

## Review of Patients who are Hospitalized by Emergency Medicine Specialist

### Acil Tıp Uzmanı Tarafından Yatırılan Hastaların İncelenmesi

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#### ABSTRACT

**Aim:** Although some of the patients admitted to the emergency room (ER) have a clinical indication for hospitalization, they may not have a confident diagnosis of which branch they will be admitted to. Therefore, this research intended to present the undiagnosed patients' features whom emergency medicine specialists (EMS) hospitalized.

**Material and Methods:** This research is a retrospective, cross-sectional and descriptive study. Patients admitted to Sakarya Training and Research Hospital's ER and hospitalized by EMS on behalf of a branch were included in the study. Data obtained from the study were analysed using IBM SPSS Statistics 21.

**Results:** The mean age of 57 patients was 70 (min: 56 - max: 80), and 30 (52.6%) of the cases were men. In the department-based evaluation of the consultations, it was ascertained that an average of 2.49 (SD=1.17) branch consultations was requested for each patient, and the average number of consultations per case was 4.16 (SD=2.09). As the number of consultations raised, the time between the emergency service application and the hospitalization decision increased statistically significantly ( $p<0.016$ ). It was observed that most hospitalizations were because the departments did not make the decision to be hospitalized (n: 40, 70.2%); furthermore, the most hospitalizations were made to the internal medicine department (n: 28, 49.1%), and the majority of the cases were admitted to the service. It was observed that only one patient needed intensive care after hospitalization (n: 1, 1.8%), and there was no interdepartmental patient turnover and mortality after the hospitalization.

**Conclusion:** The main reason for the EMS' hospitalization arrangement was the refusal of other branches to determine hospitalization. Therefore, it was perceived that the emergency specialists' hospitalization decisions were essentially accurate.

**Keywords:** Emergency room, consultation, hospitalization

#### ÖZ

**Amaç:** Bu çalışmada, AS sorumlu uzman tabiplerince değerlendirilen ve tıbbi durumunun gerektirdiği en uygun uzmanlık dalına ait kliniğe yatırılıp yapılan hastaların değerlendirilmesi amaçlanmıştır.

**Gereç ve Yöntemler:** Bu çalışma 01.01.2019 - 30.04.2021 dönemini kapsayan retrospektif, kesitsel ve tanımlayıcı nitelikte bir çalışmadır. Çalışma örneklemini, Sakarya Eğitim ve Araştırma Hastanesi (SEAH) AS'ne başvuran ve AS sorumlu uzman tabiplerince yatırılan vakalardır. Tanılar International Classification of Diseases-10 (ICD-10) tanı kodlama sistemi kullanılarak kategorize edildi. Hastalara ilişkin veriler hastane otomasyon sisteminden elde edilerek kayıt altına alınmıştır.

**Bulgular:** Yatış kararı verilen 57 hastanın ortalama yaşları 70,00 (min: 56 - max: 80) olup, hastaların 30 (%52,6)'u erkek idi. Konsültasyonların bölüm bazlı değerlendirmesinde her hasta için ortalama 2,49 (SD=1,17) konsültasyon istendiği ve hasta başına yapılan ortalama konsültasyon sayısının ise 4,16 (SD=2,09) olduğu tespit edildi. Konsültasyon istem sayısı arttıkça başvuru ile yatış kararı verilmesi arasında geçen sürenin istatistiksel olarak anlamlı derecede arttığı saptandı ( $p<0,016$ ). Yatışların en fazla bölümlerin yatış kararı vermemesinden kaynaklandığı (n: 40, %70,2), yatışın en fazla dahili branşlarda iç hastalıklarına (n:28, %49,1), hastaların büyük bir çoğunluğunun servise yatırıldığı, yatış sonrası yalnızca bir (n: 1,%1,8) hastada yoğun bakım ihtiyacının olduğu, servisler arası hasta devrinin ve mortalitenin olmadığı saptandı.

**Sonuç:** AS sorumlu uzman tabiplerince verilen resen yatış kararının özellikle tanısı konulmuş ancak ilgili bölümlerin yatış kararı vermemesinden kaynaklandığı ve yatış kararının doğru ve yerinde olduğunu olduğu anlaşılmaktadır.

