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ORIGINAL ARTICLE

Evaluation of patients who re-admitted to the emergency department within 24 hours

Evren Ekingen[1]
Ozgur Bayar[1]
Murat Buyuksekerci[2]

1. *Department of Emergency, Ankara Mamak State Hospital*
2. *Department of Pharmacology, Ankara Mamak State Hospital, email: drmuratbs@gmail.com*

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Corresponding Author:
Murat Buyuksekerci
Department of Pharmacology, Ankara Mamak State Hospital
Email: drmuratbs@gmail.com

Abstract

Objective: It was conducted to investigate the demographic and clinical characteristics of patients who re-admitted to the emergency department within 24 hours and to contribute to studies on reducing the re-admission rate.

Methods: The data of patients who re-admitted to the emergency department within 24 hours between November 2021 and September 2023 in a secondary level public hospital were retrospectively examined. Data regarding the patients' demographic information, admission dates and times, clinical characteristics, examinations, diagnoses, consultations, hospitalization and referral status were obtained from the hospital automation system.

Results: 496270 patients admitted to the emergency department during the study period. 6991 (1.4%) of the patients were admitted to the emergency department again within 24 hours. 40.3% of these patients were between the ages of 19-35 and 52.4% were women. The most common reason for re-admission to the emergency department was upper respiratory tract diseases. It was determined that 66.7% of the patients applied to the emergency department again 13-24 hours after their first admission. In their second admission, 43 patients were hospitalized or transferred for various reasons; It was determined that 1 of these patients died 5 months after being admitted to the intensive care unit.

Conclusion: Effective triage practices, directing green area patients to family physicians, making the referral chain effective, increasing health literacy, making an accurate diagnosis, allocating appropriate time to patients and explaining the treatment and expectations from treatment, ensuring that patients referred to outpatient clinics are evaluated as soon as possible and returned to the emergency department will significantly reduce applications.

Key words: emergency service; readmission; 24 hours

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Introduction

Emergency departments are designed to intervene quickly for patients, utilizing triage systems to prioritize care. In Turkey, the number of emergency department visits has grown significantly faster than the population. The national population increased by 6% from 79.8 million in 2016 to 84.6 million in 2021. However, emergency department visits surged by 39.8%, rising from 92.6 million to 129.5 million during the same period. Conversely, outpatient clinic visits decreased

Table 1. Number and Rates of Patient Applications

History	November 2021-December 2021	January 2022 December 2022	January 2023-September 2023	Total
Hospital Application (ES +OPC) (n)	88860	647998	541314	1278172
ES Application (n)	33612	281751	180907	496270
Number and percentage of ES Re-Applications (n,%)	243 (0.72%)	3457 (1.22%)	3291 (1.81%)	6991 (1.4%)

Table 2. Demographic Information of Patients Who Re-Admitted to the Emergency Department Within 24 Hours

	Number	Percentage (%)
Gender		
Male	3330	47.6
Female	3661	52.4
Age group		
0-18 years old	632	9.1
19-35 years old	2817	40.3
36-50 years old	1700	24.3
>50 years old	1842	26.3

Table 3. Clinical Characteristics of Patients Who Re-Admitted to the Emergency Department Within 24 Hours

	Number (n)	Percentage (%)
Re-Application Period		
0-12 hours	2330	33.3
13-24 hours	4661	66.7
Observation in-patient	671	9.6
Lab	3215	46
Ultrasonography	42	0.6
CT	860	12.3
MRI	8	0.1
Consultation	103	1.5
Service or Intensive Care Hospitalization	16	0.2
Service Hospitalization	7	0.1
Intensive Care Hospitalization	9	0.1
Referred another hospital	27	0.4
Service Referral	3	<0.1
Intensive Care Referral	24	0.3
Exitus	1	<0.1

Table 4. Diagnoses of Patients Who Re-Admitted to the Emergency Department within 24 Hours			
	Diagnosis	**Number(n)**	**Percentage (%)**
ICD-10 Code			
J00-J06	Upper Respiratory Diseases	1001	26
M79.1	Myalgia	736	19.1
M70-73-79	Soft Tissue Disorders	564	14.6
R10	Stomach ache	559	14.4
N30-39-23	Acute Cystitis, Urinary Tract Infection, Renal Colic	534	14.5
A04-08 K52	Gastroenteritis, Diarrhea	443	11.4

