Evaluation of Demographic Characteristics and Quality Indicators of Patients Aged 65 and Above Who Present to The Emergency Department Due to Non-Traumatıc Reasons

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Abstract

Aim: Elderly patients have higher morbidity and mortality rates, and emergency department (ED) management of them is difficult. We aimed to evaluate the demographic characteristics of patients aged 65 and above who present to the ED for non-traumatic reasons and to assess parameters that may be significant in determining the quality of care for them.

Materials and Methods: Patients over 65 who presented to the ED of a tertiary care hospital for non-traumatic reasons between September and November 1, 2021, were prospectively included. The patients' age, gender, transfer method, social life status, Identification of Seniors at Risk (ISAR) score, tests requested, blood product requested, use of urinary catheters, restriction need, abuse/neglect status, the diagnosis, consultations requested and durations, outcomes, length of stay, and those who re-applied in 72 hours were recorded.

Results: Two thousand five hundred twenty-nine patients were included. The mean age was 74.4±7.5, and 47.8% were female. The median ISAR score was 2. The most common diagnosis was infection. 70.4% of the patients were discharged, 20.4% were admitted to a ward, and 9% were admitted to the intensive care unit. The median length of stay was 220 minutes, and the median time for consultation was 119 minutes. In multivariate analysis, consultation request and type of admission were statistically significant independent variables in predicting hospitalization. Additionally, patients who needed blood products, had restrictions, and had high ISAR scores had significantly higher hospitalization rates.

Conclusion: In conclusion, planning EDs by evaluating the characteristics of the geriatric population will increase the quality of patient care.

Keywords: Emergency department, geriatric patient, elderly patient, quality indicators, seniors health

Introduction

According to the World Health Organization, old age is defined chronologically as beginning at the age of 65 (1). According to the data from the Turkish Statistical Institute (TUIK), the proportion of the elderly population within the total population was 8.2% in 2015, and it increased to 9.5% in 2020. It is projected that the proportion of the elderly population within the total population will be 11% in 2025, 12.9% in 2030, 16.3% in 2040, 22.6% in 2060, and 25.6% in 2080 (2). With this increase, it is expected that the demand for the emergency department (ED) among the elderly will rise (3).

One out of every three patients admitted to the ED is over 65 years of age (4). ED care refers to the process of deciding on the admission or discharge of an elderly patient from the hospital and defines the care and costs associated with this process (5). The admission and mortality rates, as well as the costs of ED visits, are higher for the elderly population compared to young adults (6). The mortality rate of patients aged 60 and above admitted from the ED is 21% (7). Research has shown that the increasing number

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of ED visits contributes to a decline in patient care quality, delays in the initiation of treatment, longer hospital stays, less adherence to accepted clinical guidelines, and an increase in overall costs (8).

The increase in the elderly population and the higher rate of healthcare visits compared to other age groups, along with their tendency to present with multiple chronic conditions and the risk of inappropriate medication and polypharmacy as well as their complex social and physical challenges, pose challenges for healthcare systems. Elderly patients have unique disease presentations, needs, tendencies, and outcomes (8).

The development of geriatric emergency medicine, which started in the 1990s, continued to progress with a series of studies. Geriatric EDs were first established in the United States in 2008, and their numbers have gradually increased (9).

In geriatric patient care, appropriate triage assessment, trained healthcare personnel, equipment designed for specific needs, special planning, and procedures/protocols applied to these patients are essential. This approach will allow for more durable assessments, diagnoses, and treatments tailored to the individual patient, ensuring that they benefit from healthcare services effectively and appropriately, and preventing unnecessary healthcare expenditures (9). For example, the Identification of Seniors at Risk (ISAR) is a screening tool developed to identify elderly individuals at high risk for adverse health outcomes in the ED, including death, hospitalization, or a decline in functional status. It includes six self-report questions about functional dependency (pre-illness acute changes), recent hospitalization, impaired memory and vision, and polypharmacy. Scores of 2 or higher are associated with hospitalization and mortality (10-12).

Although criteria are being developed globally to improve the quality of care, there are no defined quality indicators for elderly patients in our country. As a result, patient profiles vary between countries, and we believe that defining our elderly population and identifying their needs will enhance the quality of care.

It has been shown that high-quality care is associated with better survival and health outcomes for elderly patients (13). Therefore, the quality of care provided to elderly patients in the ED and the consideration of the special needs of elderly individuals are essential. The development of a comprehensive set of quality indicators will help improve the quality of geriatric patient care in the ED.

