



# Analysis of Hospitalized Geriatric Patients from an Emergency Department

## Acil Servis Başvurusu Sonrası Hastaneye Yatırılan Yaşlı Hasta Grubunun Analizi

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### Abstract

**Objective:** The increase in the geriatric population in industrialized countries also increases the rate at which this group utilizes emergency services. Evaluation of this patient group is not specific to a single discipline, but requires a multidisciplinary approach. Information obtained by examining emergency service use among geriatric patients can inform us of approaches to improve hospital efficiency and potentially reduce the morbidity and mortality rates.

**Material and Method:** This study investigated the retrospective records of geriatric patients who presented to emergency services during 2016 Kütahya Evliya Çelebi Training and Research Hospital, Turkey. Demographic characteristics, diagnoses, hospitalization rates, hospitalization according to clinics, seasonal characteristics, duration of hospital, and patient outcomes were evaluated. Study data were evaluated using the SPSS 20.00 statistical program.

**Results:** A total of 314.178 patients opted for emergency services during 2016, and 29.163 (9.2%) were 65 years old and older. Among these patients, 10.545 were hospitalized, of whom 4.246 (40.2%) were aged 65 years or older. The most frequently utilized hospital units were the cardiology (n=723, 17.02%), the neurology (n=717, 16.88%), and the chest diseases (n=674, 15.87%).

**Conclusion:** The geriatric population requires that necessary changes should be made in healthcare structures. Our study, which evaluates hospitalization rates and health status in geriatric population at a provincial which can also provide a regional level, can help in making patient admission, follow-up, and rehabilitation more comprehensive.

**Keywords:** Geriatric assessment, emergency department, hospitalization

### Öz

**Amaç:** Sanayileşmiş ülkelerde geriatik yaş popülasyonunun artış göstermesi bu yaş grubu hastaların acil servislere başvuru oranını da arttırmaktadır. Ayrıca bu grubun değerlendirilmesi tek bir branşa özgü olmayıp multidisipliner bir yaklaşım gerektirmektedir. Dolayısıyla bu hasta grubunun acil servis başvurularının incelenmesiyle elde edilecek veriler müdahale zamanını kısaltabileceği gibi takiplerinde de hastane kaynaklarının verimli kullanılmasını ve bunun sonucunda morbidite ve mortalite oranlarını azaltılması için yol gösterici olabilir.

**Gereç ve Yöntem:** Bu çalışma Kütahya Evliya Çelebi Eğitim Araştırma Hastanesi Acil Servisi'ne 01.01.2016 – 31.12.2016 tarihleri arasında başvuran geriatik hastaların geriye dönük kayıtları incelenerek gerçekleştirilmiştir. İncelemede hastaların demografik özellikleri, tanıları, hastaneye yatış oranları, kliniklere göre dağılımı, mevsimsel özellikleri, hastanede yatış süreleri ve sonlanım durumları değerlendirilmeye alınmıştır. Çalışmada elde edilen veriler SPSS 20.00 programı kullanılarak değerlendirilmiştir.

**Bulgular:** Çalışmanın yapıldığı süre içerisinde acil servise yapılan başvuru sayısı 314.178 olup 29.163'ü (%9,2) altmışbeş yaş ve üzeri olduğu tespit edildi. Bu dönem içerisinde acil servisten diğer servislere yatan hasta sayısı 10.545 olup, bunların 4246'sı (%40,2) 65 yaş ve üstü hasta grubunu oluşturdu. Yatış yapılan geriatik hastaların klinik dağılımına bakıldığında en sık üç klinik kardiyoloji (n=723, %17,02), nöroloji (n= 717, %16,88) ve göğüs hastalıkları (n=674, %15,87) olarak tespit edildi.

**Sonuç:** Geriatik hasta popülasyonunun hastaneye başvuru ve yatış oranlarının bölgesel olarak belirlenip değerlendirilmesi, ihtiyaca göre gerekli sağlık yapılanmasına yol göstererek, bu hastaların yatışı, takibi ve rehabilitasyonlarının daha nitelikli yapılmasına yol gösterebilir.

