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ORIGINAL ARTICLE

Effect of Covid-19 on the Pattern of the Patients Referring to the Emergency Department of Shahid Sadoughi Hospital in Yazd in 2019-2021

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A B S T R A C T

Background: Covid-19 was first declared to be a pandemic in 2020. Once it occurred, hospitals as well as emergencies were encountered scores of challenges, including a large number of patients with a new contagious viral disease on the one hand, and the importance of continuing to provide adequate and complete services to non-covid patients who daily referred to the emergencies, on the other. Moreover, as a result of the emerging crisis, the pattern and rate of visits to the emergency department by non-covid patients underwent several alterations. Therefore, the current study was designed to evaluate the effect of covid-19 on the referral pattern of non-covid patients to the emergency department of Shahid Sadoughi Hospital in Yazd.

Methods: This is an analytical cross-sectional investigation through which all the patients referred to the emergency department of Shahid Sadoughi Hospital in Yazd in April, August and November of 2018 and 2019 (before and after the outbreak of Covid-19) were examined. The variables of the study included age, gender, reason for the patient's visit, hospital service, type of discharge from the emergency room, status and time of the visit. The collected data were then entered into $SPSS_{26}$ and analyzed using Chi-square and T-test.

Results: The study included 11,587 patients aged 1 to 101 years, 58.4% men and 41.6% women. The number of emergency ward visits decreased significantly following the outbreak of the covid-19 disease. A statistically significant difference was identified between the frequency distribution of all the investigated variables at the desired times (*P-value*=0.002 for gender and *P-value*=0.0001 for other variables). Therefore, the number of the male patients within the age range of 20 to 65 years in infectious and pulmonary wards increased, but hospitalization in the orthopedics and internal neurology centers and referrals due to headache, abdominal pain, and nervous tension faced the greatest decrease. Among the types of discharge, hospitalization in and transfer to the ward lowered the most.

Conclusion: Predicated on the current study, the emergence of covid-19 has triggered a significant reduction in the number of patients visiting the emergencies; the findings of this study can thus assist senior managers how to make policies as new epidemics arise in order to treat the patients and decrease mortality.

Key words: COVID-19, Emergency, Pandemic, Hospitalization

Introduction

The outbreak of Covid-19 initiated in Wuhan, China in December 2019 (1). In January 2021, the number of confirmed cases of covid-19 amounted to more than 109 million and the number of deaths ascribed to it reached more than 2.2 million (2). The overall mortality rate of covid-19 is 2%, which is much lower than SARS and MERS. In contrast to the rapid onset of SARS, the incubation period

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is generally 3-7 days and may even rise up to 14 days. The main and most significant route of transmission is human-to-human mostly through respiratory droplets or direct contact (3, 4). In terms of symptoms, the infection with covid-19, in the preliminary stage, is associated with non-specific and general symptoms such as feeling of boredom, fatigue and body pain, fever as well as dry cough. Patients may experience gastrointestinal symptoms such as nausea, vomiting, and diarrhea shortly before the onset of fever. A small number of patients may also have headache or bloody vomiting, but may even be asymptomatic (5). In a study conducted in Wuhan, China on 41 patients on covid-19, it was revealed that fever (98%), cough (76%), shortness of breath (55%) and muscle pain and fatigue (44%) were respectively the most prevalent clinical symptoms of the disease (6). Definite diagnosis requires the identification of nucleic acid in pharyngeal or nasal swabs, sputum, lower respiratory tract secretions, or blood (3, 4). In two other studies conducted by Chen et al (7) and Wu et al (8), it was identified that the results of imaging findings (CXR, CT-SCAN) consisted of bilateral lung involvement in 114 patients (81%) out of 140 cases. Among these 140 patients, 61 (44%) had lymphopenia and 58 others (41%) had elevated AST or ALT levels. Among the biomarkers associated with infection, procalcitonin levels were reported in majority of normal subjects. However, serum ferritin and CRP levels had elevated in 63% and 86% of the patients with covid-19, respectively. In addition, the level of pro-inflammatory cytokines in plasma had escalated in affected patients, which was pertinent to the severity of the disease (7, 8).