**Anahtar Kelimeler:** Acil servis, konsültasyon, hastaneye yatış

Received: June 14, 2021

Accepted: August 27, 2021

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**Atıf için/Cited as:** Aslan N, Durmus E, Guner NG, Guenysu F, Catal F, Yurumez Y. Review of Patients who are Hospitalized by Emergency Medicine Specialist. Anatolian J Emerg Med 2021;4(3):96-101.

## Introduction

Emergency rooms (ER) provide 24/7 continuous health service to patients in need of emergency medical care. After the initial evaluation of the patients admitted to the ER, diagnosis and treatment processes are initiated (1). During these processes, emergency medicine specialists (EMS) can resolve the acute problem and discharge the patient or consult other specialists in need. In addition, consultant physicians may suggest making treatment recommendations, making a discharge decision, counseling hospitalization, or requesting the patient's referral to another health institution (1). With this essential role in decision mechanisms, consultations are an integral part of ER (2).

Consultation is acknowledged as interventions presented by a consultant with specific expertise (3). The literature confirms that the rate of EMS demanding consultation ranges between 20-60% (4,5). Several guidelines prescribe that emergency consultations should be responded to within 30-45 minutes, depending on the patient's current clinical condition (6,7). One of the fundamental reasons for ER crowding is the prolongation of the consultation processes in some countries. This situation is negatively influenced by consultant physicians' treatment recommendations, which allow the patient to stay in the ER for a long time; the patient cannot be determined regarding hospitalization or discharge. Also, additional consultations requested for the patient the patient and the unwillingness of consultant physicians to adopt the patient, especially in complicated patients who require a multidisciplinary approach, are other essential factors that negatively affect the process (4,8,9).

Health legislation was updated in 2018 to reduce these harmful circumstances in consultation processes, and it was demanded that patient follow-up in ER not exceed 24 hours. However, during the stay in the ER, the patients' hospitalization decision who can not have a definite diagnosis and patients need a multidisciplinary approach was left to the EMS (10). Nevertheless, there is inadequate data about patients hospitalized by EMS after this regulation in the current literature.

This research aimed to present the patients whose hospitalization decisions had to be made by EMS.

## Material and Methods

### Research Type

This study is a retrospective, cross-sectional and descriptive study covering the period between 01.01.2019 - 30.04.2021. The study sample group is the cases who applied to the Sakarya Training and Research Hospital (SEAH) ER but were not intended to be hospitalized by the other branches' consultant physicians and had to be hospitalized on behalf of a branch by the EMS. Consequently, the population of the

investigation is the patients admitted to the ER and hospitalized.

### Definitions

SEAH is a tertiary hospital that includes all specialties. The adult ER is an area where emergency medicine specialists, research assistants, and general practitioners work unitedly, and approximately 1000 cases are examined daily. In addition, traumatic and non-traumatic cases can be admitted to the ER by ambulance or outpatients. The emergency physicians manage the patients' diagnosis-treatment processes, and other branches' consultation can be inquired on the hospital automation system if necessitated. However, EMS can hospitalize patients who can not have a final hospitalization decision after other specialties' interviews by the medical condition of cases. EMS have been authorized in this regard by legal regulations in Turkey (10).

### Inclusion Criterias

- Patients aged 18 and over,
- Consulted cases,
- Patients who have not a definitive diagnosis or whose hospitalization indication has not been determined,
- Patients with a hospitalization indication and involving multidisciplinary approach,
- Cases who were hospitalized by EMS,

### Exclusion Criterias

- Patients whose data cannot be obtained on the automation system.

### Data Collection

Patients' age, gender, complaints, comorbidities, laboratory test results (hemogram, biochemistry, blood gas, coagulation parameters, complete urinalysis, stool microscopy, serology), electrocardiography (ECG), imaging methods used (X-ray, ultrasonography, computed tomography, magnetic resonance), requested consultations, hospitalization status (diagnosis, length of hospital stay and outcome) were obtained from the hospital automation system and patient files. In addition, the social insurance invoice costs of the treatments and tests applied to the patients in the emergency room were also noted. Patient diagnoses were classified using the International Classification of Diseases-10 (ICD-10) system.