The aim of our study, is to evaluate the demographic characteristics of patients aged 65 and above who visit our hospital ED due to non-traumatic reasons, and to assess parameters that may be significant in determining the quality of care for these patients.

Materials and Methods

Study Design and Patient Selection

This study was conducted prospectively in the Emergency Medicine Department of our hospital from 01.09.2021 to 01.11.2021, after obtaining ethical approval from the Clinical Research Ethics Committee of Health Sciences University Antalya Training and Research Hospital (decision number: 13/10, approval date: 02.09.2021).

Patients aged 65 and above who presented to the Emergency Department of Health Sciences University Antalya Training and Research Hospital for non-traumatic reasons were prospectively enrolled in the study after obtaining verbal and written consent from them or their relatives. The study's exclusion criteria were determined as patients under 65 years of age, trauma-related admission, and those with inaccessible data.

The study protocol did not interfere with the patients' therapeutic and diagnostic procedures or cause any delay.

Data Collection

The study form recorded the following data concurrently: patient age, gender, method of transfer, social living status, waiting time for examination after registration (in minutes), ISAR score (described in Table 1) requested tests in the ED, whether blood products were requested, whether the patient was followed with a foley catheter, whether any restrictions were applied, abuse/neglect status, diagnoses made in the ED, requested consultations, consultation completion time, and ED outcome.

In order to identify elderly people at risk, the Original ISAR screening tool was published in Canada in 1999. This screening tool is a 6-item questionnaire that measures early (30 days) and late (180 days) mortality, transition to nursing home, and decline in functional life activities in patients over the age of 65 who apply to the ED (Table 1). According to the ISAR screening questionnaire, frailty can be predicted if two or more questions are answered "yes" (10-12).

The patients' diagnoses, in addition to the final diagnosis, were classified as follows; cardiovascular system, neurological system, respiratory system, gastrointestinal system, renal system, infectious diseases, genitourinary system, oncology, hematological system, metabolic diseases, and others. Patient cost data were recorded as the median amount, based on the patient invoices sent to the Social Security Institution and registered in the Hospital Information Management System (HIMS).

The length of hospital stay and the rate of readmission after seventy-two hours were obtained using the Ministry of Health's e-Nabız system, the Death Information System, and the HIMS.

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Primary Outcome

The primary outcomes for patients included discharge from the ED, death in the ED, or admission to a ward or intensive care unit (ICU) from the ED.

Statistical Analysis

The study data were analyzed with SPSS (Statistical Package for the Social Sciences) 23.0 and MedCalc 23.110 programs. Numerical data were expressed as mean ± standard deviation and median, while frequency data were expressed as percentage. The Mann-Whitney U test was used to compare two independent groups for numerical data, and the Pearson chi-square and Fisher's exact tests were used for frequency data. Normality analysis was performed with the Kolmogorov-Smirnov test. Logistic regression analysis was used. All hypotheses were formulated as two-tailed tests, and the alpha critical value was accepted as 0.05.

Results

Sociodemographic Characteristics of The Patients

A total of 6597 geriatric patients presented to the ED during the study period. A total of 4068 patients were excluded from the study due to meeting exclusion criteria, missing data, and unavailability, leaving 2529 patients included in the study (Figure 1). The mean age of the patients was 74.4±7.5 years. 52.2% (n=1319) of the patients were male and 47.8% (n=1210) were female (Table 2).

Eighty-point-eight percent (n=2044) of the patients presented as outpatients. Of the patients included in the study, 89.4% (n=2260) lived with their family, 9.4% (n=237) lived alone, and 1.3% (n=32) resided in a nursing home (Table 2).

ISAR Score of The Patients

The median ISAR score of the patients was found to be 2 [interquartile range (IQR): 1-4]. The distribution of the items of the ISAR scores of the study patients is presented in Table 1. The most commonly requested tests in the patients included in the study were complete blood count (80.5%; n=2036) and biochemistry (80.4%; n=2033), followed by an electrocardiogram (59.9%; n=1514). The most frequently requested cultures were urine (5.4%; n=136) and blood (4.5%; n=113) cultures.

Examinations and Imaging Performed in The ED

The most frequently requested imaging methods were non-contrast (38.6%; n=977) and ultrasonography (20.7%; n=524). Blood product replacement was performed in 2.8% (n=72) of the patients.

