

Demographic Characteristics of Patients Registering To The Emergency Department

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ARTICLE INFO	ABSTRACT
<p>Article Type: Research Article</p> <p>Keywords: Emergency Service, Covid-19 Pandemic , Unnecessary Visits, Overcrowding</p> <p>Corresponding Author(s) Ferhat Baş</p> <p>E-mail: drferhatbas@gmail.com</p> <p>Article Application Date: 13.10.2023</p> <p>Article Acceptance Date: 05.09.2024</p>	<p><i>The aim of this article is to examine the causes and consequences of overcrowding in emergency departments. Particularly, it seeks to investigate how the surge in admissions, especially post-COVID-19 pandemic, has intensified the density in emergency department. The study focuses on analyzing one-year patient admissions at a training and research hospital in Turkey, considering seasonal variations as well. Additionally, the article aims to highlight the impact of emergency department crowding on healthcare quality and patient satisfaction, and proposes recommendations to mitigate this issue. Ultimately, the article aims to provide a comprehensive understanding of emergency department overcrowding and contribute scientifically towards potential policy interventions</i></p> <p><i>This study examined one-year patient admissions at the Emergency Department of Yenimahalle Training and Research Hospital. Data were collected from October 2021 to September 2022. Demographic characteristics of patients, timing of visits, waiting times, and reasons for admission were analyzed. Data analysis was conducted using MS Excel and subjected to statistical evaluation.</i></p> <p><i>This study examined overcrowding in the emergency department at a training and research hospital, identifying unnecessary visits, staff shortages, and the impact of the Covid-19 pandemic as key factors. Recommendations to mitigate overcrowding include improving outpatient services, increasing healthcare personnel and resources, and educating the public on appropriate emergency care use. Implementing these measures will help reduce overcrowding in emergency departments and ensure that patients receive faster and more effective healthcare services</i></p>

1. Introduction

The aim of this study is to examine the emergency department admissions whose crowdedness is increasing due to the density of admissions especially after the Covid-19 disease and to investigate the causes of crowding. For this purpose, one-year patient admissions to the emergency department of a training and research hospital affiliated to the Ministry of Health between October 2021 and September 2022 were examined. Overcrowding of the emergency departments (ED) has been a pain point in hospitals around the world. The “frequent-flyer,” which visits the emergency services at a much higher-than-average rate, accounts for almost a third of emergency services visits, even though they represent only a small fraction of all emergency services patients (Shehada et al., 2019).

Emergency departments are the departments that serve on a 24-hour basis and treat acute health problems such as accidents, gunshot wounds, heart attacks, strokes, traumas, poisonings and many more. In the Ministry of Health circular 2012/10; Trauma cases of any size, cases hospitalized after emergency department admissions, cases receiving medical intervention, cases under observation, cases referred to another health service provider or referred from another health service provider are emergency service patients (Ministry of Health, 2012).

Crowding in emergency departments is an increasingly common situation throughout the world (Moskop et al., 2009). The causes of emergency departments crowding include a complex network of intertwined processes ranging from hospital workflow to viral outbreaks (Hoot & Aronsky, 2008). In the last 20 years, emergency departments have evolved towards the provision of primary health care services as well as acute emergency care (OECD, 2020).

As in the rest of the world, the pandemic in Turkey has led to the cessation of elective surgeries and outpatient clinic services in some hospitals and this has brought about an increase in emergency admissions. 2019 OECD Waiting Times Policy Survey 13 of the 24 countries that sent full responses stated that waiting time in the emergency department was a problem. An increasing number of OECD countries are also measuring wait times in other areas, including hospital emergency services visits, mental health services or primary care for cancer care (OECD, 2020). The appropriateness and full-time availability of emergency health departments also affect the quality of health care and patient satisfaction. It is also one of the seven dimensions included in the Hospital Set of Accreditation Standards in Emergency Health Services (Kayral et al., 2016).

As a result of the patients who cannot get an examination appointment in the polyclinic, there is a density in the emergency department and emergency patients cannot receive timely and necessary health services as a result of applying to the emergency department to be examined (Turkish Emergency Medicine Association, 2020). Crowding in emergencies prevents patients from receiving adequate and timely emergency health services. Of the 600 million outpatient clinic admissions in hospitals in Turkey, 150 million are made to emergency departments. While unnecessary applications are the most important reason for crowding in the emergency department, staff shortages are another reason (Turkish Society of Emergency Medicine, 2020). 13 of the 24 countries that submitted full responses to the OECD Waiting Times Policy Survey for 2019 stated that waiting time in the emergency department was a problem (OECD, 2020).