### Statistical Analysis

The rule of three was used to calculate 95% CI in categories with no events. For continuous variables that do not fit the normal distribution according to the Kolmogorov-Smirnov test of normality, Mann-Whitney U-test or Kruskal Wallis test were used for comparison of continuous endpoints All tests were performed with a two-sided significance of 5%. For each endpoint, the absolute and relative effects and their corresponding 95% CIs were calculated as recommended by Altman et al. All analyses were performed using IBM SPSS Statistics 21.

### Ethics Approval and Permissions

Sakarya University Faculty of Medicine Non-Invasive Ethics Committee approval (29.05.2021 dated and number E-71522473-050.01.04-32190-307) was obtained. All procedures were conducted following the ethical standards

## Results

A total of 57 patients who were hospitalized by EMS were included in the study. The mean age was 70 (min: 56 - max:

80) years, and 30 (52.6%) of them were male. The most frequent ailment was a mental status deterioration [in 10 patients (17.5%)], and the most common comorbidity was hypertension [in 27 patients (47.4%)]. Demographic characteristics, vital signs, and comorbidities of hospitalized patients are shown in Table 1.

		n = 57
	<b>Age (median;IQR)</b>	70 (56-80)
<b>Gender</b>	Female (%)	27 (47)
	Male (%)	30 (53)
<b>Patient complaints</b>	Mental status deterioration (%)	10 (18)
	Abdominal pain	9 (16)
	Weakness	8 (14)
	Dyspnea	6 (11)
	Vomiting	4 (7)
	In-vehicle traffic accident	2 (4)
	Fever	2 (4)
<b>Vital Signs</b>	Bloody stool	2 (4)
	Others*	14 (25)
	Systolic blood pressure (mmHg) (median;IQR)	130 (90-150)
	Diastolic blood pressure (mmHg) (median;IQR)	72 (60-80)
	Pulse (/dk) (median;IQR)	89 (72-100)
	Fever (°C) (median;IQR)	36,5 (36,1-36,8)
	Oxygen saturation (%) (median;IQR)	95 (90-98)
	Hypertension (%)	27 (47)
	Coronary artery disease (%)	19 (33)
	Diabetes (%)	13 (23)
<b>Comorbidities</b>	Malignancy (%)	7 (12)
	Congestive heart failure (%)	10 (18)
	Chronic obstructive pulmonary disease (%)	5 (9)
	Cerebrovascular Disease (%)	5 (9)
	Chronic renal failure (%)	7 (12)

\* Syncope, icterus, foreign body in the throat, bleeding from the wound, chest pain, numbness in the arms, edema in the body, gunshot wounds, diarrhea, palpitations, nausea, vision loss, arm pain, leg edema.

**Table 1.** Demographics, vital signs and comorbidities

It was ascertained that computed tomography (CT) was inquired the most from the patients participating in the study; moreover, an average of two CT requests was made per case. Diagnostic tests applied in patients hospitalized by an EMS physician are presented in Table 2.

Each patient was meanly consulted to three branches (SD=2) five times (SD=2). It was ascertained that as the consultation numbers increased, the time between the application and the hospitalization decision increased significantly (H=12,177, SD=4, p=0.016). The relationship between the consultation number and the length of stay (LoS) in the ER is displayed in Table 3.

It was observed that the most common hospitalization diagnosis of the patients included in the study was anemia with several 13 (23%) patients. The main reason for the hospitalization determination of the EMS was that other branches did not decide to hospitalize the patients (n: 40; 70%). Patients were primarily hospitalized in internal medicine wards (n: 28; 49%) and then general surgery wards

among surgical branches (n: 5; 9%). It was ascertained that 56 (98%) of the patients were admitted to the service; furthermore, intensive care was needed in only one (2%) patient after hospitalization. There was no patient transfer between branches following hospitalization; no mortality was perceived in any patients. The shortest LoS in ER was found to be 678 minutes; also, the most prolonged LoS in ER was found to be 1536 minutes. Patients' diagnosis, LoS in ER, and outcome data are shown in Table 4.

