

Original Article / Araştırma Makalesi

**A RETROSPECTIVE STUDY ON PATIENTS HOSPITALIZED FROM THE
EMERGENCY DEPARTMENT BEFORE AND DURING THE COVID-19
PANDEMIC PERIOD**

**COVID-19 Pandemi Döneminde ve Öncesinde Acil Servisten Yatışı Yapılan Hastalar
Üzerine Retrospektif Bir Araştırma**

Ahmet YILDIZ¹ 

Cahit KORKU² 

¹Batman University, Faculty of Health Sciences, Batman

²Niğde Ömer Halisdemir University, Zübeyde Hanım Faculty of Health Sciences, Niğde

Geliş Tarihi / Received: 19.10.2023

Kabul Tarihi / Accepted: 06.03.2024

ABSTRACT

This study aims to evaluate patients hospitalized from the emergency department before and during the pandemic. The research was designed as a retrospective study. All patients (32,544 patients) who came to the emergency department of a training and research hospital for a total duration of two years, consisting of one year before the pandemic and one year during the pandemic, and subsequently required admission, were included in the study. The study compared the monthly average number of admissions, age, gender, diagnosis, discharge status, and mortality rate variables of the patients included. There was a decrease in the number of patients during the pandemic compared to the pre-pandemic period. The rate of change (decrease) ranged from 12.6% to 34%. The decrease in the number of patients in the early months of the pandemic (March, April, May, June) exceeded 25%. The mean age, average length of stay and mortality rates of patients admitted from the emergency department increased during the pandemic, and this change was statistically significant ($p<0.001$). The findings emphasize the need for developing strategies, preparedness, and taking measures for public health crises like pandemics.

Keywords: COVID-19, Emergency department, Hospitalizations.

ÖZ

Bu çalışmada pandemi öncesinde ve pandemi döneminde acil servise başvurup acil servisten yatışı yapılan hastaların değerlendirilmesi amaçlanmıştır. Araştırma, retrospektif tipte tasarlanmıştır. Pandemi öncesi ve pandemi dönemi birer yıl olmak üzere toplam 2 yıllık süre zarfında bir eğitim araştırma hastanesinin acil servisine başvurmuş olup buradan yatışı yapılan tüm hastalar (32.544 hasta) araştırma kapsamına dahil edilmiştir. Çalışmada, araştırma kapsamına alınan hastaların aylık ortalama başvuru sayıları, yaş, cinsiyet, tanı, taburculuk şekli, ve ölüm oranı değişkenlerine göre pandemi öncesi ve pandemi dönemi karşılaştırmaları yapılmıştır. Pandemi döneminde pandemi öncesi döneme göre tüm aylarda hasta sayılarında azalma olmuştur. Değişim (azalma) oranı %12,6 ile %34 arasındadır. Pandeminin ilk aylarında (Mart, Nisan, Mayıs, Haziran) hasta sayılarındaki azalış oranı %25'in üstünde seyretmiştir. Pandemi döneminde acil servisten yatışı yapılan hastaların yaş ortalaması, ortalama yatış süreleri ve ölüm oranları artmış olup bu değişim istatistiksel olarak anlamlı bulunmuştur ($p<0,001$). Bulgular, pandemi gibi halk sağlığı krizlerine yönelik stratejilerin geliştirilmesi, hazırlıkların yapılması ve önlemlerin alınması gereğini ortaya koymaktadır.

Anahtar Kelimeler: Acil servis, COVID-19, Hastaneye yatışlar.

INTRODUCTION

In December 2019, a new coronavirus (SARS-CoV-2) emerged in Wuhan, China, and spread rapidly (Schildgen, Demuth, Lüsebrink & Schildgen, 2021). On January 30, 2020, the World Health Organization (WHO) declared this new coronavirus outbreak a "public health emergency of international concern" and named it COVID-19 (Chavez, Long, Koyfman & Liang, 2020; Guo, Zhou, Liu & Tan, 2020). The COVID-19 outbreak, which posed significant threats to healthcare systems worldwide, was declared a pandemic by the WHO on March 11, 2020 (Muqattash, Niankara & Traoret, 2020; World Health Organization [WHO], 2020). Turkey reported its first COVID-19 case on March 11, 2020. On 9 June 2023, there have been 767,750,853 confirmed cases of COVID-19 were reported, including 6,941,095 deaths reported to the WHO worldwide. In Turkey, 17,004,677 confirmed cases of COVID-19 have been confirmed, including 101,419 deaths (World Health Organization [WHO], 2023).