Table 5. Relationship of the Most Common Patient Diagnoses with Second Application Time Intervals				
	Reapplication Deadlines			
	0-12 Hours	13-24 Hours	Total	
Diagnosis				P value
Upper Respiratory Dis.	356 (35.5%)	645(64.4%)	1001	p<0.001
Myalgia	220(29.9%)	516(30.1%)	736	p<0.001
Soft Tissue Disorders	168(29.8%)	396(30.2%)	564	p<0.001
Stomach ache	190(34%)	369(66%)	559	p<0.001
Acute Cystitis, Urinary Tract İnfections, Renal Colic	171(32%)	363(68%)	534	p<0.001
Gastroenteritis, Diarrhea	198(44.7%)	245(55.3%)	443	p=0.122
Total	**1303(34%)**	**2534 * (66%)**	**3837**	p<0.001

*p<0.001; Patients admitted between 13-24 hours and those admitted within the first 12 hours were compared with the chi-square test.

from 199.5 million to 136.9 million [1].

This overcrowding in emergency departments leads to several problems: reduced physician time per patient, increased risk of errors, longer wait times, and a higher frequency of violent incidents [2-5]. The rate of readmission to the emergency department within 24 hours is a recognized indicator of patient care quality [6]. Additionally, readmissions contribute to the rising workload in emergency departments [7, 8].

This study aimed to investigate the demographic and clinical characteristics of patients readmitted to the emergency department within 24 hours. Our goal is to contribute to research focused on reducing readmission rates.

Methods

This retrospective study examined data for patients readmitted to the emergency department within 24 hours at Mamak State Hospital, a secondary healthcare institution, between November 2021 and September 2023. Data obtained from the hospital's electronic system included patient demographics (name, surname, age, gender), admission details (date, time), International

Classification of Diseases (ICD-10) diagnosis codes, examination findings, consultations performed, service admissions, and referral statuses.

Table 6. Relationship between Age Groups and Second Application Time Intervals

	Reapplication Deadlines			p
	0-12 Hours	13-24 Hours	Total	
Age Groups				
0-18 years old	237	395 *	632	p <0.001
19-35 years old	981	1836 *	2817	p <0.001
36-50 years old	563	1137 *	1700	p <0.001
>50 years old	549	1293 *	1842	p <0.001
Total	**2330**	**4661**	**6991**	

Data analysis was performed using IBM SPSS Statistics for Windows Version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). Descriptive statistics (frequency distribution, percentages) were used to analyze the research data. Chi-square tests were employed to analyze the created cross-tables. A p-value less than 0.05 ($p<0.05$) was considered statistically significant.

The research ethics committee approval was obtained from Yildirim Beyazit University Yenimahalle Education and Research Hospital Clinical Research Ethics Committee. (Decision No: E-2023-77 Date: 20.12.2023)

Results

During the study period, a total of 1,278,172 patients were admitted to the hospital (emergency department and outpatient clinics combined). Emergency department admissions accounted for 38.8% (n=496,270) of all admissions, while outpatient clinic visits comprised the remaining 61.2% (n=781,902). We found that 1.4% (n=6,991) of patients seen in the emergency department were readmitted within 24 hours (Table 1).Among the readmitted patients, 47.6% (n=3,330) were male and 52.4% (n=3,661) were female. Regarding age distribution, 9% (n=632) were aged 0-18, 40.3% (n=2,817) were aged 19-35, 24.3% (n=1,700) were aged 36-50, and 26.3% (n=1,842) were over 50 years old (Table 2).For patients readmitted within 24 hours, 33.3% (n=2,330) returned within the first 12 hours, and 66.7% (n=4,661) returned between 13-24 hours. Among the readmitted patients, 9.6% (n=671) were placed under observation, 46% (n=3,215) required various laboratory tests, 0.6% (n=42) underwent ultrasonography, 12.3% (n=860) underwent computed tomography (CT), 1.5% (n=8) underwent magnetic resonance imaging (MRI), and 1.5% (n=103) required consultation. Notably, 0.2% (n=16) of readmitted patients were admitted to the ward or intensive care unit (ICU), and 0.4% (n=27) were transferred to another hospital. One patient admitted to the ICU with COVID-19 pneumonia and pulmonary embolism unfortunately died five months later (Table 3).The most frequent diagnoses for patients readmitted within 24 hours were: upper respiratory tract infections (14.3%, n=1001), myalgia (muscle pain) (10.5%, n=736), soft tissue disorders (8.1%, n=564), abdominal pain (8.0%, n=559), acute cystitis and renal colic (7.6%, n=534) gastroenteritis (6.3%, n=443) (Table 4). The first 5 diagnoses of patients who were re-evaluated after re-admission and hospitalized or referred to another center were acute myocardial infarction (n=10), pneumonia (n=6), cerebrovascular diseases (n=3), pulmonary embolism (n=2), hemothorax and pneumothorax (n=2), respectively. When the relationship between the diagnoses, which are the most common reasons for recurrent admission, and the application time was examined, it was determined that 66% of the patients made their second application 13-24 hours after their first application. It was determined that statistically more patients were readmitted in the second 12 hours compared to the first 12 hours for all the most common patient diagnoses ($p<0.001$) (Table 5). When the relationship between age ranges and second application times was examined, it was determined that the re-admission rates were statistically more significant in the second 12 hours compared to the first 12 hours in all age groups ($p <0.001$) (Table 6).

