

## Geriatric Patient Admissions to the Emergency Service

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### Abstract

**Objective:** In this study, we aimed to analyze the demographic features of patients older than 65 years admitted to the emergency department.

**Material and Methods:** All patients who were over 65 years old and admitted to a tertiary care emergency department were included in this retrospective study. Information, including admission dates (month, season), age, sex, admission type, diagnosis, duration of hospitalization, and outcome in the emergency department of the patients, was evaluated. The obtained data were analyzed with student t-test and chi-square test by using SPSS 17.0 software.

**Results:** Of 238,222 patients admitted to the emergency department, 8793 (3.6%) were over 65 years old; 58% of the patients were female and 42% were male. The rate of chronic obstructive pulmonary disease (COPD) among respiratory problems in males and the rate of hypertension among cardiac problems in females were found to be significantly high. The highest admission rate was in the autumn months (32.6%). The most common reason for admission to the emergency department was cardiac problems (21.7%). This was followed by neurological problems, trauma, respiratory system problems, and urinary tract infections, respectively. The highest mortality rate was 45% in the general intensive care unit. The most frequent cause for mortality was cardiac problems.

**Conclusion:** Cardiac problems were the most common cause of admissions to the emergency department, hospitalization, and mortality in geriatric patients. Future studies for determining the admission rate and most frequently observed illnesses of geriatric patients might be helpful in developing special care areas and special scanning tests for geriatric patients. (*JAEM 2014; 13: 53-7*)

**Key words:** Emergency, geriatrics, demographics

### Introduction

Aging is an irreversible physiological process that includes all functional and structural changes in tissues and systems of the body (1). It directly affects the social life and involvement of an individual (2). The limit of aging, which is used as a chronological concept, has been accepted as 65 years by the World Health Organization (3). In our country, owing to enhanced health facilities, the rate of the elderly population is increasing day by day. Many diseases, including decreased cognitive abilities, an apparent increase in the incidence of chronic diseases and malignancies, musculoskeletal disorders, insulin resistance, hypertension, and atherosclerosis appear with aging (4).

Of the admissions to the emergency department, 15% of them are geriatric patients, and the admission rate has been increasing in parallel with their increased population. Atypical complaints of these patients generally make the triage process difficult for emergency

department physicians, and they need more detailed evaluation methods (2). Diagnosis and treatment protocols must be developed for accurate and rapid triage of these patients. This study aimed to identify demographic features and mortality and morbidity rates of geriatric patients admitted to the emergency department of a training and research hospital in order to contribute possible protocols.

### Material and Methods

All patients who were 65 years old and over and who were admitted to a tertiary care emergency department between the dates of December 1, 2009 and December 31, 2010 were included in this retrospective study. Information about admission dates (month, season), age, sex, admission type (by ambulance or outpatient), duration of hospitalization, diagnosis, and outcomes in the emergency department of the patients was evaluated. Pre-diagnoses of the

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patients were grouped as cardiac disorders (chest pain, heart failure, ischemic heart diseases, rhythm disorder), respiratory system disorders, neurological diseases, upper respiratory tract infection, trauma, musculoskeletal disorders, urinary tract infection, nephrological disorders, gastrointestinal system disorders, and metabolic and endocrine disorders. In accordance with the aim of the study, the seasons were defined as: Spring: March 1-May 31, Summer: June 1-August 31, Autumn: September 1-November 30, and Winter: December 1-February 28. Statistical analysis of the obtained data was conducted with student t-test and chi-square test by using SPSS 17.0 software, and a value of  $p < 0.05$  was accepted as statistically significant.

## Results

Of 238,222 patients admitted to the emergency department, 8793 (3.6%) were older than 65 years; 50.8% of the patients younger than 65 years were females and 48.2% of them were males. On the other hand, among the patients over 65 years old, 58% of them were females and 42% of them were males.

For the patients who were older than 65 years and who were admitted to the emergency department, the mean age was found to be 73.18+6.94 in all patients: 73.2+7.40 in the females and 72.5+6.24 in the males. The mean age of the females and of the male patients was not statistically significant ( $p > 0.05$ ). When admission dates were evaluated, it was found that admissions were more frequent in autumn (32.6%), followed by winter (28.2%). The least frequent admissions were seen in the summer (16.2%). A nearly 2-fold increase was observed in the number of patients in November and December, compared to other months ( $p = 0.03$ ). It was determined that of the patients over 65 years old, 79.2% of them were outpatients, 20.1% was transferred by the 112 ambulances, and 0.7% arrived by private ambulances. The most common reason for admission to the emergency department was cardiac disorders (21.7%). It was followed by neurological disorders, trauma, respiratory system disorders, and urinary tract infection, respectively (Table 1).