The COVID-19 pandemic, which rapidly spreads and affects the entire world, has had significant impacts on the use of healthcare services. The increases in cases have led to increased utilization of healthcare services in units such as emergency departments and intensive care units for the testing, vaccination, and treatment of patients with positive test results (Bravata et al., 2021; Goh et al., 2020; Siegel et al., 2021). However, the pandemic has also resulted in a significant decrease in the utilization of healthcare services due to factors such as implementation of lockdown measures, transition to remote learning in schools, travel restrictions, fear of COVID-19 transmission, deferral of non-COVID-19 emergency healthcare service demands by governments, and allocation of healthcare resources for COVID-19 (Gitmez, 2024; Kambris, Aiblooshi, Elamin & Ajja, 2023; Korku, 2023; Zielasek, Vrinssen & Gouzoulis-Mayfrank, 2021; Tsai & Yang, 2022; Yıldız & Bulut, 2021).

The COVID-19 pandemic has had a significant impact on emergency department (ED) visits, as well as on the overall utilization of healthcare services. In the early months of the pandemic, there was a notable decrease in ED visits for non-COVID-19-related health needs (Clark et al., 2023; Slagman et al., 2020; Yıldız & Bulut, 2021). The impact of the pandemic has led to differences not only in the number of patients, but also in variables such as mortality rates, age, sex, diagnosis, and average length of hospital stay. Although there has been a general decrease in pediatric ED visits (Pines et al., 2021a), there has been an increase in ED visits for children and adolescents with psychiatric problems (Turco et al., 2023). No significant change was observed in ED visits for patients with hepatitis compared to the pre-pandemic period (Science, Campigotto & Ng, 2022). On the other hand, there has been a decrease in ED visits

for surgical patients (Göksoy, Akça & İnanç, 2020). Studies conducted on cardiology patients have shown a decrease in ED visits during the pandemic (Lange et al., 2020; Pines et al., 2021b; Sokolski et al., 2021). Additionally, delays in accessing emergency care and an increase in out-of-hospital cardiac arrest cases have been observed in patients with acute cardiac problems (Bilir & Altuntaş, 2022). When comparing by gender, a decrease in ED visits by female patients has been observed (Nourazari et al., 2021; Hartnett et al., 2020). In conclusion, it can be said that the COVID-19 pandemic has different effects on patients who present to the ED based on their characteristics, highlighting the need for further research in this area.

In this study, changes in the number of patients presenting to the ED and hospitalized both before and during the pandemic were examined. A review of the literature revealed that previous studies on this topic have generally focused on the number of patients visiting the ED (Akova et al., 2023; Clark et al., 2023; Slagman et al., 2020; Sokolski et al., 2021; Yıldız & Bulut, 2021). In contrast to existing studies, this research specifically evaluates patients who not only visited the ED but were also hospitalized. The inclusion of patients admitted from the ED in the scope of the study can be interpreted as encompassing cases of relatively greater severity. This study aims to evaluate patients who visited the ED and were subsequently admitted to the hospital before and during the pandemic period. The research findings highlight changes in the number of patients hospitalized from the ED during the pandemic, indicating a shift towards cases that could be considered serious. While the impact of the COVID-19 pandemic may diminish, the risks associated with similar public health issues are likely to persist in the future. It is believed that the results of this study will provide valuable insights to policymakers, decision-makers, and healthcare professionals on how to prepare for future public health crises.

MATERIAL AND METHOD

The Type of Research and Research Question

The research was designed descriptively and retrospectively. The study examined changes in the total number of patients who sought ED and were hospitalized during the pandemic compared to the pre-pandemic period. Furthermore, a comparison was made between pre-pandemic and post-pandemic periods based on variables such as age, gender, diagnosis, average length of hospital stay, mortality rate, and discharge type for the patients included in the scope of the study. In this context, the research question has been determined as follows: "Are there differences in the number of patients presenting to the emergency department, age,

gender, length of stay, mortality rate, discharge type, and diagnoses between pre-COVID-19 and pandemic periods?"