The number of patients monitored with a Foley catheter in the ED among those aged 65 and above, who presented due to non-traumatic reasons, was 386 (15.3%), (including those who had a catheter inserted in the ED and those who arrived with a Foley catheter in place), urinary tract infection (UTI) associated with Foley catheter use was observed in 42 (1.7%) of the patients included in the study. Restrictions were applied to 1.3% (n=32) of the patients, with the most commonly used method being physical restraint (93.8%).

The Diagnosis

When examining the diagnoses received by patients aged 65 and above who presented to the ED due to non-traumatic reasons, the most common diagnoses were infections (26.5%; n=670), followed by cardiovascular system pathologies (20.13; n=514), gastrointestinal system pathologies (14.4%; n=365), neurological problems (7.1%; n=180), and respiratory system diseases (5.4%; n=137) (Table 3). Among infections, the most common was UTI (10.4%; n=262), followed by pneumonia (6%; n=153).
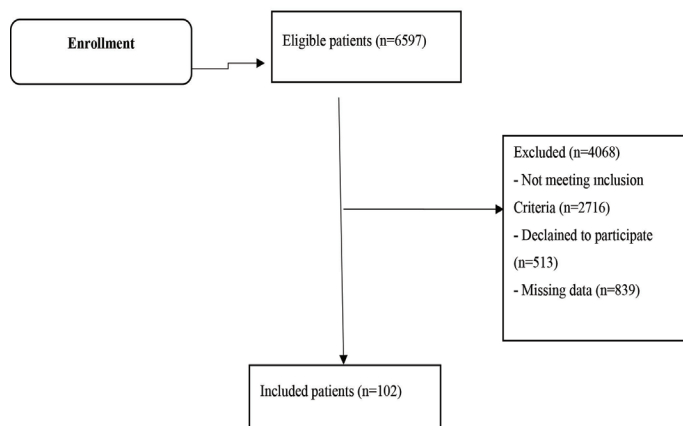

Figure 1: Patiens flow chart

n: Number of patients

Table 1. Identification of Seniors at Risk screening survey questions		
Identification of Seniors at Risk screening tool	**Yes**	**No**
Did you need help from someone in your daily life before the illness or injury that brought you to the emergency room?	1	0
Have you needed more support in your own care since the illness or injury that brought you to the emergency room?	1	0
Have you been hospitalized for 1 or more nights in the last 6 months? (excluding emergency room stays)	1	0
Is your vision good in general?	0	1
Do you experience significant problems with your memory in general?	1	0
Do you take 3 or more medications per day?	1	0

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Consultations

In the study, 51.6% (n=1304) were terminated without a consultation in the ED. Some of the patients were discharged from the ED without a consultation, while 48.2% (n=1225)

a consultation was requested for them. The most frequently requested consultations were in the following departments: general internal medicine (14.6%; n=370), cardiology (14.6%; n=369), neurology (10.3%; n=260), and infectious diseases (9.9%; n=251). The total time spent on consultations in the ED was 119 minutes (IQR: 60-228) (Table 4).

Outcomes

Of the patients included in the study, 70.4% (n=1781) were discharged from the ED, 20.4% (n=516) were admitted to a ward, and 9% (n=228) were admitted to the ICU. Four (0.2%) patients died in the ED. 4.5% (n=115) of the discharged patients reapplied to the ED within 72 hours. The median length of stay of the hospitalized patients was 6 (IQR: 3-11) days. The median waiting time for examination after registration was 4 (IQR: 0-30) minutes, and the median length of stay in the ED was 220 (IQR: 110-375) minutes. The median ED costs of the patients included in the study were 151 (IQR: 75-277) Turkish Liras (Table 5).

Table 2. Sociodemographic data of the study patients	
Variable	Mean ± SD
Age	74.4±7.5
	n (%)
Gender	
Male	1319 (52.2)
Female	1210 (47.8)
Transfer method	
By themselves	2044 (80.8)
With 112 ambulance service	484 (19.1)
Social life status	
Lives with his/her family	2260 (89.4)
Lives alone	237 (9.4)
Living in a nursing home	32 (1.3)
Abuse or neglect	5 (0.2)
ISAR score	
ISAR-1	853 (33.7)
ISAR-2	1330 (52.6)
ISAR-3	763 (30.2)
ISAR-4	668 (26.4)
ISAR-5	505 (20)
ISAR-6	1593 (63)
Total ISAR Score (Median-IQR)	2 (1-4)