In the first part of the study, information about the causes and consequences of overcrowding in emergency departments was given. In the second part, the results of the analysis of the emergency admissions of the hospital examined in the study are included. In the last section, suggestions were made about what can be done to prevent emergency crowding.

2. Crowding In Emergency Services

Increasing patients’ satisfaction with health care is the main health policy goal. Fast access to healthcare is one of the factors that increase patient satisfaction (OECD, 2020). The department where patients expect to receive the fastest health service is the emergency services. As in, the access period to health services in many OECD countries has been prolonged with the Covid-19 pandemic (OECD, 2020). Prolonged waiting times lead to worsening of health outcomes. It suggests that prolonged waiting may lead to worsening of the disease’s symptoms, worsening of the patient’s condition, and a less positive clinical outcome, and may also increase the likelihood of unplanned emergency admission (Bernstein et al., 1997; Rexius et al., 2004; Sobolev & Fradet, 2008).

In the healthcare industry, waiting times have always been a problem. Waiting times are a dynamic phenomenon (Siciliani & Hurst, 2005). Regardless of the type of health care needed, waiting times are a result of the demand for health services being greater than the supply. If demand exceeds supply, it increases over time, and if supply exceeds demand,

it decreases. Both demand and supply are likely to increase over time. Changes in the conditions of examination and treatment lead to a change in demand. This dynamic element indicates that if demand grows faster, periods of increased supply can be associated with increased waiting times. Policies to reduce waiting times, on the other hand, can increase supply, reduce or better manage demand, or both. It can be caused by capacity constraints or inefficiencies in referral processes and healthcare delivery, which can lead to a queue and patients having to wait.

The right mix of policies to address long waiting times is likely to depend on the health care system in each country. Successful approaches, however, typically combine specifying an appropriate maximum waiting time with interventions on the supply and demand side and regular monitoring of progress. In OECD countries, the most common policy used to reduce waiting times due to specialist consultations and elective treatments is to set a maximum waiting time. Maximum waiting times can then be used as a target for the provider and/or as a guarantee for the patient (as in the UK and Finland), and penalties may be imposed for providers who do not meet these targets. Waiting time guarantees can also be linked to patient selection policies (as in Denmark and Portugal), whereby patients are offered a choice of more providers (including private hospitals) when they approach or reach their maximum waiting time at no additional cost (OECD, 2020).

When waiting times are set as a goal, regulators and reimbursement agencies can use this as an accountability measure for healthcare delivery, with possible consequences when the goal is not met. The supply of treatment is determined by the overall capacity, which depends on the health workforce and its composition and infrastructure and equipment. But it is not only the availability of labor and capital that determines the supply, but also the productivity in which capacity is used. Efficiency will depend on communiqué-based arrangements made at the level of health workers and payment systems and organization. When health care workers are paid with a service charge rather than a salary or per capita payment, and when provider payments are based on activities, incentives to increase supply are stronger (Siciliani & Hurst, 2005).

Supply-side policies that increase resources and/or efficiency can be implemented to reduce wait times. Other policies act on the demand side and mostly aim to prioritize patients based on the need to avoid adding patients to the waiting list when the expected benefits are little or no at all, to reduce inappropriate referrals, tests and procedures, or to redistribute waiting times among patients with varying degrees of severity (so that patients with more severe conditions wait less) (OECD, 2020).

However, supply-side policies on their own are unlikely to deliver the expected reductions in wait times. The main risk is that the additional supply is offset by an increase in demand through an increase in referrals, tests and procedures, some of which are not suitable. Countries should ensure that supply-side policies are linked to the implementation of maximum waiting times to avoid frustration. Maximum wait times can serve as an indirect policy lever to ensure that providers do not offset them by increasing demand (albeit supply-driven demand or improper referrals) when supply increases (OECD, 2020).

Policymakers can also offer a variety of complementary and more direct approaches on the demand side to reduce waiting times for discretionary treatment, but any deficit reduction in demand can be politically difficult to accept. Clinical prioritization tools that distinguish between patients with different health benefits and severity can improve the referral process and the composition of patients on the list. Prioritization policies can also help reallocate wait times by allowing patients with more severe conditions to wait less than those with less severe conditions. However, more and more countries are taking advantage of the potential of new technologies (e.g. teleconsultations) to improve timely access to health services. Covid-19 crisis accelerates implementation of teleconsultation and other digital health tools (OECD, 2020).