As evidenced by the Centers for Disease Control and Prevention (CDC), more than 299,028 deaths occurred from January 26 to October 3, 2020 So that 2.3 of these deaths were directly induced by Covid-19 (9). Resultantly, the spread of the virus engendered chaos in health systems around the globe. Countries sought to deal with the disease while maintaining the integrity of their health systems. Hospitals were constrained to meet the ongoing health service needs of the community while responding to the additional burden of covid-19 cases and readjusting their care priorities (10).

Failure to visit or delay in visiting the emergency room to receive care can be a potential factor in increasing mortality during the covid-19 pandemic (9). This could contribute to excess non-covid-19 deaths, which the CDC defines as "an increase in non-covid-19-related deaths beyond what would be expected."

As uncovered by the results of a study conducted in the United States by Anthony et al. in 2020, the rate of referral to the emergency department totally decreased by 39.6%. In addition, the referral rate for emergency cases reduced to 35.8%, for non-emergency cases to 52.1%, and for psychiatric diseases to 30.2%. The number of referrals for women and children under 18 was associated with a greater decrease. (11). Even in another study conducted by Josha et al (12) in 2021, patients at 5 hospitals in Massachusetts were examined in a two-month period (March 3 to April 30, 2020) and compared with the identical period of the previous year. The number of emergency patients in 2020 decreased by 30.9% compared to 2019. However, the average intensity of the patients' clinical manifestations increased and most of the specialized consultations, including psychiatry, trauma and cardiac surgery reduced (12).

By investigating on May 2021 in Denmark, Jacobs concluded that hospital admissions for all major non-covid-19 disease categories lowered during the pandemic compared with the previous period. Moreover, the mortality rate appeared to be higher in general and for hospitalized patients it was influenced with conditions including respiratory diseases, cancer, pneumonia, and sepsis, and then suggesting that more attention is required to be paid to the management of serious medical conditions other than covid-19 (13).

In 2021, Elisa in Alberta, Canada, investigated the impact of covid-19 on hospital admissions and emergency visits, and concluded that despite the relatively low level of hospital admissions for

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covid-19 in Alberta, there was an immense impact on the system, so that the health care had been constrained to bear fewer hospital admissions and emergency visits. This had led to a significant decrease in the admission of chronic obstructive pulmonary disease and a significant increase in the admission of patients with mental and behavioral disorders caused by alcohol consumption (14).

Given the significant reduction in the number of patients visiting the emergencies even with life-threatening conditions, which may be associated with the fear of the virus or due to the overcrowded hospitals, reduction of the staff's attention to non-covid patients, and the lack of similar studies in Iran, this study was designed with the aim of investigating the effect of covid-19 on the pattern of patients referring to the emergency department to properly discover what strategies can be utilized to facilitate safe, timely and appropriate medical services to all patients in the community.

Materials and methods

The current applied research was conducted using a retrospective cross-sectional analytical approach. The setting was Shahid Sadoughi Hospital of Yazd with 533 active beds; a subspecialty and level 3 hospital, which is the center for admission and referral of the patients in the province and those coming from the south and southeast of the country, as well as the admission and hospitalization center for covid-19 in Yazd province. It is worth noting that in addition to all adult patients, pediatric patients with trauma complaints, accidents, falls, and all kinds of musculoskeletal injuries, as well as diseases that require various eye, ear, throat, and nose procedures, are all referred to the adult emergency department of this hospital. All the patients referring to this center are first visited by the emergency medicine specialist and treatment process continues depending on the nature of the illness, or the rest of the treatment process propels by the emergency medicine service so that the patient is discharged from the emergency room before 6 hours. After the diagnosis of the emergency medicine specialist the patient is visited by other specialists and transferred to the relevant center.

