therefore, the sample group was more extensive and more diluted than the other studies. Second, it is necessary to periodically investigate the patients' mortality status after hospitalisation or after discharge. However, we included only deaths that occurred in the emergency department.

5. Conclusion

Emergency departments are the hospital units where most COVID-19 patients are diagnosed, followed up, and their hospitalisation decision is made. In our emergency departments approximately 33% of the patients with COVID-19 symptoms had a positive test result. Patients with COVID-19 symptoms in good general condition should be delivered to other hospital units outside the emergency room to reduce the burden on the emergency services. The probability of transmitting the disease to the society can be decreased if city administrators apprehend the essential actions to transfer cases which do not need an ambulance.

6. Conflict of interest

The study did not involve any funding or grant.

7. Authors' contribution

ED: Was the first author of the manuscript. Participated in literature review, data collection, consensus discussion, submitted discussion and suggestions, recommendations.

FG: Proofreading, manuscript editing, data analyses.

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