SD: Standard deviation; n: Number, ISAR: Identification of Seniors at Risk, IQR: Interquartile ratio

Table 3. Diagnoses of study patients and distribution of related organ systems	
Variable	n (%)
Infectious diseases	670 (26.5)
Urinary tract infection	262 (10.4)
Pneumonia	153 (6)
Soft tissue infection	133 (5.3)
Central nervous system infection	14 (0.6)
Upper respiratory tract infection	40 (1.6)
Catheter infection	10 (0.4)
Other infections	58 (2.3)
Cardiovascular system	514 (20.3)
Atypical chest pain	192 (7.6)
Heart failure	109 (4.3)
Acute coronary syndrome	82 (3.2)
Dysrhythmias	50 (2)
Hypertension	49 (1.9)
Acute arterial occlusion	18 (0.7)
Deep vein thrombosis	11 (0.4)
Aortic dissection	3 (0.1)
Neurological problems	180 (7.1)
Ischemic stroke	129 (5.1)
Hemorrhagic stroke	12 (0.5)
Seizure	29 (1.1)
Others	10 (0.4)

n: Number

Table 4. Consultation data of geriatric patients in the emergency department	
Variable	n [%]
Number of consultations	
No consultation	1304 [51.6]
1 consultation	645 [25.5]
2 consultation	303 [12]
3 consultation	135 [5.3]
4 consultation	59 [2.3]
5 consultation	32 [1.3]
6 consultation	25 [1]
7 consultation	11 [0.4]
8 consultation	9 [0.4]
9 consultation	4 [0.2]
10 consultation	1
11 consultation	1
Department and number of consultations	
Internal medicine	370 [14.6]
Cardiology	369 [14.6]
Neurology	260 [10.3]
Infectious diseases	251 [9.9]
Pulmoner diseases	151 [6]
General surgery	130 [5.1]
Anesthesia and reanimation	86 [3.4]
Urology	55 [2.2]
Cardiovascular surgery	52 [2.1]
Orthopedics and traumatology	40 [1.6]
Neurosurgery	33 [1.3]
Eye diseases	17 [0.7]
Medical oncology	16 [0.6]
Ear, nose and throat diseases	11 [0.4]
Thoracic surgery	7 [0.3]
Hematology	3 [0.1]
Nephrology	2 [0.1]
Psychiatry	1 [0.1]
Endocrinology	1
Median time (minutes) [median-IQR]	119 [60-228]

IQR: Interquartile range, n: Number

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Statistical Analysis

In the univariate analysis conducted to compare the characteristics of hospitalized and discharged patients, no significant differences were found in terms of gender and social living status, while the hospitalization rate was significantly higher in patients who had blood products requested (44.4% vs. 29.1%; p=0.05) and consultation (60.4% vs. 0.6%; p=0.00) in the ED compared to those who did not. Additionally, patients who arrived at the ED in an ambulance had a higher hospitalization rate compared to those who arrived by themselves (55% vs. 23.6%, p=0.00), and patients who had restrictions applied had a higher hospitalization rate compared to those who did not (59.4% vs. 29.2%, p=0.00). A statistically significant difference was found between the mean ages of hospitalized and discharged patients (75 vs. 73; p<0.001). Additionally, the ISAR scores (3 (IQR: 2-4) vs 2 (IQR: 1-3); p=0.00) and length of stay in the ED for hospitalized patients [334.5 (IQR: 210-556) vs 180 (IQR: 90-300); p=0.00] were significantly higher compared to those who were discharged (Table 6).

Table 5. Outcomes of study patients and time and costs from emergency department to hospitalization

Variable	n (%)

Outcome from emergency department
    Discharged
    Service admission
    Intensive care unit admission
    Exitus
	
	1781 (70.4)
	516 (20.4)
	228 (9)
	4 (0.2)

Readmission after 72 hours	115 (4.5)
	Median (IQR)
Waiting time between admission and examination (minutes)	4 (0-30)
Duration of stay in the emergency department (min)	220 (110-375)
Hospital stay (days)*	6 (3-11)
Emergency department cost (Turkish Lira)	151 (75 -277)
n: number, IQR: interquartile ratio, *Post-emergency period	