Study Population

All patients who came to the ED of a training and research hospital and were subsequently admitted for a total period of 2 years, one year before the pandemic and one year during the pandemic, were included in the study. The period before the first case of COVID-19 was reported in Turkey was considered the "pre-pandemic period" (March 11, 2019, to March 10, 2020), and the period after the first COVID-19 case was reported was considered the "pandemic period" (March 11, 2020, to March 10, 2021). A total of 32.544 patients were included in the study, with 18.315 patients from the pre-pandemic period and 14.229 patients from the pandemic period.

Data Collection

The data were collected by the researcher by visiting the statistics department of the hospital where the study was conducted. The authorized personnel provided the list of patients who applied to the emergency department over a total period of 2 years, comprising one year before the pandemic and one year after the pandemic. The relevant data for these patients were then requested and gathered. As an inclusion criterion in the research, it has been determined that the patients included must have been hospitalized from the emergency department. As the data were obtained retrospectively from the hospital automation system, all hospitalized patients were included in the study without the need for sampling.

Statistical Analysis

The data were analyzed using the SPSS 21.0 program. Descriptive statistics such as numbers and percentages were used, along with the chi-square test for categorical variables and the independent samples t-test for continuous numerical variables, to compare patients before and after the pandemic. The assumption of normal distribution for the t-test was assessed by examining the kurtosis and skewness values of the data. It was observed that the kurtosis and skewness values were between +1 and -1, indicating that the normality assumption was satisfied.

Ethical Declaration

The study was conducted with all necessary approvals, including COVID-19 Research Authorization from the Ministry of Health, Ethical Committee Approval from Niğde Ömer

Halisdemir University Ethics Committee [No: 2021/13-1], and administrative permissions from the hospital management.

RESULTS

The characteristics of the patients included in the study, including the number of ED visits before and after COVID-19, gender, age, discharge status, and whether they received a confirmed diagnosis of COVID-19, are presented in Table 1. A total of 32.544 patients were admitted to the ED of the participating training and research hospital, with 18,315 patients in the pre-pandemic period and 14.229 patients in the pandemic period. A significant portion of these patients (60.7%) were women. The patients were classified into three age groups for evaluation: children, adults, and the elderly. It was determined that the majority (74.3%) fell into the adult category. When classified as under 18 years, 18-65 years, and over 65 years, more than half of the patients (53.6%) were in the 18-65 age range, and approximately one in every five patients (20.7%) were over 65 years old. Regarding the discharge status, a significant portion of the patients (64.2%) were discharged as recovered. The overall mortality rate was found to be 4.8%. Among the patients admitted during the pandemic period, 23.3% received a confirmed diagnosis of COVID-19.

Table 1. Characteristics of the Patients Included in the Study

		Number	%
Number of patients admitted from the emergency department	Pre-COVID-19 Period (March 11, 2019 - March 10, 2020)	18.315	56.3
	Pandemic period (March 11, 2020 - March 10, 2021)	14.229	43.7
	Total	32.544	100.0
Gender	Female	19.769	60.7
	Male	12.775	39.3
Age	<18	8.362	25.7
	18-65	17.433	53.6
	>65	6.749	20.7
Discharge Status (Classification 1)	Healing	20.898	64.2
	With Partial Healing	7.058	21.7
	Discharged voluntarily	2.210	6.8
	Was referred	821	2.5
	Death	1.557	4.8
Discharge Status (Classification 2)	Death	1.557	4.8
	Other*	30.987	95.2
COVID-19 Definitive Diagnosis	Yes	3.314	23.3
	No	10.915	76.7

* Healing, With Partial Healing, Discharged voluntarily, Was referred

The number of patients and changes by month during the pre-pandemic and pandemic periods are presented in Table 2. During the pandemic period, there was a decrease in the number of patients in all months compared to the pre-pandemic period. The rate of change (decrease) ranged from 12.6% to 34%. Within the first 20 days of the pandemic, there was a 34% decrease compared to the same period in the previous year. In the initial months of the pandemic (March, April, May, June), the rate of decrease in the number of patients was greater than 25%. Although the change decreased in July, August, and September, it again exceeded 25% in October.