The statistical population of the research contained all the patients referring to the emergency ward of Shahid Sadoughi Hospital in Yazd in the months of April 2019, August 2019 and November 2019 (when the spread of covid-19 in Yazd was at the highest in 2019 and are known as the peak of the spread of covid-19.) as well as the months of April 1998, August 1998 and November 1998 (similar time periods in the previous year). Census was the sampling method through which all the patients who had referred to the adult emergency room at the mentioned times were investigated. The inclusion criteria comprised all non-covid patients referring to the adult emergency department of Shahid Sadoughi Hospital in Yazd during the mentioned time periods. Exclusion criteria included patients who had referred to the adult emergency department of Shahid Sadoughi Hospital in Yazd due to covid-19, as well as non-covid patients whose case information was incomplete and it was impossible to access the patients to complete the case. The data collection tool was a pre-specified checklist comprising variables such as age, gender, reason for patient visit, hospitalization service, type of discharge and outcome (how the patients leave the emergency room, including sending them to another hospital, recovery and discharge by physician's order, hospitalization and transfer to the ward, discharge by personal choice and death) and the referral's time. The collected data were then entered into $SPSS_{26}$. For descriptive analysis, percentage, mean and standard deviation criteria were applied and Chi-square test was utilized to compare frequency distribution as well as T-test to compare means. *P-value* <0.05 was regarded as significant.

Ethical considerations

Ethical principles were considered in writing materials and using scientific books and resources. For implementing this research, no additional costs were imposed on the patients. Obtaining permission from the officials of the university and

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related hospitals and obtaining oral consent from the research participants, as well as observing the framework of confidentiality of information, maintaining respect and respecting rights, explaining the purpose of the research were the ethical considerations observed in this research. It should be noted that this study obtained the approval of the Ethics Committee of the Faculty of Medicine in Shahid Sadougi University of Medical Sciences in Yazd with the code of ethics under the number IR.SSU.MEDICINE.REC.1400.297.

Result

This study was performed with the purpose of investigating and comparing the impact of covid-19 on the pattern of non-covid patients referring to the emergency department of Shahid Sadoughi hospital on March 2019, July 2019, October 2019, March 2020, July 2020 and October 2020. In this work, 11,587 patients who had referred to the adult emergency department of Shahid Sadoughi in Yazd Educational-Therapeutic Hospital during the mentioned periods were examined. The mean age of the patients was 39.9; the minimum was 1, and the maximum101 years. Additionally, out of 11,587 patients examined, there were 58.4% and 41.6% males and females, respectively.

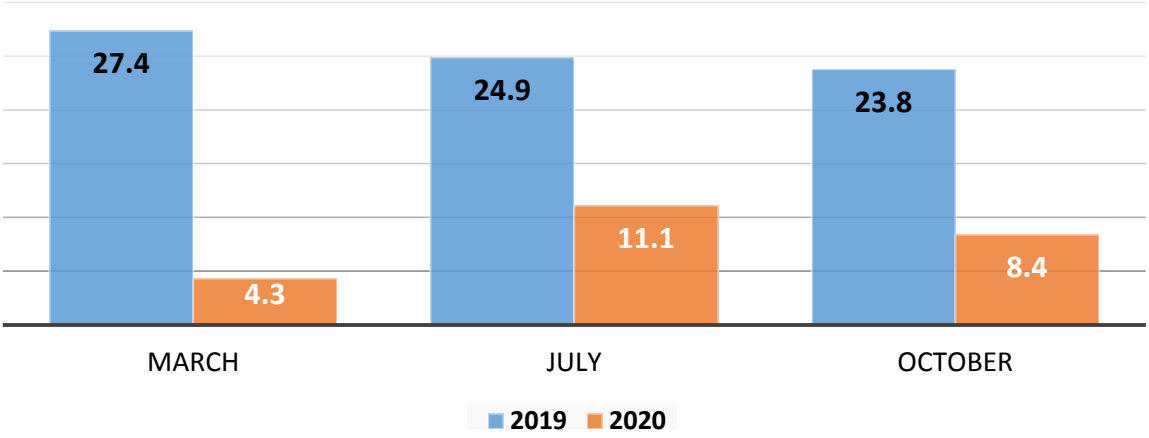

Figure 1. Comparison of frequency distribution of patients according to time of their visit

As illustrated by the above Fig, for the times prior to the outbreak of Covid-19 (in 2019), the highest frequency of the patients visiting the emergency ward was in March 2019. Similarly, after the outbreak of Covid-19 (year 2020), the highest frequency of patients visiting the emergency occurred in July 2020. Furthermore, the highest difference in the number of patients visiting the emergency room before and after the outbreak of covid-19 was in March 2019 and March 2020 (23.1% decrease in March 2020 compared to March 2019); this significant decrease can be justified considering that the initial peak of the disease was in March 2020.