Table 6. Univariate analysis of variables determining hospitalization

Variable	Hospitalization n (%)	Discharge n (%)	p value

Gender
    Female
    Male
	
	353 (29.2)
	395 (29.9)
		
		857 (70.8)
		924 (70.1)
			0.67

Social life status
    Living alone
    Living with family
    Living in a nursing home
	
	73 (30.8)
	661 (29.2)
	14 (43.8)
		
		164 (69.2)
		1599 (70.8)
		18 (56.3)
			0.18

Blood product requirement
    Yes
    No
	
	32 (44.4)
	716 (29,1)
		
		40 (55.6)
		1741 (70,9)
			0.00

Consultation requirement
    Yes
    No
	
	740 (60.4)
	8 (0.6)
		
		485 (39.6)
		1296 (99.4)
			0.00

Transfer method
    By themselves
    With 112 Ambulance Service
	
	482 (23.6)
	266 (55)
		
		1563 (76.4)
		218(45)
			0.00

Restriction requirement
    Yes
    No
	
	19 (59.4)
	729 (29.2)
		
		13 (40.6)
		1768 (70.8)
			0.00

	Median (IQR)	**Median (IQR)**	
Age	75 (69-81)	73 (68-79)	0.00
ISAR score	3 (2-4)	2 (1-3)	0.00
Staying time in emergency room	334.5 (210-556)	180 (90-300)	0.00
n: Number, IQR: Interquartile ratio, ISAR: Identification of Seniors at Risk			

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Table 7. Logistic regression analysis to determine the independent variable effective in predicting hospitalization			
Variable	Odds ratio	95% Confidence interval	p value
Age	1	0.98-1.01	0.73
ISAR score	1	0.94-1.09	0.63
Staying time in emergency department	0.99	0.99-1.00	0.11

Social life status
  Lives alone
  Lives in a nursing home
	1.2
	0.93
		0.80-1.78
		0.38-2.27
			0.37
			0.87

Consultation requirement	233	114-477	0.00
Transfer method	1.66	1.27-2.15	0.00
Restriction requirement	1.33	0.57-3.1	0.50
ISAR: Identification of Seniors at Risk			

In the logistic regression analysis conducted to identify the independent variables effective in predicting hospitalization for patients aged 65 and above, who presented to the ED due to non-traumatic reasons, consultation request [odds ratio (OR): 233.95% confidence interval (CI): 144-477] and transfer method (OR: 1.66; 95% confidence interval CI: 1.27-2.55) were found to be statistically significant independent variables (Table 7).

Discussion

According to the 2021 data from the TUIK, women make up 44.3% of the population aged 65 and above. In Antalya province, this rate is 53.63% (2). In a multicenter study conducted in our country by Ergin et al. (14) in 2015, the average age of 1299 patients was recorded, focusing on those aged 65 and older across different provinces. In another study conducted by Yıldırım et al. (15) in 2016, a retrospective analysis of geriatric patients presenting to the ED was conducted. In the same study, the mean age of the patients was reported as 76.1±7 years, and 47.7% of them were women. In another study conducted by Tanderup et al. (16) on geriatric patients, the mean age was 78 years and 56.2% were women. Our study's findings are consistent with other studies in the literature.

This study showed that 89.4% of patients aged 65 and above who presented due to non-traumatic reasons lived with their family, while 9.4% lived alone. According to data published by TUIK in 2021, 24.1% of households in our country have at least one individual aged 65 and above. The proportion of households consisting of individuals aged 65 and above living alone constitutes 6.2% of the entire population, with 74.9% of these individuals being women. In Antalya province, 20.9% of households have at least one individual aged 65 and above, while 5.5% of all households consist of individuals aged 65 and above living alone (2). In a study conducted by Tekten et al. (17), which examined the follow-up of geriatric patients in

the ED, it was found that 97.5% (n=236) of the patients lived with their family, while 2.5% lived alone. There are insufficient data in the national literature on this topic, and in the study conducted by Tekten et al. (17), the proportion of elderly patients presenting to the ED living with their family is higher than the finding identified in our study, although it is close. Since there are no official statistical data regarding the living conditions of all elderly individuals in our country, it has not been possible to compare the living conditions of elderly patients identified in our study with geriatric patients in our country.