**Anahtar Kelimeler:** Geriatik değerlendirme, acil servis, hastaneye yatış



## INTRODUCTION

Geriatric patients represent a special community for emergency services and although there is no clearly defined age range, many countries consider this cohort to begin from 65 years of age.<sup>[1]</sup> Human life span is longer in industrialized countries. In the last 100 years, human life span has been extended by more than 25 years. Due to decreasing birth rates and improved medical care, the proportion of individuals aged over 80 years shows a particularly noticeable increase in the overall population.<sup>[2]</sup> Life expectancy data from the World Health Organization shows that the estimated average lifespan in Turkey is 71 years for men and 75 years for women.<sup>[3]</sup> According to the Turkish Statistical Institute, in 2014, the geriatric population in Turkey was 6,192,962, i.e., 8% of the total population. The male population constitutes 43.6% and the female population constitutes 56.4% of the geriatric population. According to population projections, it is estimated that the geriatric population will increase to 10.2% of the total population by 2023, 20.8% by 2050, and 27.7% by 2075.<sup>[4]</sup> Consistent with this increase, it has been estimated that rates of hospital presentation and emergency service utilization by geriatric population will grow when compared to those by the non-geriatric patient population.<sup>[5,6]</sup>

Physiological changes that occur with aging in the geriatric population result in a decrease in the functional capacity. These contribute to the emergence or exacerbation of many diseases, such as cardiovascular, nervous system, metabolic, and endocrine diseases. Chronic diseases present in older patients are exacerbated because of reduced physiological resources or electrolyte imbalances.<sup>[7,8]</sup>

It has been shown that at least 75% of the geriatric population is under drug treatment for one or more illnesses and that clinicians are more cautious when evaluating patients. Emergency departments are specialized units that provide initial and timely evaluation of patients when they first arrive at the hospital. Physiological changes that occur among older individuals and the effects of existing chronic diseases and drug treatment regimens can prolong the evaluation process in emergency services. Accordingly, mortality and morbidity rates can be increased. Knowing these risks among geriatric patients, the emergency physician endeavors to make a prompt and accurate diagnosis, facilitate appropriate treatment, and use existing facilities efficiently as part of a multidisciplinary care team.

The hospital where the present research was undertaken is the only public hospital in the center of the Kutahya city in Aegean Region of Turkey. It provides 750 medical and care beds and 90 intensive care beds. This study evaluates the rates of hospitalization of geriatric patients in the rural hospital in Aegean Region of Turkey in order to inform more efficient use of hospital resources, diagnostic and treatment services, and follow-up and rehabilitation according to patients' level of need.

## MATERIAL AND METHOD

This study was undertaken to investigate the retrospective records of geriatric patients who presented to emergency services at Kütahya Evliya Çelebi Training and Research Hospital between 01.01.2016 and 31.12.2016. The medical records of our patients were accessed via the hospital's data automation system. The study protocol conformed to the ethical guidelines of the Declaration of Helsinki and was reviewed and approved by the Clinical Research Ethics Committee of Dumlupınar University (Permission granted: 18.01.2017, Decision no:2017/06 2018/8-1).

### Statistical Analysis

The study population consisted of geriatric patients (>65 years old). The demographic characteristics of patients, hospitalization rates, hospitalization according to clinics, seasonal characteristics, and length of stay and outcomes of patient hospitalization were evaluated using SPSS (Version 20.0, SPSS Inc., Chicago, IL). Descriptive statistics (mean±SD) and percentage were calculated for all variables.

## RESULTS

A total of 314,178 patients were enrolled in the study during 2016, and 29,163 (9.2%) of these patients were aged 65 years and more. The number of patients hospitalized to emergency services during the study was 10,546. Among this group, 4,246 (40.2%) patients were aged over 65 years. The sample of 4,246 patients over 65 years had a mean age of 76.1±7.0 (range, 65-102). The study sample comprised 2,027 (47.7%) females and 2,219 (52.3%) males (**Table 1**). The average age of female patients was 76.8±7.1, while that of male patients was 75.4±6.8. When the referral complaints of patients admitted to the clinics were evaluated, the three most common symptoms were dyspnea, chest pain, and general impairment. The most common diagnoses were respiratory system disorders, cardiac disorders and neurological diseases. Patients were admitted to the appropriate clinics following a review of their symptoms and examinations performed at the end of the study. Accordingly, 3,352 (78.9%) patients were admitted to internal clinics, and 894 (21%) patients were admitted to surgical clinics.