Discussion

Studies consistently report a rise in emergency department admissions each year, with repeat visits contributing significantly to this increased workload. Beştemir et al. [1] demonstrated a 39.8% surge in emergency department admissions from 2016 to 2021, despite a population increase of only 6%. In our study, conducted between November 2021 and September 2023, emergency department visits accounted for 38.8% of all hospital admissions. It is generally considered concerning when emergency departments manage more than 35% of a hospital's overall patient volume [9]. There is a clear need for well-designed and sustainable healthcare policies to decrease unnecessary emergency department visits.

Our analysis revealed a higher rate of re-admissions among females compared to males. This finding aligns with similar studies in the literature, which also report a higher frequency of emergency department visits by female patients in general [10-12]. This trend might contribute to the observed high rate of repeat visits.

The re-admission rate in our study ranged from 0.72% to 1.81% across the given timeframe (November 2021-September 2023), with an average of 1.40%. One potential explanation for the year-over-year increase in re-admission rates could be related to our hospital being newly established in July 2021. As equipment and staffing deficiencies were addressed over time, it's possible that patients returned to our facility for repeat visits in subsequent years. When compared to existing literature, emergency department re-admission rates typically fall between 1.4% and 7.8% [13, 14]. The lower re-admission rate observed in our study might be due to the presence of other hospitals in close proximity, leading patients to seek care at alternative facilities for their second visits.

Recurrent emergency department visits can be attributed to various factors, including those related to the patient, the disease itself, the physician involved in the initial care, and systemic issues within the healthcare system. Kelly et al. [15] identified disease-related causes as the most prominent factor (61%), followed by patient-related factors (27%), physician-related factors (11%), and systemic issues (1%). Akyol et al. [16] reported that 16.2% of re-admissions were attributable to physician-related factors, and that one-third of these re-admissions could have been prevented. While the general reasons for re-admission remain consistent across studies, the specific percentages vary. Common characteristics of patients who re-admit include persistent or worsening complaints, or the development of new symptoms.

In our study, 66.7% of patients who returned to the emergency department did so within 13-24 hours of their initial visit. Possible explanations for this high number of applications in the second 12 hours could be the ineffectiveness of the initial treatment, incompatibility between the treatment and the patient's condition, or inadequate information provided by the physician during the first visit. Thoroughly explaining the disease course, the planned treatment, situations that warrant a return visit to the emergency department, and recommending appropriate follow-up appointments with outpatient clinics when necessary can potentially reduce the number of repeat visits to the emergency department.

A review of the literature reveals that the most common diagnoses associated with repeat emergency department visits include abdominal pain, dyspnea (difficulty breathing), musculoskeletal disorders, and hypertension [14, 17, 18]. In our study, the most frequent diagnoses were upper respiratory tract infections, musculoskeletal disorders, abdominal pain, urinary tract infections/renal colic, and gastroenteritis. Similar to our findings, other studies conducted in Turkey have identified upper respiratory tract infections as the leading cause of re-admission [16, 19].

Our study has limitations. Firstly, it was conducted at a single center. Secondly, as a retrospective study, it lacks data to investigate the specific reasons behind re-admissions. Finally, the possibility exists that patients may have sought care at other nearby hospitals for their second visits.

Conclusion

Enhancing health literacy among the population, implementing appropriate triage systems, directing non-emergency cases to primary care physicians, ensuring a well-functioning referral network, establishing accurate diagnoses and initiating appropriate treatment, providing patients with sufficient information about their condition and its management, and promptly referring patients from the emergency department to outpatient clinics for follow-up care can all contribute to reducing emergency department workload and the frequency of re-admissions.

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