Most of the cardiac problems consisted of essential hypertension (52.5%), non-specific chest pain (25.5%), acute coronary syndromes (19.8%), heart failure (18%), and rhythm disorders (12.2%). In one-fourth of the patients with neurological disorders, cerebrovascular event (24.8%) was the reason for admission. When the diagnoses were analyzed considering gender, the frequency of chronic obstructive pulmonary disease (COPD) among respiratory system disorders was higher in the males than in the females ( $p = 0.001$ ). In the females, hypertension rate was found to be significantly higher ( $p = 0.003$ ). Regarding the seasons, upper respiratory tract infection ( $p = 0.00$ ) and COPD from respiratory system disorders ( $p = 0.00$ ) and acute bronchitis were more frequently seen in winter ( $p = 0.03$ ), and stroke ( $p = 0.03$ ) was more frequent in autumn. Significant seasonal changes were not observed for other diagnoses. Of the emergency patients over 65 years old, 11.5% (1013 patients) was hospitalized, and 0.1% (16 patients) was dead when they arrived at the emergency department or died during their treatment in the emergency department; 18.6% of hospitalized patients (189) were followed in the intensive care unit, and 81.4% (824) was followed in the clinics. When emergency patients over 65 years old were evaluated in terms of the clinics where they were hospitalized, it was found that cardiology included the highest number of hospitalized patients (Table 2).

**Table 1.** Distribution of the patients according to pre-diagnoses

Diagnosis	Patient number	%
Cardiac disorders	1907	21.7
Neurological diseases	1205	13.7
Trauma	962	11
Respiratory system disorders	839	9.5
Urinary tract infection	751	8.5
Upper respiratory system infection	676	7.6
Musculoskeletal disorders	580	6.6
Nephrological disorders	492	5.7
Gastrointestinal system disorders	442	5.0
Endocrine and metabolic disorders	414	4.7
Others	525	6

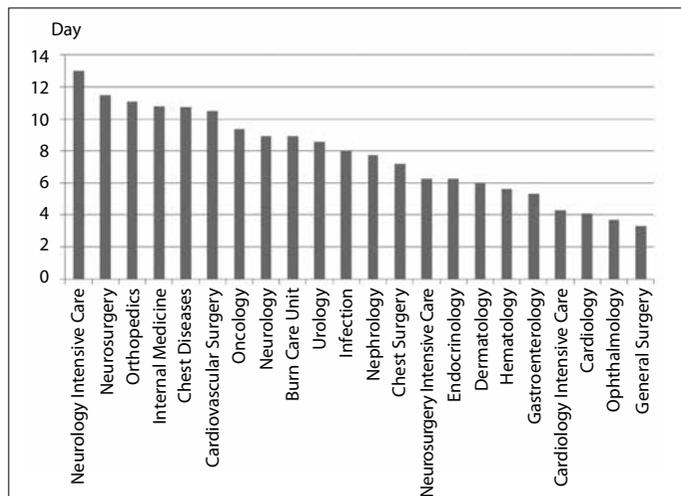
**Table 2.** Clinics of the hospitalized patients

Clinics	Number of hospitalized patients	%
Cardiology	150	14.3
Nephrology	128	12.6
General surgery	123	12.1
Neurology	114	11.2
Gastroenterology	106	10.4
Orthopedics	69	6.8
General intensive care	58	5.7
Coronary intensive care	52	5.1
Neurological intensive care	42	6.8
Neurosurgery intensive care	37	3.8
Other units	134	13.2
Total	1013	100

**Table 3.** Causes of exitus during the hospitalization

Causes of exitus	Percentage	Number of patients
Cardiac disorders	25%	18
Nephrological disorders	18%	13
Respiratory disorders	15%	11
Infections	13%	9
Neurological diseases	10%	7
Endocrine and metabolic disorders	8%	6
Trauma	4%	3
Others	7%	5

When the patients were assessed in terms of hospitalization duration, the mean hospitalization time was found to be 7.1+6.2 days. It was seen that neurology intensive care was the unit with the highest hospitalization time (13+6.23 days) (Figure 1).



**Figure 1.** Distribution of hospitalization durations for hospitalized patients who are 65 years old and over

Of the hospitalized patients, 89.6% was discharged from the clinic in which they were hospitalized, 7% (72 patients) died, and 3.6% was referred to other services. The highest mortality rate was observed in the hospitalized patients in the general intensive care unit (45%) (Figure 2). Cardiac disorders were ranked as first among reasons for mortality (Table 3).