The most common symptoms were chest pain, general impairment, and shortness of breath when considering presentations to the emergency unit of internal clinics. Most common patient diagnoses included respiratory system disorders, cardiac disorders and neurological diseases. Commonly attended internal medicine clinics included cardiology, neurology, chest diseases, and internal diseases in the order of frequency. Patients hospitalized to the emergency unit of surgical clinics were found to most commonly have abdominal pain, trauma, and chest pain. The most common diagnoses of these patients were acute abdominal problems, trauma-related fractures, and cardiac diseases among patients who were awaiting a surgery. The most common

of hospitalized clinics were general surgery, orthopedics, traumatology, cardiovascular surgery, and neurosurgery according to frequency of the patients who were admitted to surgical clinics. When the service and intensive care rates of patients were examined, 2.640 (62.2%) were hospitalized and 1.606 patients (37.8%) were admitted to intensive care. The average duration of hospitalization was 9.9 days in intensive care and 12.1 days in other services. When seasonal rates of patient admissions were examined, geriatric patients visited the chest diseases unit and intensive care unit commonly during spring (n=203) and winter (n=259), and the internal disease unit common during autumn (n=185). Patient admission to the cardiology unit and coronary intensive care unit also increased during autumn (**Table 1**). When the outcomes of the patients were examined, 714 patients (16.9%) were discharged due to life termination, 41 patients (1%) were referred for further examination and treatment, and 3.491 patients (82.1%) were discharged (**Table 2**).

## DISCUSSION

With aging, functional capacity decreases and chronic disease prevalence increases. This often leads to the emergence of acute diseases, either independently or in association with existing illness.<sup>[10]</sup> A multidisciplinary approach is needed to determine the etiologic basis of acute or chronic diseases that are encountered in emergency services.<sup>[10,11]</sup> Multidisciplinary teams are necessary as it takes time and diverse skills to complete the necessary examinations and consultations.<sup>[11-13]</sup>

In studies of geriatric patients, the rates of admission to emergency services have been shown to vary considerably from 11.5% to 50%.<sup>[11-14]</sup> In our study, the rate of admission was 9.2%. This rate appears to be affected by the characteristics of the geographical region and the local population. In the Aegean Part of Turkey, the sampling frame for the current study, 11% of the provincial population constitutes the age group defined as geriatric, as determined in 2013.<sup>[4]</sup> Therefore,

**Table 1.** Distribution of the patients according to diagnoses, Demographic features and Seasonal distribution

		Gender		Seasons				Total
		Female	Male	Spring	Summer	Autumn	Winter	
Respiratory system disorders	Service	291	410	212	104	120	265	926
	Intensive Care	97	128	66	49	43	67	
Cardiac disorders	Service	78	78	35	31	24	66	865
	Intensive Care	316	393	169	180	202	158	
Neurological diseases	Service	234	247	110	126	123	122	839
	Intensive Care	199	159	98	72	95	93	
Gastrointestinal system disorders	Service	256	227	106	119	150	108	578
	Intensive Care	40	55	32	21	18	24	
Trauma	Service	188	131	75	87	87	70	360
	Intensive Care	15	26	7	12	15	7	
Nephrological disorders	Service	83	93	32	57	42	45	260
	Intensive Care	43	41	14	22	25	23	
Endocrine and metabolic disorders	Service	46	31	21	22	16	18	106
	Intensive Care	14	15	8	7	7	7	
Infectious disorders	Service	20	29	16	12	10	11	68
	Intensive Care	7	12	5	7	2	5	
Hematologic disorders	Service	22	19	16	9	9	7	48
	Intensive Care	5	2	2	1	2	2	
Urologic disorders	Service	22	62	26	20	13	25	91
	Intensive Care	1	6	1	0	4	2	
Cardiovascular disorders	Service	20	16	10	13	5	8	58
	Intensive Care	9	13	4	5	6	7	
Others	Service	17	20	13	7	8	9	47
	Intensive Care	4	6	3	2	2	3	
<b>Total</b>		<b>2219</b>	<b>2027</b>	<b>1081</b>	<b>985</b>	<b>1028</b>	<b>1152</b>	<b>4246</b>