Table 1. Comparison of frequency distribution of gender based on the desired times in the patients

Gender	Time						Total
	March 2019	July 2019	October 2019	March 2020	July 2020	October 2020	
Male	1806 %56.8	1679 %58.2	1576 %57.2	308 %61.5	803 %62.2	599 %61.5	6771 %58.4
Female	1373 %43.2	1207 %41.8	1181 %42.8	193 %38.5	487 %37.8	375 %38.5	4816 %41.6
Total	3179 %100	2886 %100	2757 %100	501 %100	1290 %100	974 %100	11587 %100
P	0.002						

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The results of the investigation regarding the comparison of the frequency distribution of gender between the desired times in the studied patients are projected in Table 1 Using the Chi-Square test for the analysis of the data, a statistically significant difference was determined between the frequency distribution of gender and the studied times (*P-value* = 0.002), so that in 2020 (after the outbreak of the disease) in comparison to 2019 (before the outbreak), the frequency of the female clients compared to that of the men decreased significantly.

Table 2. Comparison of the frequency distribution of the hospitalizing wards with regard to the desired times

Hospitalizing Center	Time						Total
	March 2019	July 2019	October 2019	March 2020	July 2020	October 2020	
Other Centers	63 10.2%	48 8.2%	48 8.7%	10 16.4%	25 9.1%	38 16.8%	232 10.0%
Infectious	67 10.9%	85 14.6%	87 15.8%	3 4.9%	29 10.5%	78 34.5%	349 15.1%
Pulmonary	52 8.4%	52 8.9%	47 8.5%	14 23.0%	46 16.7%	41 18.1%	252 10.9%
Orthopedy	91 14.7%	75 12.9%	67 12.1%	1 1.6%	34 12.4%	19 8.4%	287 12.4%
Surgery	77 12.5%	81 13.9%	64 11.6%	8 13.1%	38 13.8%	16 7.1%	284 12.3%
Heart	34 5.5%	27 4.6%	32 5.8%	0 .0%	9 3.3%	8 3.5%	110 4.8%
CNS	72 11.7%	62 10.6%	62 11.2%	7 11.5%	22 8.0%	9 4.0%	234 10.1%
Gastric	47 7.6%	38 6.5%	51 9.2%	10 16.4%	27 9.8%	12 5.3%	185 8.0%
Gynecology	22 3.6%	29 5.0%	25 4.5%	0 .0%	15 5.5%	1 .4%	92 4.0%
Nephrology, Rheumatology, Endocrine	56 9.1%	54 9.3%	46 8.3%	8 13.1%	25 9.1%	4 1.8%	193 8.3%
Oncology	36 5.8%	32 5.5%	23 4.2%	0 .0%	5 1.8%	0 .0%	96 4.1%
Total	617 100.0%	583 100.0%	552 100.0%	61 100.0%	275 100.0%	226 100.0%	2314 100.0%
P				0.0001			

The results of the study comparing the frequency distribution of the hospitalizing wards (excluding the emergency medicine services) at the desired times are illustrated in Table 2. As is demonstrated, a statistically significant difference was revealed between the frequency distribution of hospitalizing wards in the provision of services at the studied times *(P-value* <0.0001), so that the frequency for infectious and pulmonary services in 2020 (after the outbreak of covid-19) increased significantly compared to 2019. Moreover, the frequency of hospitalization of patients in cardiology, oncology and gynecology wards decreased significantly in 2020 (after the outbreak of the disease) compared to 2019. However, this frequency for surgery, neurology, and internal wards was less affected by the peaks of covid-19 compared to other wards.