In the literature, those who apply to the emergency service 4 or more times per year are expressed as “frequent emergency service users”. In two studies examining frequent emergency department admissions, it was stated that the rate of frequent emergency admissions among total emergency department admissions was 14%. Cardiovascular and gastrointestinal diseases are important factors in emergency department admissions (Dufour et al., 2019; Huang et al., 2003). A similar report found that the most frequent 500 users of an emergency services accounted for 8% of total visits, and that 29% of these visits may be eligible for primary care (Dent et al., 2003).

Another reason for overcrowding in the emergency department or services? is insufficient staffing (Derlet & Richards, 2002; Kyriacou et al., 1999; Richards et al., 2000). A study by the American Association of Emergency Specialists found that the average nurse cared for 4 patients at the same time and the average doctor cared for 10 patients at the same

time (Schneider et al., 2003). The lack of adequate service beds also affects the crowd in the emergency (Cooke et al., 2004; Derlet et al., 2001; Compiler & Richards, 2002; Hwang, 2006; Richards et al., 2000). Patients who are hospitalized from the emergency department in Turkey should be transferred to the relevant clinic within a maximum of 2 hours (Ministry of Health, 2022). Another reason for the crowding in emergencies is the delays in laboratory tests (Derlet et al., 2001; Richards et al., 2000).

Emergency services crowding also affects the quality of health care. The most negative consequence of crowding in emergency services is death, and a significant, positive relationship has been observed between mortality rates and the number of weekly visits (Miró et al., 1999). When emergency services become overcrowded, rates of leaving without examination increase (Kyriacou et al., 1999). At least half of those who leave without examination need medical attention or are even hospitalized (Baker et al., 1991; Bindman et al., 1991; Rowe et al., 2006).

Another dimension of emergency department crowding is patient costs. Patients who are hospitalized in the emergency services for more than a day also stay in the hospital longer and the costs of treatment increase (Krochmal & Riley, 1994).

To eliminate crowding in the emergency services, it is necessary to increase the number of observation units and beds with an increase in resources and staff (Hoot & Aronsky, 2008). The employment of extra staff in the emergency department has been shown to shorten the waiting time by up to 35 minutes and reduce emergency departures without examination by 37% (Bucheli & Martina, 2004; Donald et al., 2005; Shaw & Lavelle, 1998).

3. Analysis and Findings

The admissions made to Yenimahalle Training and Research Hospital Adult Emergency Department between 01/10/2021-31/09/2022 were included in the study. The study was analyzed in quarterly periods in order to see the seasonal effect. Permission was obtained from the Yenimahalle Training and Research Hospital Ethics Committee for the study. The analyses performed in the study were performed by using Ms Excel Program.

Emergency department admissions were crowded in the summer rather than in the autumn and winter period, when there were epidemics of cold, flu, etc. The number of applications in the summer semester is more than 1.5 times higher than the number of applications in the summer and autumn semesters. It is evaluated that the reason for the increase in applications in the summer months is the leave period, the physicians do not take care of more patients than the number of patients defined in the Central Patient Appointment System in the summer months and especially in the summer period, the physicians take work stoppage action.

Some of the data obtained from the hospital were duplicate records, and when the duplicate 128,814 data were removed, the number of hospital admissions decreased to 194,320 within a year. Of the patients who applied, only 19 patients were treated with daily hospitalization. The average age of the applicants is 40.22 and 52.43% of them are women. There is a statistically significant difference between the mean age according to gender among the applicants. While 97.57% of the emergency department applicants were under the roof of the Social Security Institution, 2.43% of the health services were financed by other institutions and organizations. While 1.61% of emergency applications were provisioned as work accidents, 1.16% as traffic accidents, emergency applications were provisioned from 96.67%. While 93.82% of the applicants were discharged, 1.57% were hospitalized, 1.13% were referred to another hospital and 0.9% died.