Table 2. Numbers and Changes in Patients by Months in Pre-Pandemic and Pandemic Periods

	Pre-pandemic (N=18.315)		During the pandemic (N=14.229)		
		N		Difference (%)	
11-31 March 2019		1.059	11-31 March 2019	699	-34.0
April 2019		1.507	April 2019	1.115	-26.0
May 2019		1.566	May 2019	1.161	-25.9
June 2019		1.692	June 2019	1.184	-30.0
July 2019		1.784	July 2019	1.409	-21.0
August 2019		1.749	August 2019	1.546	-11.6
September 2019		1.631	September 2019	1.312	-19.6
October 2019		1.672	October 2019	1.240	-25.8
November 2019		1.371	November 2019	1.193	-13.0
December 2019		1.394	December 2019	1.088	-22.0
January 2020		1.315	January 2020	991	-24.6
February 2020		1.161	February 2020	929	-20.0
1-10 March 2020		414	1-10 March 2020	362	-12.6

Comparison of patients according to variables of age, length of stay, discharge status, and gender pre- and during the pandemic is presented in Table 3. In the study, the mean age of the pandemic patients (38.6 ± 26.8) was observed to be higher than the mean age of pre-pandemic patients (34.9 ± 27.3) and this difference was statistically significant ($p < 0.001$). When the age variable was considered categorically, It was found that the number of patients under 18 decreased during the pandemic period while the proportion of patients aged 18-65 and over 65 increased compared to the pre-pandemic period ($p < 0.001$). When examining the mean length of stay, it was observed that the mean length of stay for post-pandemic patients (4.3 ± 6.6) was higher than the mean length of stay for pre-pandemic patients (3.9 ± 6.6), and this difference was statistically significant ($p < 0.001$). The mortality rate of patients during the pandemic period (6%) increased compared to the pre-pandemic period (3.8%), and this difference was found to be statistically significant ($p < 0.001$). When analyzed by gender, it was determined that the proportion of female patients during the pandemic period (62.9%) increased compared to the pre-pandemic period (59.1%), and this difference was statistically significant ($p < 0.001$).

Table 3. Comparison of patients by Age, Length of Stay, Discharge Type, and sex in Pre-Pandemic and Post-Pandemic Periods

	Pre-pandemic (N=18.315)		During the pandemic (N=14.229)		P
	Mean	SD ^c	Mean	SD ^c	
Age (year)^a	34.9	27.3	38.6	26.8	<0.001
Length of Stay (day)^a	3.9	6.6	4.3	6.6	<0.001
Discharge Status^b					
Death	697	3.8	860	6.0	<0.001
Other	17,618	96.2	13,369	94.0	
Gender^b					
Female	10,826	59.1	8,943	62.9	<0.001
Male	7,489	40.9	5,286	37.1	

^a Independent samples t-test

^b Chi-square test

^c Standard deviation

The comparison of patients according to their diagnoses before and after the pandemic is presented in Table 4. When examining Table 4 it is observed that during the pandemic period the proportion of patients diagnosed with “pregnancy, childbirth, and puerperium-related diseases”, “respiratory system diseases” and “circulatory system diseases” increased compared to the pre-pandemic period. Although the number of patients with these certain diagnoses decreased during the pandemic period, their proportional increase was due to the overall decrease in the number of patients. This change was found to be statistically significant ($p < 0.001$). The number and proportions of patients diagnosed with (“digestive system diseases”, “symptoms and abnormal clinical and laboratory findings”, “genitourinary system diseases”, “endocrine, nutritional, and metabolic diseases”, “injuries, poisonings, and other external causes”, “conditions originating in the perinatal period”, “musculoskeletal and connective tissue diseases”, “nervous system diseases”, “mental and behavioral disorders”, “neoplasms”, “skin and subcutaneous tissue diseases”, “ear and mastoid process diseases” decreased both numerically and proportionally during the pandemic period. These changes (decreases) were found to be statistically significant ($p < 0.05$). However, no significant differences were observed in the number and proportion of patients diagnosed with diseases involving ‘blood and blood-forming organs and immune system diseases’; ‘infectious and parasitic diseases’; ‘eye and adnexa diseases’; and ‘congenital malformations, deformations, and chromosomal abnormalities’ during the pandemic period compared to the pre-pandemic period ($p > 0.005$).