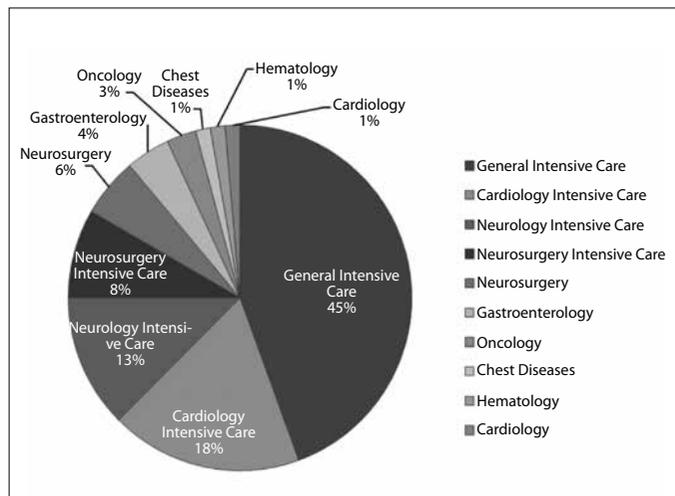
### Discussion

In developing countries, the care of elderly people is more difficult because of some reasons, such as low rate of literacy, poverty, insufficient family and social support, high aging rate, and lack of social services (5), which increases the admissions to emergency departments. In the study by Şahin et al. (6), the admission rate of geriatric patients to the emergency department was found to be 13.2%. It was 13% in the study of Ünsal et al. in 2003 (7) and 9% in another study (8).

This rate was 3.6% in our study, which is lower than in other studies. This might have resulted from the fact that other studies were conducted in university hospitals, while our study was done in a training and research hospital. The outpatient admission rate is quite high in our patients. On the other hand, the outpatient admission rate is lower in university hospitals, and the disease profiles mostly consist of chronic disorders.

In almost every society, the rate of females in the population and their life expectancy at birth are higher, which also causes higher rates of females in the elderly population. In a study, 50.3% of geriatric patients admitted to the emergency department were found to be females, and 49.7% of them were males (6). In another study, these rates were 57% and 43% (7), respectively. Similar to other studies, in our study, the rate of females was 58% and the rate of males was 42%.

According to data from the Turkish Statistical Institute in 2009, the average life expectancy at birth was longer in females. It was 73.7 years in total-71.5 years in males and 76.1 years in females (9). In the study of Satar et al. about the evaluation of patients over 65 years old who were admitted to the emergency department for any reason, the mean age was 72±6.02 years in total, 72.6±5.9 years in females, and 72.5±6.1 years in males (10). Another study found the mean age to be 73.88 years, and it also revealed similar mean ages for females



**Figure 2.** Exitus rates according to the clinics where patients are hospitalized

and males (females: 74.10 years, males: 73.59 years) (11). In our study, the mean age was 73.18+6.94 years for all patients, 73.2+7.40 years for females, and 72.5+6.24 years for males, which was consistent with the literature.

Mert et al. (8) evaluated the admissions to the emergency department of Mersin University in terms of seasons, and they found that the highest rate of admissions was in August (13.6%). In a study conducted in Çukurova University, the highest rate of admission frequency was 27.7% in winter (10). In our study, the highest rate of admissions was in autumn (32.6%) and then winter (28.2). The data of Mert et al. are inconsistent with our data. This difference may result from population movements in the summer and winter in Adana and Mersin, despite their being in the same climate zone. Since Mersin is a holiday resort, its population increases in the summer. In our study, the reason for the high admission rate in autumn may be due to the fact that it was the end of the holiday season, and the population of the province increased. Moreover, in our study, a nearly 2-fold increase was identified in the number of patients in November and December 2010, compared to other months. This period was the time when influenza virus pandemic, known as swine flu among people, is common.

The risk of disabilities and chronic diseases has increased in geriatric patients. Therefore, an ambulance is often needed for the transfer of patients to hospitals. These patients are evaluated by primary care physicians in other countries, and they are transferred to hospitals if necessary. In our country, these patients are usually brought into the emergency department by the 112 ambulance service. Recently, studies about home care service approaches for geriatric patients have begun at hospitals (8). It is considered that this service will decrease the rate of transfers by the ambulance and admissions to the emergency department. Also in our study, it was determined that 20.1% of the patients were brought into the emergency department by the 112 ambulance, and 0.7% arrived by private ambulance. In another study, the rate of transfer by ambulance was 7.5% (10). The high rate of transfer by ambulance might result from the fact that our hospital was the first in the list of patient admissions by 112 ambulance services.