## Discussion

Throughout the study period, the patients' number admitted to SEAH adult ER was 759846, of which 33992 (4.5%) were hospitalized. The hospitalized patients' mean age was 44 years. It has been stated in the literature that the hospitalized patients' age range from the ER is 40-79 years mostly (11). However, patients' mean age who had to be hospitalized by EMS was 70 years. Publications assert that the clinic's severity increases with the age of 65 and older in

Diagnostic tests	Patient count n (%)	Tests per patient (Mean; SD)
Hemogram	55 (97)	2 (1)
Biochemical parameters	56 (98)	2 (1)
Blood gas analysis	40 (70)	1 (1)
Coagulation parameters	39 (68)	1 (1)
Urine tests	27 (47)	1 (1)
Stool analysis	2 (4)	0.03 (0.2)
Rt-PCR	7 (12)	0.1 (0.3)
Hormone Tests	40 (70)	1 (1)
Electrocardiography	28 (49)	1 (1)
X-ray	23 (40)	1 (1)
Ultrasonography	15 (26)	0.3 (1)
CT	<b>18 (32)</b>	<b>2 (2)</b>
Magnetic Resonance Imaging	7 (12)	0.2 (1)

**Table 2.** Diagnostic tests applied

patients admitted to the ER, making patient management more complicated (12,13). The average age of the patients hospitalized by the emergency physician in our study is 70, consistent with the literature. The number of cases hospitalized by EMS to all hospitalized patients is only 0.17%, representing a small group of patients.

Consultation number	LoS in the ER (minute)	p-value*
1	427 (258-923) <sup>a</sup>	
2	891 (583-1344)	
3	1028 (608-1147)	<b>0.016*</b>
4	1242 (796-2051)	
5 and more	1299 (926-2051) <sup>a</sup>	

\* Kruskal Wallis test was applied while calculating the p-value.

<sup>a</sup> A statistically significant difference was found between the values indicated with the same letter in the subgroup analysis using Bonferroni correction and Mann Whitney U test (U=22583,000, p=0.029, z=-2,981 r=-0,64).

**Table 3:** The correlation of consultation number and the length of stay in the ER

Our study remarked that the most frequent ailment in patients admitted to the hospital was mental status change. In research conducted in the USA on this subject, it was published that approximately 1.5 million emergency applications per year were originated from mental state deterioration (14). Likewise, Christopher et al. also described that 8% to 10% of patients over 65 years who applied to the ER had a degradation in mental status (15,16).

The majority of patients admitted to the emergency department have comorbidity. Yıldız S. et al. reported that 87.3% of patients admitted to the emergency department had one or more comorbidities. Hypertension is the most common comorbidity with a rate of 58.2%, followed by diabetes with 33.4% and coronary artery diseases with 28.3%, respectively (17). Thus, the result of both this study and our study overlap in that hypertension is the most common comorbidity.

Although EMS uses anamnesis, physical examination, laboratory, and imaging methods to diagnose patients, recently increasing technological developments and easy accessibility have brought imaging methods to the fore (18). In the literature, it has been affirmed that EMS frequently utilizing imaging methods for reasons such as rapid and definitive diagnosis, refraining from avoiding the disease, the request of the consultant physicians, and medicolegal problems. CT is one of the most preferred imaging methods in all age groups, especially in patients over 65 (19,20). CT was the most inquired imaging method among the patients participating in our study is steady with the literature.

Consultations requested from other branch specialists are essential in emergency patient management. For example, EMS may demand a consultation to refer to other specialties' knowledge in diagnosing and treating a complex case and obtain a decision in the form of discharge or hospitalization. Nevertheless, treatment and patients' hospitalization of cases who need a multidisciplinary approach, whose general condition is poor and primarily in the geriatric age group, is not undertaken by any department (1). Intercalarly, the tests request and other department consultations suggested by the consultant physician, which are not urgent in the patient's diagnosis and treatment, from the emergency service expands the consultations number. As a result, it may prolong the time taken for the patient to be hospitalized an LoS in ER (1). Parallel to the increase in the consultations number in our study outcomes, prolonging patients' waiting time in the emergency department is similar to the literature data (21,22).