Table 4. Comparison of Patients by Diagnoses in Pre-Pandemic and Pandemic Periods

	Pre-pandemic (N=18.315)		During the pandemic (N=14.229)		Chi- square test
	N	%	N	%	p
Pregnancy, Childbirth, and Puerperium-related Diseases	4.275	23.3	4.108	28.9	<0.001
Respiratory System Diseases	3.793	20.7	3.337	23.5	<0.001
Circulatory System Diseases	2.853	15.6	2.569	18.1	<0.001
Digestive System Diseases	3.460	18.9	2.527	17.8	0.009*
Symptoms and Abnormal Clinical and Laboratory Findings	3.738	20.4	2.113	14.8	<0.001
Genitourinary System Diseases	1.611	8.8	1.163	8.2	0.046*
Endocrine, Nutritional, and Metabolic Diseases	1.508	8.2	9.82	6.9	<0.001
Injuries, Poisonings, and Other External Causes	1.715	9.4	9.73	6.8	<0.001
Conditions Originating in the Perinatal Period	1.250	6.8	846	5.9	<0.001
Blood and Blood-Forming Organ and Immune System Diseases	681	3.7	542	3.8	0.669
Musculoskeletal and Connective Tissue Diseases	788	4.3	410	2.9	<0.001
Nervous System Diseases	1.142	6.2	337	2.4	<0.001
Infectious and Parasitic Diseases	377	2.1	288	2.0	0.828
Mental and Behavioral Disorders	505	2.8	226	1.6	<0.001
Neoplasms	363	2.0	229	1.6	0.013*
Skin and Subcutaneous Tissue Diseases	319	1.7	154	1.1	<0.001
Eye and Adnexa Diseases	134	0.7	87	0.6	0.190
Congenital Malformations, Deformations, and Chromosomal Abnormalities	67	0.4	56	0.4	0.686
Ear and Mastoid Process Diseases	58	0.3	21	0.1	0.002*

*p<0.05

DISCUSSION

In this study, patients who presented to the ED and were admitted to the hospital for 24 months, consisting of 12 months before the pandemic and 12 months during the pandemic, were evaluated. The results showed a decrease in the number of patients ranging from 12.6% to 34% in all months during the pandemic period compared to the pre-pandemic period. Furthermore, it was determined that the decrease in patient numbers was more pronounced in the early months. When reviewing the literature, it is observed that there has been a decrease in the overall number of patients visiting the ED during the pandemic (Akova et al., 2023; Clark et al., 2023; Fernández Miaja et al., 2023; Sokolski et al., 2021). A study conducted in Turkey found a 52.3% decrease in ED visits during the first three months of the pandemic (Yıldız & Bulut, 2021). Another study conducted in Turkey reported a decrease from 147.624 to 60.764 in pediatric ED visits following the COVID-19 pandemic (Akova et al., 2023). Similarly, a study in Europe revealed that there were 30.158 ED visits during the pandemic period compared to 20.226 visits before the pandemic (Sokolski et al., 2021).

In our study, the evaluated patients were those who required hospital admission from the ED. It can be inferred that these patients required inpatient care due to insufficient outpatient treatment and their conditions were more serious compared to those treated on an outpatient basis. A decrease in this patient group was also observed in the study. The decrease in ED visits during the COVID-19 outbreak can be attributed to various reasons. During the COVID-19 period, measures such as curfews were implemented to prevent the spread of the virus, and individuals were encouraged to stay at home. Schools were closed, and remote work practices were increased (Kambris et al. 2023; Zielasek et al. 2021; Tsai & Yang, 2022; Zakeri & Dehghan, 2020). Additionally, governments enacted legal regulations to reduce the risk of infection in hospitals and channelize health resources to COVID-19 patients by restricting the use of non-urgent health services (Butt et al., 2020; Parisien et al., 2020). Furthermore, due to the fear of contracting COVID-19, patients chose to postpone their healthcare needs. As a result, it can be stated that hospital and ED admissions decreased.

In this study, it was determined that the average age of patients admitted to the ED increased during the pandemic period. A study conducted in the United States (US) revealed a significant decrease in pediatric visits to the ED compared to adults during the COVID-19 pandemic (Pines et al., 2021b). Another study conducted in Morocco reported a decrease in pediatric visits to the ED due to maxillofacial trauma during the pandemic (Lahrach, Nini, Hattab, Aziz & Hattab, 2023). In Italy, a study found a significant increase in the average age of patients admitted to the ED during the COVID-19 outbreak, along with a decrease in the younger population (Andreozzi et al., 2020). The decrease in ED visits among the younger population can be attributed to lockdown measures, social distancing practices, and the transition to remote education, resulting in a decrease in infectious diseases among young individuals. Indeed, a study conducted in the US indicated a 58% decrease in pediatric ED visits for acute respiratory tract infections during the pandemic (Haddadin et al., 2021). The increased rate of elderly individuals seeking emergency care can be explained by the fact that they are more susceptible to the severe effects of COVID-19 compared to younger individuals.

