

# Increased Length of Stay in Emergency Department in Turkey: Due to Inappropriate Emergency Department Use or Aging?

## Acil Serviste Uzun Süreli Yatışlar: Acilin Uygunsuz Kullanımı mı, Yaşlılığın Sonucu mu?

Müge GÜNALP,<sup>a</sup>  
Behnan GÜLÜNAY,<sup>a</sup>  
Onur POLAT,<sup>a</sup>  
Serdar GÜRLER,<sup>a</sup>  
Arda DEMİRKAN,<sup>a</sup>  
Meltem AKKAŞ,<sup>b</sup>  
Nalan METİN AKSU<sup>b</sup>

<sup>a</sup>Department of Emergency Medicine,  
Ankara University Faculty of Medicine,  
<sup>b</sup>Department of Emergency Medicine,  
Hacettepe University Faculty of Medicine,  
Ankara

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Yazışma Adresi/Correspondence:  
Müge GÜNALP  
Ankara University Faculty of Medicine,  
Department of Emergency Medicine,  
Ankara,  
TÜRKİYE/TURKEY  
gunalpmuge@yahoo.com

**ABSTRACT Objective:** Emergency department (ED) crowding has long been recognized as a “crisis” in Turkey. The reasons for overcrowding are high number of patients, limited capacity of inpatient clinics, patients aged 65 years of age or older, and a prolonged length of stay in ED. This study aimed to investigate the causes of increased ED stay in a university hospital, in Turkey. **Material and Methods:** This was a prospective observational study carried out over 3 months. We evaluated the data of the outpatients and patients transferred by ambulance to the ED of a university hospital in Turkey. Age, gender, triage scores, date and time of presentation, discharge date and time, definitive diagnosis time, diagnosis categories, and the length of stay in ED were analyzed. **Results:** The mean age of 1311 patients was 57.68±19.35 years. The mean diagnosis time of the patients was 459.38 minutes (7.39±0.73 hours), and the mean ED stay was 2134 minutes (35.29±3.29 hours). The rate of the patients over 65 years of age (41%) ranked the highest among three age groups. The early discharge rate of the older patients was significantly lower, and their hospitalization duration was significantly higher. At the end of initial 48 hours, 625 patients (47.6%) were discharged; only 55 patients (4.1%) could be transferred and hospitalized in the related clinics, while 545 patients (41.5%) were followed-up at the Observation and Clinical Decision Unit by emergency physicians. **Conclusion:** In our study, it was determined that longer than 48-hour delay in transferring the patients to the clinics, and the patients ≥ 65 years of age were the most important reasons for prolonged length of stay in the ED.

**Key Words:** Length of stay; emergency medical services; aged

**ÖZET Amaç:** Günümüzde acil servislerdeki (AS) hasta kalabalığı Türkiye’de önemli bir sorun haline gelmiştir. AS’nin aşırı kalabalık olmasının birçok sebebi vardır. Bu faktörlerin bazıları, hasta sayısının fazlalığı, yataklı servislerin kapasitelerinin yetersizliği, ve 65 yaş ve üzeri hasta grubu ve acil serviste uzun süreli yatışlardır. Bu çalışmamızda, AS’de yaşanan aşırı yoğunluğun ve uzun yatışların sebepleri araştırılmıştır. **Gereç ve Yöntemler:** Ankara Üniversitesi Acil Tıp Anabilim Dalında 01 Temmuz 2010-01 Ekim 2010 tarihleri arasında yürütülen bu prospektif gözlemsel çalışmada, acil servise ayaktan ve ambulans ile başvuran hastaların kayıtları tutulmuştur. Hastalara ait yaş, cinsiyet, triaj skorları, başvuru tarih ve saati, taburcu tarih ve saati, tanılarının ne zaman kesinleştiği ve acil serviste kalış süreleri kaydedilmiştir. **Bulgular:** 1311 hastanın yaş ortalaması 57,68±19,35 yıl olarak tespit edildi. AS’de hastaların ortalama tanı alma süresi 459,38 dakika (7,39±0,73 saat) ve ortalama kalış süresi 2134 dakika (35,29±3,29 saat) olarak saptandı. Altmış beş yaş üzeri hasta grubu %41 oranla acil servisimize başvuran üç ayrı yaş grubu içinde ilk sırayı aldı. AS’de yaşlı hastaların erken dönemde taburcu olma oranları anlamlı olarak düşük, hastanede kalış süreleri diğer yaş gruplarından anlamlı olarak yüksek bulundu (p<0,001). İlk 48 saatin sonunda; 625 hastanın (%47,6) acil servisten taburcu edildiği, 55 hastanın (%4,1) ilgili kliniklere nakledilebildiği, buna karşın 545 (%41,5) hastanın acil servis gözlem ünitesinde acil doktorları tarafından izlenip tedavi aldıkları saptandı. **Sonuç:** Altmış beş yaş üzeri hasta grubunun ve tanısı konarak tedavisi sürdürülecek hastaların transferlerindeki 48 saati aşan gecikmenin acil servis kalabalığının en önemli nedeni olduğunu belirlendi.