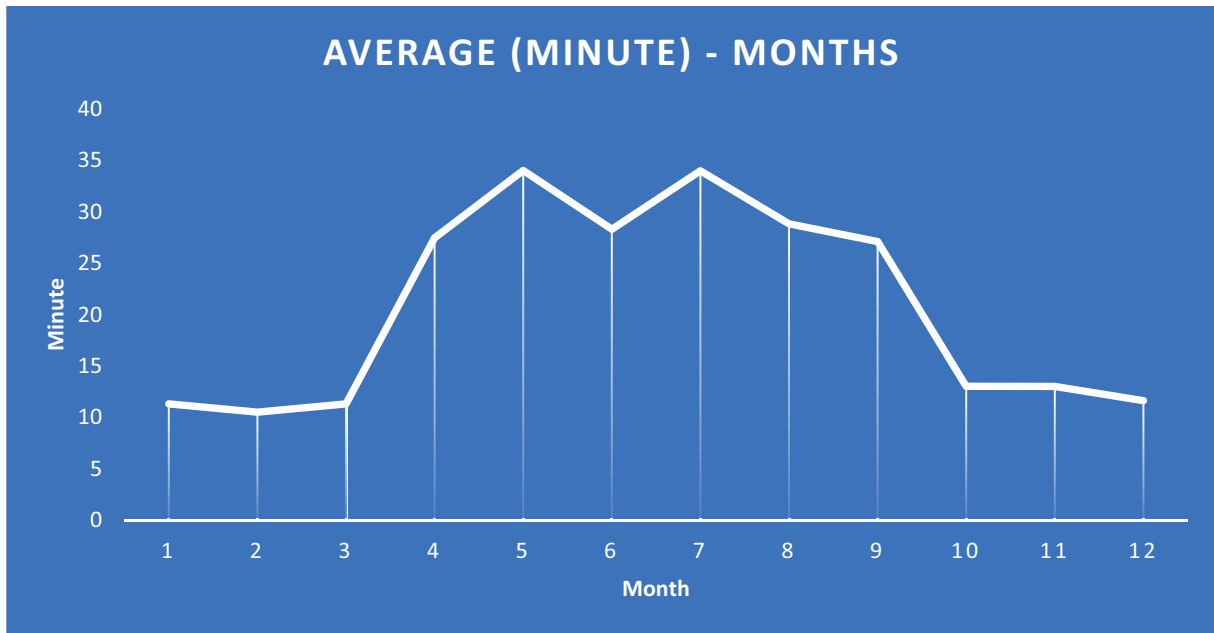
345 of the patients admitted to the emergency department (0.018%) were processed within the scope of the tourist's health. Patients of 68 different nationalities were admitted to the emergency department. The highest number of foreign national applications were from Syria (339 times), Iraq (291 times) and Uzbekistan (110 times).

55.41% of those admitted to the emergency department are patients between the ages of 18-45. 11.5% of the patients admitted to the emergency department are patients aged 65 and over. 47.42% of emergency department admissions were made between 08-16 hours when polyclinics were open, 41.77% between 17-24 hours and 10.82% between 24 and 8 a.m.

When the number of applications is examined by days; the number of applications in the first two days of each month is higher than on other days. When evaluated on a monthly basis, the highest number of emergency applications was in July. Patients who apply to the emergency department in the Autumn and Winter period wait for about 12 minutes to be examined, while the waiting time for the examination in the Spring and Summer period can be up to 34 minutes. The monthly distribution of hospital admissions is given in Table 1.

Table 1: Monthly Evaluation of Adult Emergency Department Admissions

MONTHS	NUMBER OF APPLICATIONS	REFERENCE %	AVERAGE WAITING TIME (MINUTES)
JANUARY	12.921	6,89%	11:31
FEBRUARY	10.714	5,72%	10:51
MARCH	12.992	6,93%	11:31
APRIL	13.161	7,02%	27:47
MAY	16.670	8,90%	34:03
JUNE	18.214	9,72%	28:31
JULY	25.738	13,73%	34:00
AUGUST	19.471	10,39%	29:24
SEPTEMBER	18.831	10,05%	27:10
OCTOBER	13.118	7,00%	13:02
NOVEMBER	12.793	6,83%	13:01
DECEMBER	12.783	6,82%	12:02
TOTAL			

**Figure 1: Plot of Wait Times**

There is a discrepancy between the first triage procedure performed in the emergency services and the area examined. The triage of 61.96% of the patients who were triaged as green field patients was converted to yellow area. Comparison of inspection areas and triage is given in Table 2.