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Table 3. Comparison of the distribution of the frequency of referrals as for the desired times

Reason for referral	Time						Total
	March 2019	July 2019	October 2019	March 2020	July 2020	October 2020	
Other reasons	1022	1170	1299	273	506	450	4720
	32.1%	40.5%	47.1%	54.5%	39.2%	46.2%	40.7%
Abdominal pain	463	374	330	40	150	88	1445
	14.6%	13.0%	12.0%	8.0%	11.6%	9.0%	12.5%
Convulsion	24	17	18	1	8	5	73
	.8%	.6%	.7%	.2%	.6%	.5%	.6%
Consciousness reduction	53	42	52	6	23	12	188
	1.7%	1.5%	1.9%	1.2%	1.8%	1.2%	1.6%
Chest pain	98	98	73	16	22	26	333
	3.1%	3.4%	2.6%	3.2%	1.7%	2.7%	2.9%
Trauma	940	767	604	90	358	205	2964
	29.6%	26.6%	21.9%	18.0%	27.8%	21.0%	25.6%
Mental stress	78	45	24	4	10	2	163
	2.5%	1.6%	.9%	.8%	.8%	.2%	1.4%
Fracture-Dislocation	42	61	27	1	11	8	150
	1.3%	2.1%	1.0%	.2%	.9%	.8%	1.3%
Cancer	20	15	21	3	15	3	77
	.6%	.5%	.8%	.6%	1.2%	.3%	.7%
Shortness of breath-Asthma	175	118	139	42	103	126	703
	5.5%	4.1%	5.0%	8.4%	8.0%	12.9%	6.1%
Blood transfusion	20	17	15	11	13	6	82
	.6%	.6%	.5%	2.2%	1.0%	.6%	.7%
Vomit	108	75	68	6	42	22	321
	3.4%	2.6%	2.5%	1.2%	3.3%	2.3%	2.8%
Headache	109	75	63	3	22	17	289
	3.4%	2.6%	2.3%	.6%	1.7%	1.7%	2.5%
Toxicity	27	12	24	5	7	4	79
	.8%	.4%	.9%	1.0%	.5%	.4%	.7%
Total	3179	2886	2757	501	1290	974	11587
	%100	%100	%100	%100	%100	%100	%100
P				0.0001			

The findings of the study as to the comparison of the frequency distribution of the reason for the patients' visit according to the time of the visit are presented in Table 3 and reveal a statistically significant difference between the frequency distribution of the reason for the visits (*P-value* <0.0001); the frequency of patients' visits due to dyspnea increased significantly in the mentioned months of 2020 compared to the identical periods in 2019. Additionally, the frequency of patients' visits due to abdominal pain, stress and headache decreased significantly in 2020 compared to 2019.

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Table 4. Comparison of the frequency distribution of the type of discharge at the desired times

Transfer to other hospitals	43	58	51	14	17	14	197
	1.4%	2.0%	1.8%	2.8%	1.3%	1.4%	1.7%
Discharge by personal choice	254	232	266	64	133	94	1043
	8.0%	8.0%	9.6%	12.8%	10.3%	9.7%	9.0%
Recovery and discharge	2758	2465	2293	412	1109	832	9869
	86.8%	85.4%	83.2%	82.2%	86.0%	85.4%	85.2%
Transfer to ward and hospitalization	76	82	76	0	1	0	235
	2.4%	2.8%	2.8%	.0%	.1%	.0%	2.0%
Total	3179	2886	2757	501	1290	974	11587
	%100	%100	%100	%100	%100	%100	%100
P	0.0001						

Furthermore, results of the study on the comparison of the frequency distribution of the type of patients' discharge on the basis of the time of visit are displayed in Table 4 and illustrates a statistically significant difference between the frequency distribution of the type of discharge according to the time of visit (*P-value* <0.0001) so that, except for the frequency of death which turned out to rise, the frequency for other types of discharge decreased significantly; the highest decrease was associated with transfer to the ward and hospitalization in the months of 2020 compared to the same periods in 2019.