Ünsal et al. (6) evaluated geriatric patient admissions to the emergency department, and they found that the most frequent reasons

for admissions were hypertension, cardiac and pulmonary disorders, and upper respiratory tract and urinary tract infections. Satar et al. (10) reported that the most frequent diagnosis was stroke. According to Kekeç et al. (12), the most frequent diagnoses were metabolic/systemic diseases, cardiovascular diseases, and cerebrovascular diseases. In our study, cardiac and neurological disorders came first, and they were followed by trauma. The most frequent cardiac disorder was essential hypertension. One-fourth of the patients admitted to the emergency department with neurological disorders were diagnosed as stroke. This difference among studies may be due to different socio-cultural structures for which hospitals provide services, intensive work of one department, and the locations of the hospitals. Hence, our hospital is located at the city center, and every patient can be admitted directly to the hospital without referral.

In the studies conducted, it is reported that hospitalization is needed much more for elderly patients than for the younger population, and hospitalization time is longer (13). In our study, 11.5% of the patients over 65 years old were hospitalized. Of these patients, 13.6% was monitored in the intensive care unit, and 86.4% was monitored in the clinics. The clinics where the patients were hospitalized were more frequently cardiology, nephrology, general surgery, neurology, and gastroenterology. In similar studies, the rates of hospitalization were 18.9%, 21.2%, 28.2%, and 59.35%, and the rates of hospitalization in the intensive care unit were 70.4% and 38.1% (7,8,10-12). When the clinics where the patients were hospitalized were assessed, it was seen that the highest rate of hospitalization was in the internal medicine department, cardiology, and neurology among internal departments and in general surgery and orthopedics among surgical departments (10,13). In our study, the highest rate of hospitalization was in the cardiology department, which was consistent with the fact that cardiac disorders were ranked first. Nevertheless, the low rate of hospitalization in the intensive care unit might be associated with an insufficient number of beds in this unit. In general, at least one of the patients who was admitted to the emergency department was hospitalized, and at least one of the hospitalized patients had a severe disease requiring intensive care.

In our study, it was observed that hypertension was more frequent in females, and COPD was more frequent in males. However, there was no statistically significant difference for other diagnoses. In the study by Ünsal et al. (7), the rates of hypertension, upper respiratory tract infection, and urinary tract infection were significantly higher in the female patients, and other cardiac diseases (arrhythmia, heart failure) and pulmonary diseases were significantly higher in the male patients.

In another study, it was observed that the rate of admissions due to malignancies was higher in males, and the rate of admissions due to accidents/traumas was higher in females (8). This difference among the studies may be due to the characteristics of the hospital locations.

The mean hospitalization time was 7.1+6.2 days in our study. In another study, this duration was found to be 5.74±5.8 days for geriatric patients and 3.35±5.1 days for the adult patients who were not geriatric. Our study demonstrated that the longest hospitalization duration was in patients hospitalized in the neurology intensive care and neurosurgery clinics. In the orthopedic clinic, the hospitalization durations were extended, because for most of the patients, surgical operations were planned to be performed in the next several days. Since chronic patients with multiple disorders were usually treated in

the clinics of internal medicine and chest diseases, their hospitalization time was above the mean (Figure 1).

In our study, 7% of the hospitalized patients (72 patients) were exitus, and the highest rate of exitus was observed among hospitalized patients in the general intensive care unit (45%). It might be due to the fact that our hospital had only one general intensive care unit, and the patients with the need for intensive care were referred to this unit by most of the departments. Furthermore, accompanying diseases are required to be followed by several units in cooperation with each other. This is why hospitalization in the general intensive care unit is mostly preferred. However, it is thought that this situation increases the rate of exitus. Cardiac disorders were the most common cause of mortality, and nephrological and respiratory disorders followed them.

## Conclusion

With the increasing elderly population, the use of emergency departments by geriatric patients also increases. In various studies, it has been noticed that geriatric patients are admitted to emergency departments due to different reasons. In our study, the most common reason for admission to the emergency department was cardiac disorders. Moreover, hospitalization and mortality rates of the patients with cardiac disorders were higher. Identifying the admission rate and common diseases of geriatric patients by further studies will help to establish special care areas and special scanning tests for these patients. In this way, treatment planning with more rapid and more accurate diagnosis may decrease the number of recurrent admissions.

**Ethics Committee Approval:** Ethics committee approval was obtained.

**Informed Consent:** Due to the retrospective nature of this study, informed consent was waived.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept - S.S., Ü.B.; Design - Ü.B., A.A.; Supervision - S.S., A.A.; Resource - N.K., M.G.; Materials - M.G., N.K., Ü.K.; Data Collection&/or Processing - Ü.B., Ü.K., M.G.; Analysis/ Interpretation - A.A., N.K., Ü.B.; Literature Search - N.K., A.A., Ü.B.; Writing - Ü.B., A.A., N.K.; Critical Reviews - S.S., A.A.

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