According to the results of this study, 80.8% of patients aged 65 and above visit the ED through outpatient visits, while 19.1% arrive by 112 emergency medical services ambulances. In a study conducted by Lee et al. (18), the ED visits of individuals aged 65 and above were evaluated. It was found that 38% of the 3230 patients presented to the hospital with ambulance assistance, and the number of ambulance admissions increased with the rise in patients' mean age. In the study conducted by Tekten et al. (17), 56.6% of geriatric patients presented to the ED on their own, while 43.4% arrived in an ambulance. In the study conducted by Benedict and Adefuye (19), 63.5% of the patients presented to the ED through outpatient visits. In another study conducted by Burt et al. (20), the rate of ambulance usage for ED visits was found to be 14.2%, with 39% of these visits made by elderly individuals. In our study, the rate of outpatient visits by elderly patients to the ED exceeded that in other studies in the literature, while the rate of ambulance admissions was lower than that in other studies. These differences may be attributed to factors such as the ambulance usage habits of the population in the study region, the proportion of elderly individuals living with their family, alone, or in a nursing home, the hospital level, and the types of patients it primarily serves.

This study showed that the median ISAR score for patients aged 65 and above who presented to the ED due to non-traumatic

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reasons was 2. In a study by Loddo et al. (21), an ISAR score above 2 was found in 72.4% of 421 geriatric patients who presented to the ED. In a study conducted by Chakroun-Walha et al. (22) in Tunisia, it was reported that 38% of the patients had an ISAR score above 1. In a study conducted by Bahadırlı et al. (23) in [Country Name], an ISAR score was found to be negative (<2) in 162 out of 473 patients who presented to the ED. The results of this study regarding the ISAR scores of geriatric patients are generally consistent with the findings reported in the literature.

Another finding of this study is that the most common diagnosis in geriatric patients presenting due to non-traumatic reasons was infections, followed by cardiovascular system pathologies. UTI and pneumonia are the most common infections observed in this age group. In a study conducted by Yıldırım et al. (15), the most common pathologies identified in the geriatric patient group were respiratory, cardiac, and neurological conditions. In another study conducted by Ergin et al. (14), 19.5% of the patients were diagnosed with cardiovascular system issues, 17.6% with gastrointestinal system problems, and 15.2% with pulmonary system conditions. In a single-center study conducted by Dundar and Ayranci (24), 10.692 geriatric patients were examined, and the most common symptoms for ED visits in this group were dyspnea at a rate of 18.5%, followed by abdominal pain at a rate of 12.4% and chest pain at a rate of 8.3%. Since studies on geriatric patients presenting to the ED follow different methods in classifying the existing pathologies of this patient group, a direct comparison between the findings of our study and the literature is not possible. For example, unlike the literature, geriatric patients in our study were not classified according to their symptoms; and pneumonia, which could be classified under respiratory conditions, was instead evaluated as an infection.

In a study conducted in our country, that followed individuals aged 65 and above in the ED, biochemical tests were requested for 90.9% of the patients, direct radiographs for 86.4%, computed tomography (CT) for 23.4%, and microbiological tests for 6.5% (25). In a retrospective study by Celiński et al. (26) examining 1200 geriatric patients presenting to the ED, biochemical tests were requested for 73.8% of the patients, direct radiographs for 38.4%, ultrasound for 11.5%, and CT for 23.4%. While the findings related to blood tests in our study are consistent with the literature, in the two studies referenced above, direct radiographs were the most frequently requested imaging method in the elderly patient group. This may be related to the study populations. While our study focused on non-traumatic visits, the two studies mentioned above also included patients who presented due to trauma.

According to the results of this study, 15% of geriatric patients were followed with a Foley catheter. Of the 13,215 geriatric

patients studied by Fakih et al. (27), 6.7% received bladder catheterization in the ED. Compared to the other two studies, the rate of bladder catheterization is higher in our study. This difference may be due to variations in the patient population and in treatment approaches.

In this study, 1.3% of the geriatric patients had restrictions applied in the ED. In a two-year retrospective study conducted by Swickhamer et al. (28), 83 patients were examined, and physical and chemical restraints were applied to 42.2% of the patients. In a study conducted by Eltaliawi et al (29). in Egypt with 287 patients, the prevalence of all restraint methods was found to be 11%, while the frequency of physical restraint alone was 3.2%. Studies in the literature report varying rates of patient restraints, and the restraint rate identified in our study is considerably lower than other studies. This may be due to differences in the patient populations of the studies, or it could be a result of some of the data being collected retrospectively.