Table 5. Comparison of the age frequency distribution based on the desired times in the examined patients

Age (year)	Time						Total
	March 2019	July 2019	October 2019	March 2020	July 2020	October 2020	
20-1	664	608	534	56	218	153	2233
	20.9%	21.1%	19.4%	11.2%	16.9%	15.7%	19.3%
35-21	923	879	781	190	429	283	3485
	29.0%	30.5%	28.3%	37.9%	33.3%	29.1%	30.1%
50-36	605	551	570	128	279	218	2351
	19.0%	19.1%	20.7%	25.5%	21.6%	22.4%	20.3%
65-50	489	385	409	72	203	168	1726
	15.4%	13.3%	14.8%	14.4%	15.7%	17.2%	14.9%
80-66	340	313	291	36	106	101	1187
	10.7%	10.8%	10.6%	7.2%	8.2%	10.4%	10.2%
80<	158	150	172	19	55	51	605
	5.0%	5.2%	6.2%	3.8%	4.3%	5.2%	5.2%
Total	3179	2886	2757	501	1290	974	11587
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
P	0.0001						

The findings of the study on the comparison of the frequency distribution of the patients' age range predicated on the time of visit are projected in Table 5. As is revealed, a statistically significant difference could be detected between the frequency distribution of the patients' age range predicted on the time of visit; which for the elderly (over 65 years old) decreased significantly compared to the young and middle-aged (20 to 65 years old) during the peak times of covid-19 in 2020 compared to the same time in 2019.

Discussion

The results of the present study illustrate a 23.1% decrease in the number of non-covid patients visiting the emergency room in March 2020 compared to the same period in 2019, a 13.8%

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decrease in the number of patients visiting the emergency ward in July 2020 versus the identical month in 2019, and a 15.04% decrease in the number of patients visiting the emergency ward in October 2020 compared to the same month in 2019. In other similar studies, a decrease in the number of patients visiting the emergency room following the emergence of covid-19 compared to that of before was observed. As an instance, in Kuchijovsky's study, a 50.7% reduction in emergency visits was reported in 2020 compared to 2019 (15). A study conducted by Elisa et al (14) in 2021 compared emergency department visits in Alberta, Canada from March 16 to December 23, 2020, with the same period in 2019. In 2020, the admission rates in both the medical and surgical diseases in the emergency ward diminished (14). Moreover, in Valkar's study, from February 9 to April 21, 2020, the number of patients in the emergency department decreased by about 50% compared to the previous year (16). Similarly, in a study by Karolina et al in 2021, it was concluded that the hospitalization rate of non-covid patients in Croatian hospitals declined in 2019 compared to 2018, and the highest decrease was observed in April 2019, which is highly consistent with the findings of the present study (17).

These results may be due to an increment in individuals' fear and concern about contracting covid-19, unveiling that person tend to avoid attending in high-risk environments. A 2020 investigation by Veronika and her colleagues in Italy analyzing the reduction in emergency ward admissions also reflected that the sharp drop in admissions during the pandemic may be associated with fear of the virus, hence reporting that patients with serious diseases had prevented to refer to the emergencies. In particular, alarming data have been obtained regarding the reduction of cardiovascular and neurological admissions. These patients had delayed to utilize medical care and thus likely faced fatal consequences, solely due to fear of exposure to covid-19, otherwise resulting in preventable morbidity and mortality (18).

Based on the results of the present study, the impact of the disease on patterns including gender, age, reason for referral, hospitalizing center, and type of discharge and outcome, has been significantly efficient in considering individuals to refer to the emergencies; referral after the onset of the disease has been more in favor of male gender, age range of 20 to 65 years, hospitalization in the infectious and lung service and referral in spite of dyspnea.