**Table 2.** Distribution of the patients according to diagnoses and outcome of patients

Diagnosis		Outcome of patients				Total
		Discharged	Exitus	Transport	Refuse	
Respiratory system disorders	Service	607	78	3	13	701
	Intensive Care	116	100	4	5	225
Cardiac disorders	Service	141	14	1	0	156
	Intensive Care	581	103	8	17	709
Gastrointestinal system disorders	Service	413	52	15	3	483
	Intensive Care	57	35	2	1	95
Neurological diseases	Service	436	39	5	1	481
	Intensive Care	227	126	2	3	358
Trauma	Service	289	22	7	1	319
	Intensive Care	26	14	1	0	41
Nephrological disorders	Service	150	24	0	2	176
	Intensive Care	39	44	0	1	84
Endocrine and metabolic disorders	Service	71	6	0	0	77
	Intensive Care	17	12	0	0	29
Infectious disorders	Service	37	12	0	0	49
	Intensive Care	8	10	1	0	19
Hematologic disorders	Service	36	4	1	0	41
	Intensive Care	5	2	0	0	7
Urologic disorders	Service	76	5	0	3	84
	Intensive Care	7	0	0	0	7
Cardiovascular disorders	Service	31	2	1	2	36
	Intensive Care	17	5	0	0	22
Other	Service	32	4	1	0	37
	Intensive Care	8	1	0	1	10
<b>Total</b>		<b>3427</b>	<b>714</b>	<b>52</b>	<b>53</b>	<b>4246</b>

the geriatric population admitted to hospital was found to be in proportion to the overall population. One noteworthy element of this study is that it provides evidence for the current patient population in the provincial center because Kütahya Evliya Çelebi Training and Research Hospital can present large scale of population due to its location.

Several studies regarding the utilization of emergency hospital services by geriatric patients have been undertaken internationally. In a study conducted by Kekeç et al.<sup>[15]</sup> the three most common causes of admission were metabolic or systemic diseases, cardiovascular diseases, and cerebrovascular diseases. In another study, Ünsal et al.<sup>[10]</sup> assessed the emergency service presentations of older patients and determined that the most frequent causes of admission were hypertension, cardiac and pulmonary diseases, and upper respiratory tract and urinary tract infections. In a study performed by Castella et al.<sup>[16]</sup> it was reported that cardiovascular diseases were the main cause of admission to hospitals in older patients across the both sexes. In our study, the three most common causes of admission were chronic pulmonary diseases, cardiovascular diseases, and cerebrovascular diseases. In addition to cardiovascular and respiratory system diseases, studies have reported fall-related injuries among older adults as frequent causes of admission.<sup>[17,18]</sup> In our study, trauma was ranked seventh in general prevalence among the referrals of older patients and second in surgical cases.

In the literature, emergency hospitalization rates among the geriatric age group range from 11.5% to 61%.<sup>[14,15]</sup> Vanpee et al.<sup>[11]</sup> reported a 69% hospital admission rate in their study of a patient population over 75 years of age. The wide range of hospital admission rates among older adults is explained by the fact that countries have different definitions of geriatric population.<sup>[11]</sup> In our study, the hospitalization rate of the geriatric patient population increased in proportion with the other age groups (40.2%), which is consistent with the literature. When the patient group that was admitted to the emergency department was evaluated, it was determined that one out of every three patients was in the geriatric age group.

Two ways in which our findings differ from the international literature relate to length of hospital stay and outcomes of geriatric age group hospitalization. The average duration of hospitalization was 12.1 days for intensive care and 9.9 days for other services among the geriatric group of patients.

When presentations of the geriatric age group were evaluated in relation to emergency department admissions, reasons for illness included the presence of co-existing diseases accompanying the presenting condition, deterioration of cognitive function, and slowness of movement.<sup>[2,19]</sup> In addition to these reasons, all necessary tests for geriatric patient diagnoses and determination of appropriate treatments could not always be made. Barriers to diagnosis and treatment

included the lack of adequate equipment and the inappropriate physical conditions of the emergency room. For this reason, the recommended service model for older patients is the geriatric emergency service, where appropriate equipment, physical environment, and well-trained multidisciplinary staff are available.<sup>[20]</sup>

Comprehensive assessment to guide diagnosis is important for geriatric care. In their evaluation of the efficacy of geriatric assessment in emergency services, Garf et al.<sup>[21]</sup> concluded that comprehensive geriatric assessment reduced the requirement of functional assistance, re-admission to hospital, and needs for long-term care. However, rapid circulation in the emergency department prevents comprehensive geriatric assessment. For this reason, different methods have been suggested in the literature to admit older patients to emergency services.<sup>[21-25]</sup> In recent times, hospitals have begun to restructure their physical environments for older patients, and some have set up geriatric monitoring departments with bed capacities of four to seven.<sup>[20]</sup>

## CONCLUSION

In these conditions, we believe that geriatric age group admission rates and health status can lead to the establishment of regional geriatric care centers, even if they are not provincial, so that the admission, follow-up, and rehabilitation of these patients can be more comprehensive.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study protocol was approved by the Medical Ethics Committee of Dumlupınar University (Permission granted: 18.01.2017, Decision no:2017/06 2018/8-1).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

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