Table 2: Emergency Department Applications Triage/Inspection Unit Compliance

Triage/Inspection Unit	N	%
Red	1204	0,62%
Emergency Service Yellow 2	1181	0,61%
Emergency Service Green 1	10	0,01%
Yellow	191034	98,31%
Emergency Service Yellow 2	70154	36,10%
Emergency Service Green 1	120410	61,96%
Emergency Service Green 2	163	0,08%
Green	2081	1,07%
Emergency Service Yellow 2	108	0,06%
Emergency Service Green 1	1865	0,96%
Emergency Service Green 2	107	0,06%

When the applications to the emergency department are evaluated on a day-by-day basis, it is seen that the number of applications made on Mondays (15.22%) is less on weekends than on weekdays. Approximately half of the patients were admitted to the emergency department between 08-16 on both weekdays and weekends, while only 10% were admitted to the emergency department after midnight. While 47.67% of the red field patients were admitted to the emergency department between 08-16 hours, 40.95% were admitted to the emergency department between 17-13 hours and 11.38% after midnight.

Table 3: Emergency Department Referrals by Day and Time Zone

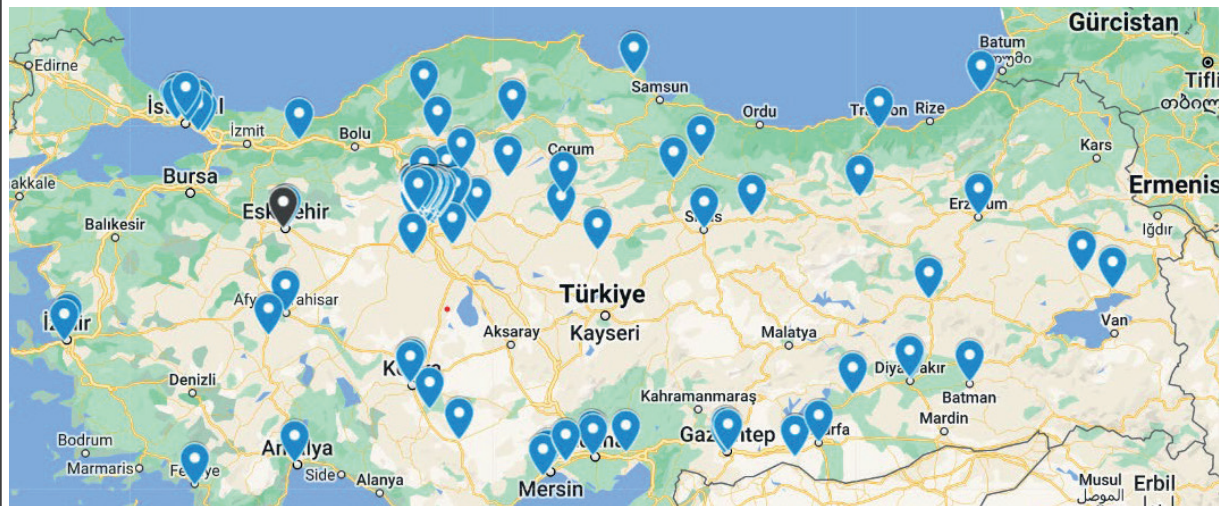
DAY	APPLICATION RATE	TIME ZONES		
		08-16	17-23	00-07
Monday	15,22%	48,64%	40,96%	10,41%
Tuesday	14,32%	46,99%	42,74%	10,26%
Wednesday	14,54%	47,82%	41,83%	10,36%
Thursday	14,17%	47,85%	41,83%	10,32%
Friday	14,36%	47,65%	41,90%	10,46%
Saturday	13,57%	46,93%	41,27%	11,80%
Sunday	13,81%	45,88%	42,17%	11,95%

Of the patients admitted to the emergency department once, 75.44% admitted once, 15.59% twice, 4.97% three times, and 4% (5,438 admissions) four times a year or more, who were considered frequent emergency services users. The average number of referrals for frequent emergency services users is 41 (min:4-max:59), while the median number of referrals is 4. The average age of frequently admitted users was found to be 41.32 years. Of those admitted to the emergency department frequently, 38.85% admitted to the hospital four times, 20.08% five times, 12.18% six times, and 6.93% seven times. 57% of frequent admissions are female patients. The most common admission to the emergency department was a male patient from the age of 34 who was admitted 59 times with the diagnosis of hemorrhoids.

Table 1: Diagnoses Received by Frequent Emergency Applicants

ICD code	n	%
M79- SOFT TISSUE DISORDERS	1356	60,22%
Z00-GENERAL INSPECTION AND INSPECTION	473	11,38%
R10-ABDOMIAL AND PELVIC PAIN	338	5,80%
J06-ACUTE UPPER RESPIRATORY TRACT INFECTION	306	4,75%
M54-DORSALJI	267	3,62%
R07-PAIN IN THE THROAT AND CHEST	230	2,69%
J39-UPPER RESPIRATORY TRACT DISEASES	203	2,09%
Z03-SUSPECTED DISEASES	181	1,66%
R11-NAUSEA VOMITING	175	1,55%
N30-CYSTITIS	136	0,94%
L50-URTICARIA	130	0,86%
OTHER	124	4,43%

The average age of frequent admissions to the emergency department is 41.1 years and all patients who frequently apply to the emergency department are covered by social security. These findings are consistent with the literature. When the residence addresses of the frequent admissions to the hospital are examined, it is seen that there are applications from 36 different cities.