Among the diseases that require the most hospitalization from the ER, internal causes such as drug interactions, infections, metabolic disorders, and cardiac causes can be counted (26). However, in our study, it was recognized that anemia patients had to be hospitalized by EMS regularly. The fact that anemia is prevalent, especially in developing countries and the need for 24-hour follow-up of the patient in early transfusion complications after erythrocyte suspension replacement may explain these circumstances (16,17). This result can be interpreted as the EMS's tendency to treat patients who need a blood transfusion in the ward. Hence, it can be appreciated that the patients were hospitalized mainly in the internal medicine branch's wards. The fact that the patients hospitalized in our research were not transferred between branches after hospitalization can be interpreted as the EMS decided when choosing a branch correctly. Unfortunately, no comparison could be made due to insufficient information in the literature about this topic. The time elapsed between the emergency admission and hospitalization of the patients is closely related to emergency patient management and has been associated with morbidity and mortality of the patients (27,28). In a study by Shen Y et al., the time from the decision of

		n=57 (%)
<b>Diagnosis</b>	D64.9: Anemia, unspecified (%)	13 (23)
	N17: Acute kidney failure (%)	5 (9)
	K72.9: Hepatic failure, unspecified (%)	4 (7)
	R10: Abdominal and pelvic pain (%)	4 (7)
	R50.9: Fever, unspecified (%)	3 (5)
	K92.2: Gastrointestinal hemorrhage, unspecified (%)	2 (4)
	E87.8: Other disorders of electrolyte and fluid balance, not elsewhere classified (%)	4 (7)
	N28.0: Ischemia and infarction of kidney (%)	2 (4)
	Z03: Encounter for medical observation for suspected diseases and conditions ruled out (%)	2 (4)
	Other* (%)	18 (32)
<b>Reason for hospitalization</b>	Diagnosis could not found (%)	17 (30)
	No branches aspire patient hospitalization (%)	40 (70)
<b>Hospitalization department</b>	Internal medicine (%)	28 (49)
	Infectious diseases (%)	5 (9)
	Non-Surgical Branches	
	Pulmonology (%)	2 (4)
	Gastroenterology (%)	4 (7)
	Cardiology (%)	1 (2)
	Neurology (%)	1 (2)
	Orthopedics (%)	3 (5)
	General surgery (%)	5 (9)
	Surgical Branches	
	Gynecology (%)	2 (4)
	Ear Nose Throat Diseases (%)	2 (4)
	Neurosurgery (%)	1 (2)
Urology (%)	3 (5)	
<b>Patient's unit</b>	Ward	56 (98)
	ICU	1 (2)
<b>The need for ICU after hospitalization</b>	Yes	1 (2)
	No	55 (9)
<b>Patient transfer between branches</b>	Yes	57 (100)
	No	0
<b>Outcome</b>	Discharged	51 (90)
	Refused Treatment	1 (5)
	Escape	3 (2)
	Referral to another institution	2 (4)
	LoS from application to hospitalization decision (min) (median; IQR)	1063 (678-1536)
LoS until admission to service after hospitalization decision (min) (median; IQR)	124 (62-383)	

**Table 4.** Patients' diagnosis, LoS in ER, and outcome data

hospitalization to admission to the ward was found to be 139 minutes, which is similar to our study result of 124 minutes (29). Although this result seems acceptable, the main obstacle is the long time elapsed from the admission of the patients to the ER until the decision for hospitalization is made. In our study, this period was 1063 minutes (17.7 hours), and the EMS' authorization to hospitalize patients may have played a role in preventing further prolongation of this period.

### Limitations

The limitations of our study are that it is retrospective and single-centered. Also, due to insufficient information in the literature related to the subject of our study, it should be supported with a more extensive patient series to be conducted.

### Conclusion

It was observed that the EMS' hospitalization decision was caused by the refusal of the relevant branches to hospitalize the patient, especially in the diagnosed patients. It is recognized that the hospitalization decisions made by the EMS were primarily correct and appropriate. However, due to insufficient information in the literature related to the subject of our study, it should be supported with a more extensive patient series to be conducted.

**Conflict of Interest:** The authors declare no any conflict of interest regarding this study.

**Financial Disclosure:** The authors declared that this study received no financial support.

**Authors' Contribution:** NA; Led and conceived the project, and authored the manuscript, ED; Data collection, compiling, statistics and discussion, NGG; Contributed to design articles, collected and analysed data, FG; Contributed to collect and analyse data, FÇ; Collected and analysed data, literature review and discussion, YY; Helped perform the analyses with constructive discussions. The manuscript was written and approved by all authors.

**Ethical Statement:** Ethical approval for this study was obtained from Sakarya Training and Research Hospital Ethics Committee with the approval number E-71522473-050.01.04-32190-307.

All authors declared that they follow the rules of Research and Publication Ethics.

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