The study revealed an increase in the average length of hospital stay and mortality among patients admitted to the ED during the pandemic compared to the pre-pandemic period. Studies conducted in China and Nepal on different patient groups also found an increase in hospital stays during the pandemic (Guo et al., 2022; Singh et al., 2021). A study in South Korea reported higher hospital mortality rates among critically ill patients during the pandemic (Kim et al., 2022). The reluctance of individuals with postponable healthcare needs to seek hospital

care during the pandemic, coupled with the increased likelihood of individuals with more urgent and significant illnesses seeking care, increased the proportion of patients with serious conditions among total patient admissions. As a result, it can be stated that the average length of hospital stay and mortality rates increased during the pandemic. Additionally, the increase in mortality rates during the pandemic can be attributed to deaths associated with COVID-19. A study conducted in Sweden found that the mortality rate of hospitalized COVID-19 patients was associated with the acceptance rate of COVID-19 patients (Strålin et al., 2022).

The study also observed a decrease in the number of both male and female patients who presented to the ED and were admitted during the pandemic, but a proportional increase was found among female patients. Two separate studies conducted during the COVID-19 pandemic in the United States showed a greater decrease in female patients' visits to the ED compared to males (Hartnett et al., 2020; Nourazari et al., 2021). Therefore, it can be concluded from the literature that different results have been obtained in this regard, and further studies are needed to investigate whether there are gender differences in ED visits.

The study determined an increase in hospital admission rates for “pregnancy, childbirth, and puerperium-related diseases”, “respiratory system diseases” and “circulatory system diseases” during the COVID-19 pandemic compared to the pre-pandemic period. The increase in respiratory system diseases can be attributed to COVID-19 cases. The increase in the rates of pregnancy, childbirth, and puerperium-related diseases can be explained by the limited postponement of these conditions. During the pandemic, patients with other diagnostic groups (“digestive system diseases”, “symptoms and abnormal clinical and laboratory findings”, “genitourinary system diseases”, “endocrine, nutritional and metabolic diseases”, “injuries, poisonings and other external causes”, “conditions originating in the perinatal period”, “musculoskeletal and connective tissue diseases”, “nervous system diseases”, “mental and behavioral disorders”, “neoplasms”, “skin and subcutaneous tissue diseases”, “ear and mastoid process diseases”) experienced both numerical and proportional decreases. The literature review reveals a decrease in hospital admissions even in disease groups traditionally considered emergencies, such as cardiology, surgery, and oncology patients. In a study conducted in Turkey by Göksoy et al. (2020), a 25% reduction in surgical ED admissions during the pandemic was reported. Similarly, a study in Portugal by Falcão et al. (2020) on cardiology patients identified up to a 50% decrease in ED visits. Additionally, a study in Italy by Qua Quarini et al. (2020) demonstrated that cancer patients postponed their treatments during the pandemic. The decrease in hospital admission rates for specific diagnoses during the

COVID-19 pandemic can be associated with the prioritization of COVID-19 patients in hospitals and delayed hospital admissions for non-COVID-19-related illnesses.

CONCLUSION

This study evaluated patients who presented to the ED and required hospital admission during the COVID-19 pandemic and the pre-pandemic period, revealing significant changes in the pandemic in the included patients. The patients included in the study were those who required hospital admission as their conditions could not be managed with outpatient treatment alone, indicating that they had relatively more severe conditions. The study identified significant decreases in the number of patients during the pandemic. Therefore, it can be inferred that even some critically ill patients did not receive or could not receive treatment during the pandemic. The study also observed an increase in hospitalization duration, average age, and mortality rates among the patients. Furthermore, changes in patient ratios were identified based on gender and diagnostic groups. The findings highlight the need for effective planning and utilization of budget, manpower, and other important resources of healthcare institutions during pandemics and similar crises. The prioritization of patients and services during crises can create a disadvantageous situation for other patient groups. Therefore, alternative service flow planning that considers the needs of patients not at the forefront of the crisis is deemed crucial. Public health authorities should have a well-designed plan and service flow process that can manage increased admissions, prevent infection spread, and allocate sufficient resources during crisis periods. The findings of this study can serve as a guide in this regard.

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