**Figure 2:** Distribution of Frequent Emergency Service Applicants by Their Residential Address

When the diagnoses of patients who frequently apply to the emergency department are examined; 60.22% of soft tissue disorders, 11.38% of general examination without complaints and known diagnosis, 5.80% of abdominal and pelvic pain and acute upper respiratory tract diseases.

4. Discussion

Improper use of emergency services causes applicants to have late access to health care. Knowledge of socio-demographic characteristics in emergency department admissions will help to solve the problem. Approximately 10% of the admissions to hospital outpatient clinics are admitted to the emergency department. Considering that the hospital where the analysis is performed is a tertiary education and research hospital, it is necessary not to apply to a tertiary care hospital for the treatment of problems such as flu and flu that can be solved in other health institutions.

The fact that approximately half of the applications were made during working hours and that more than half of the applicants were between the ages of 18-45 may have been due to the desire for quick access to the outpatient clinic service (Gindi et al., 2016; Köksal et al., 2009; Niska et al., 2010). It was observed that approximately 62% of the applicants applied to the emergency department due to non-urgent problems. This rate is higher than the rates stated in the literature (Çevik & Tekir, 2014; Kilicaslan et al., 2005).

It was observed that an average of 400 patients were examined daily in the emergency department and this number increased to 800 in the summer months. This situation causes delays in the service intake of patients who need real emergency services. There was a strong statistically significant positive correlation ($r=0.806$, $p<0.001$) between the number of patient admissions and waiting times.

Similar to the literature, the most common reason for application is musculoskeletal system diseases starting with the "M" code (63.84%). The rate of admission from the emergency department is 1.57% and this rate is compatible (Ataman et al., 2011; Niska et al., 2010).

There are extensive studies in the literature on frequent emergency services admissions. However, frequent applicants do not show homogeneous group characteristics. Studies have shown that frequent admissions are associated with the number of emergency services visits per year with mental illness, substance and alcohol dependence (Billings & Raven, 2013; Ledoux & Minner, 2006). In our study, information on this subject could not be given due to the lack of such information in the anamnesis of frequently using patients.

Employment status and state insurance are often associated with high ED use (Gill & Riley, 1996; Yusuf et al., 2011). For example, younger age groups have also been associated with overuse of the emergency services, either because of the characteristics of the neighborhood surrounding the hospital or the type of hospital from which the data were obtained (Akseli, 2013; Gill & Riley, 1996).

5. Conclusion

In this study, an analysis of the emergency department visits at a training and research hospital was conducted, examining the reasons behind overcrowding in emergency departments. The findings identified the causes of overcrowding and suggested measures to mitigate it:

- 1. Unnecessary Visits:** Patients often visit the emergency department for non-emergency conditions due to difficulties in accessing outpatient services and inadequacies in the appointment system. This contributes to overcrowding and delays in care for truly urgent cases.
- 2. Staff and Resource Shortages:** Insufficient healthcare personnel and inadequate medical equipment in emergency departments lead to service disruptions and prolonged waiting times.
- 3. Pandemic Impact:** The Covid-19 pandemic caused significant disruptions in healthcare services and access, resulting in a notable increase in emergency department visits.
- 4. Lack of Education and Awareness:** Patients' lack of information about when to seek emergency care results in an increase in unnecessary visits.
- 5. Access to Healthcare Services:** Problems in accessing primary healthcare services drive patients to seek care directly from emergency departments, increasing their burden and reducing service quality.

Based on these findings, the following recommendations are proposed to reduce overcrowding in emergency departments:

- Enhance the efficiency of outpatient services and improve the appointment systems.
- Ensure sufficient healthcare personnel and medical equipment in emergency departments.
- Increase the capacity of emergency departments and prepare adequately for extraordinary situations like pandemics.
- Educate and inform the public about appropriate emergency department usage.
- Facilitate access to primary healthcare services and expand these services.

These measures will contribute to reducing overcrowding in emergency departments and ensure that patients receive faster and more effective healthcare services.

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