The presence of more men in high-risk environments and their smoking, and therefore less compliance with health protocols, may explain these findings. Additionally, the findings of a study directed in 2021 demonstrated the highest reduction of referral being in children over 18 years old and the lowest in individuals over 85 years old. The decrease in visits was higher in men. The rate of referral for most diagnoses except for general surgical emergencies, respiratory infections and vulnerable cases declined. Several diagnostic categories containing fractures and musculoskeletal diseases, ENT emergencies, gastrointestinal infections, non-emergencies in gynecology and obstetrics, central nervous system emergencies except stroke and respiratory diseases except for infection, were associated with more than 60% reduction (15). In other words, consistent with the current study, the mentioned study proved the effect of the incidence of covid-19 on the variables of gender and the type of inpatient ward. Although in the current study, there was an increase in the referral of men compared to women and a decrease in hospitalization in the age range of 18-85 years following the onset of the disease, it was not in line with the results of the above study reporting the rate of reduction in the referral of men and those aged lower than 20 and higher than 65 years to be greater. The reason for this inconsistency in gender can be attributed to the cultural and racial disparities of the communities studied in the two investigations, and the inconsistency as for age can be ascribed to the nature of the emergency wards under study, i.e., predominantly admitting adult patients.

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Considering the alteration in the pattern of why patients refer to the emergencies following the outbreak of covid-19, the results of William's study uncovered that common and often low-intensity problems such as headache, chest pain and minor injuries tended to subside during the outbreak of Covid-19; however, suicide thoughts, suicide attempts or self-harm escalated by 100% (19).

Furthermore, an investigation performed by Hartnett in the United States of America in 2020 demonstrated the visit decrease for all age groups, and this reduction was lower in 10-year-old (72%) and 11 to 14-year-old children (71%). The decline turned out to be even higher in women (45% in women *vs.* 37% in men). The greatest reduction involved abdominal pain and other digestive symptoms, musculoskeletal pain except back pain, hypertension, nausea and vomiting, non-specific chest pain, headaches including migraines, urinary tract infections, and asthma, thus being in agreement with the results of the present study (20).

In addition, Anthony's study revealed the rate of referral for women and children under the age of 18 being associated with a higher decrease (11), which was also consistent with the results of the current investigation. Even in a research performed by Teodoros, the greatest fall in visits appeared in patients affected with hypertension, diabetes, headache and migraine, mood and personality disorders, water and electrolyte disorders, and abdominal pain whereas the frequency of the diseases related to the lower respiratory system in 2020 was higher than that in 2019 (67.5%) (21). In Veronica's study, it was also highlighted that the overall emergency admissions in 2020 compared to 2019 decreased by 37.6%, but the admissions for infectious diseases in 2020 emerged to be 30%, while this rate proved to be 5% and 6% in 2018 and 2019 respectively; this is consonant with the results of the present study as to an increment in hospitalization for infectious diseases (18).

In another research by Ivana et al (22) entitled "Evaluating the Impact of the Covid-19 Pandemic on Hospitalization in Split-Dalmatia County, Croatia," encompassing two various time periods, i.e., the pre-epidemic period (from March 2019 to February 2020) and the epidemic period (from March 2020 to February 2021) the researchers recorded a fall in the total number of hospitalizations during the epidemic. In addition, the results suggested that the covid-19 epidemic bears the capacity to impact the type of discharge of patients from hospital and increase the risk of death; this also corroborates with the results of the current study, which demonstrates an increase in death and voluntary discharge from the emergencies (between the months under study in the years 2020 and 2019) (22).

Conclusion

As concluded in this study, the overall spread of covid-19 has caused a significant decrease in the number of patients visiting the emergency room, particularly during the first peak of the disease (March 2020 compared to March 2019). It can also be asserted that the incidence of the disease would affect the patterns of gender, age, reason for referral, type of discharge and type of hospitalizing ward in emergency department visits. More research is, however, required to investigate the causes and long-term consequences related to this decrease in the emergency department visits for comprehending how this epidemic affects the delivery of ambulatory and hospital care and how these problems can be prevented from reoccurring in the years to come.

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Conflict of interest

The authors of this article declare no conflict of interest.

Author Contributions

S.A and M.J designed the research, F.HO and

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F.HA collected and analyzed data, S.A and M.J wrote the paper, and S.A had the primary responsibility for final content. All the authors read and approved the final manuscript.

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