According to the results of this study, at least one consultation was requested for 48.4% of geriatric patients presenting for non-traumatic reasons, and the most frequently requested consultations were in the departments of internal medicine, cardiology, neurology, and infectious diseases. In a study conducted by Kapçı et al. (25), 70% of patients aged 65 and above who presented to the ED were consulted with at least one department. The most frequently requested consultations were in the departments of internal medicine, pulmonology, and neurology. In another study conducted by Loğoğlu et al. (30) in our country, a consultation was obtained for 43.4% of the geriatric population presenting to the ED. The most frequently requested consultations were in the departments of cardiology, internal medicine, and pulmonology (7). In a cohort study conducted by Celiński et al. (26) covering the years 2016-2018, 1200 geriatric patients were examined, and the consultation rate was found to be 64.9%. While there are differences in the consultation rates among studies in the literature, the departments for which consultations are requested show similarities. The differences in consultation rates may stem from the patient selection criteria between studies, as well as variations in the emergency medicine systems across countries or even within the same country. Consultation rates may also vary depending on factors such as whether the hospital where the study was conducted is a teaching and research hospital, a lower-level hospital, or a public or private hospital.

According to the results of this study, 70.4% of geriatric patients presenting with non-traumatic conditions were discharged from the ED, 20.4% were admitted to a ward, 9% were admitted to the ICU, and 0.2% died in the ED. In a study conducted by Kapçı et al. (25), the ED visits and subsequent outcomes of patients aged 65

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and above were investigated. In the study, which retrospectively evaluated a total of 536 patients, 47.4% were discharged from the ED, 36.4% were admitted to a ward, 10.8% required ICU admission, and three patients died. In an analysis conducted by Loğoğlu et al. (30), it was reported that 75% of patients aged 65 and above who presented to the ED were discharged. In another study, 18.46% of the patients were admitted to a ward, 2.54% were admitted to the ICU, and 0.4% died in the ED. In the study conducted by Keskinoğlu et al. (31), it was found that 90% of geriatric patients presenting to the ED were discharged within a few hours. 19% of the patients were admitted to a ward, 3.5% were admitted to the ICU, and 0.023% died. In a study conducted by Ergin et al. (14), it was reported that 67.5% of patients aged 65 and above who presented to the ED were discharged, 21.7% were admitted to a ward, and 10.8% were treated in the ICU. In another study conducted by Lumjeaksuwan et al. (32) in Thailand, the discharge rate from the ED for geriatric patients was 58%, while a study by Latham and Ackroyd-Stolarz (33), it was reported to be 71.6%. The discharge and admission rates of geriatric patients reported in the literature are generally consistent with the findings of our study. As previously mentioned, the differences in results reported by other studies may be attributed to variations in patient populations and emergency medical services systems.

According to the results of this study, the median length of stay of elderly patients in the ED is 220 minutes. In the study conducted by Latham and Ackroyd-Stolarz (33), the mean length of stay for geriatric patients in the ED was 7.87±95 hours. In a study by Salvi et al. (10), the length of stay for geriatric patients in the ED was found to be 10.3±8 hours. In a study by Lağoğlu et al. (30), the mean length of stay in the ED for discharged patients was 162.7 minutes, while for hospitalized patients, it was 220.6 minutes. Similarly, in a study conducted by Kapçı et al. (25), the mean length of stay in the ED was found to be 213±192 minutes. The resemblance of our study to those conducted in our country may be related to the likeness of our healthcare system.

This study showed that patients with a high ISAR score had significantly higher hospitalization rates than other patients. In a meta-analysis conducted by Galvin et al. (11), ISAR scores and hospitalization rates were compared. For the 30-day hospital admission rate, the sensitivity was 0.83 and the specificity was 0.26, while for the 3-month hospital admission, the sensitivity was 0.80 and the specificity was 0.38. In a study conducted by Salvi et al. (10), a comparison was made between ISAR scores and the mortality rates of patients in the ED. A significant difference was found in the 6-month mortality follow-up between the normal and frail populations, and this was shown to have a correlation with the patients' ISAR scores. In a study conducted by Di Bari et al. (12), a comparison was made between the ISAR

scores and the mortality rates occurring during hospital or ED admissions. As a result, an increase in the ISAR score is associated with an increased mortality rate.

This study showed that patients who arrived at the hospital by ambulance had significantly higher hospitalization rates than others. In a study by Strum et al. (34), 35% of geriatric patients who called 911 emergency services presented to the ED under paramedic care, while 7.5% presented to the ED independently. Among patients who presented to the ED with paramedic assistance, 40.2% were classified as urgent, while among those who presented on their own, 18.9% were classified as urgent. In a study conducted by Parker et al. (35) the hospitalization rate of patients who arrived via private patient transport was found to be significantly higher compared to that of others. According to the study conducted by Sun et al. (36), patients who arrived at the ED in an ambulance were 1.7 times more likely to be hospitalized than patients who came on their own.

This study showed that 4.5% of the discharged patients were re-admitted to the ED within 72 hours. In a study conducted by Millhouse et al. (37), the readmission rate to the ED within 72 hours was found to be 5.45%. In the study conducted by Dinh et al. (38) and Robinson and Lam (39), the rate of readmission to the ED within 72 hours was found to be 4.9%. In the study conducted by Aslaner (40), the rate of readmission to the ED within 72 hours was found to be 6%. The rate of readmission to the ED within 72 hours after discharge is consistent with those reported in the literature.

According to the results of this study, the median cost of patients treated in the ED is 151 TL, which is approximately $8.4. In another study conducted in our country, which defined the expenditures of patients presenting to the ED in 2011, the cost of patients directly discharged from the ED was 115.1±89.9 TL (calculated at $72.3 for that year), the cost of patients admitted to a ward was 146.5±87.5 TL (calculated at $92.1 for that year), and the cost of patients admitted to the ICU was 179.2±122.2 TL (calculated at $112.7 for that year). In the same study, the cost for patients who were deceased was 432±222.6 TL (calculated as 271.6$ for that year), and the cost of patients transferred to another hospital was 216.1±121.5 TL (calculated as 135.9$ for that year) (25). In a study conducted by Hwang et al. (41) in the United States, which examined the cost analysis of geriatric patients in two different hospitals, the average age of the patient groups was approximately 81. The average treatment cost for the first group was 2436 USD, while for the other group it was 2905 USD. The cost findings identified in our study are consistent with another study conducted in our country by Kapçı et al. (25), but they are quite different from the figures reported from the United States. It is normal for ED patient care costs to vary depending on the study country, and the figures will differ based on the country's

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economic conditions and healthcare policies. Even within the same country, there can be significant differences in patient care costs between public and private hospitals.

Study Limitations

This study has several limitations. Lifestyles of geriatric patients are affected by many factors. For example, factors such as the elderly care culture of the country where the study was conducted, the region where the study took place within the same country, and whether the data were collected from urban or rural areas, can all lead to differences in the lifestyle of the elderly and variations in hospital admissions.

Another factor that could contribute to differences in the study population is that this study was conducted in a tertiary care ED. When examining admissions to primary and secondary care hospitals as well as private hospitals, differences in the admissions of geriatric patients can be observed. Therefore, it would be more accurate to classify the results of our study as third-level care admissions rather than extrapolating them to all geriatric admissions.

In this study, the cost calculation derived from the healthcare expenses of geriatric patients may vary significantly depending on the hospital, the city where the study was conducted, and the country. The distinction between private and public hospitals causes significant differences in hospital fees, and the healthcare policies and economic conditions of countries lead to considerable disparities in the pricing of healthcare services. The financial data obtained in this study should be evaluated specifically for third-level public hospitals in our country.

Conclusion

According to the current findings of the study, parameters such as social living status, method of hospital transfer, ISAR score, procedures performed in the emergency department, physical restraints, need for blood products, time markers, cost, consultation, and readmission may be useful for geriatric patients, just as other ED quality indicators are. Furthermore, patients who require blood products and consultations, those brought to the ED by 112 emergency services, those subjected to restraints, and those with a high ISAR score, have significantly higher hospitalization rates compared to other patients. Additionally, the need for consultation and being brought to the ED by 112 emergency services was identified as effective independent variables in predicting hospital admission.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Clinical Research Ethics Committee of Health Sciences University Antalya Training and Research Hospital (decision number: 13/10, approval date: 02.09.2021).

Informed Consent: This study was conducted prospectively.

Footnotes

Authorship Contributions

Concept: A.A., A.G., M.K., Design: A.A., A.G., M.K., Data Collection or Processing: A.A., A.G., D.K., Analysis or Interpretation: D.K., Literature Search: A.G., M.K., Writing: A.A., A.G., M.K.

Conflict of Interest: The authors declare that they have no conflict of interest.

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