**Anahtar Kelimeler:** Yatış süresi; acil tıbbi servisler; yaşlı

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Overcrowding in emergency departments (ED) has become a serious issue in the world. The reasons that differentiate an ED from the other outpatient clinics are the need for a physician to evaluate everybody applying regardless of their age, gender, social status, or emergency state, and after the evaluation, the need to treat the disease and observe the patient, and if necessary, to provide intensive care. Considering these, EDs have a wide-range of use, are open for service round the clock, easily accessible, and can provide care and intervention anytime, which can sometimes be free of charge. In addition, limited and non-systematic primary care services have imposed patients to present to the ED as an initial application area for medical services. This has caused overload in ED, resulting in reduced quality of patient care, lower satisfaction of the patients with the services, and increased number of patients that leave the ED without receiving any treatment. EDs usually serve over their capacities. Health care workers interpret overcrowding to the exploitation of emergency services. In addition to numerous reasons for overcrowding in EDs, several external factors also have important roles, some of which are high number of patients, limited capacity of inpatient clinics, and aging population.

This study aimed to investigate the causes of increased ED length of stay and patient circulation in the ED of a university hospital in Turkey.

## MATERIAL AND METHODS

This study evaluated prospectively the data of the outpatients and patients transferred by an ambulance to the ED of a university hospital in Turkey between July, 01, and October, 01, 2012. All the traumatic and non traumatic patients older than 18 years of age were included in our study. One attending emergency physician, 4 emergency medicine residents, 8 nurses and 15 interns work in our ED during a shift. Our ED is divided into four adjacent areas: A fast track area (two regular beds for examinations), an Acute Critical Care Unit (30 regular beds; 2 for resuscitation, 6 for trauma), Observation and Clinical Decision Unit (OCU) (24 regular beds), and an Intensive Care Unit (ICU) (12

regular beds). In our hospital, ED-based critical care is delivered in a collaborative manner by emergency medicine and ICU doctors, with nursing support provided by ED nurses in our ICU. Emergency care physicians are responsible for medical management of these four units.

The triage scores of the patients were calculated according to Manchester Triage Scale system, and they were allocated into five color coding groups after their emergency states were considered by triage nurses. In our system, red color represents the most urgent group that requires immediate attention. Orange color represents very urgent group that requires care in the first 10 minutes. Yellow color represents the group that requires intervention within the first hour of presentation. Green color represents the patient group that does not require emergency intervention, and can wait as long as 120 minutes. Blue color represents the group that is non-urgent and can wait as long as 240 minutes.

The patients that were followed-up at ED were included in our study. The follow-up durations of the patients at each of these three units were separately recorded. Those that were discharged after prescription of medications at a fast track area upon triage were excluded. The patients' data were age, gender, complaints upon presentation, triage scores, date and time of presentation, discharge date and time, the unit where the care was provided, definitive diagnosis time, diagnosis categories, and the length of stay in ED.

ED diagnoses (ICD-9) were grouped using the Clinical Classification Software from the Agency for Healthcare Research and Quality. Chi square test was used for the statistical analysis. A p-value of less than 0.05 was considered to be significant.

## RESULTS

The study analyzed the data of 1500 patients. Since the data of 189 were not reliable, the analysis based on 1311 patients. The mean age of the patients was  $57.68 \pm 19.35$  (mean  $\pm$  standard deviation) years. The diagnoses of the patients were categorized according to ICD-9. The mean diagnosis time of the pa-

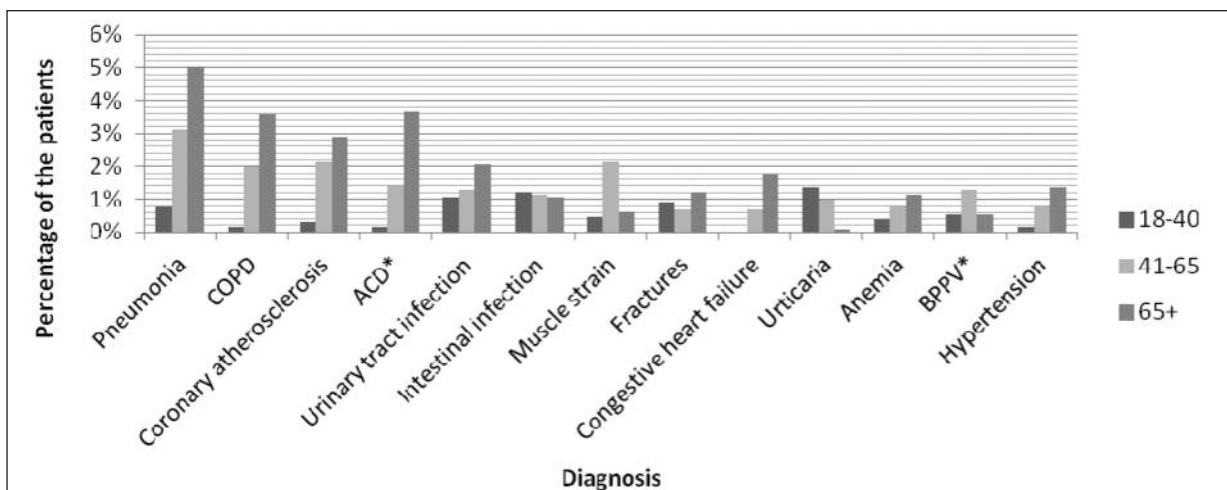
tients was 459.38 minutes (7.39±0.73 hours), and the mean ED stay was 2134 minutes (35.29±3.29 hours). The patients were divided into three groups according to their age. Of 1311 patients, 284 (21.6%) were aged between 18-40 years, 490 (37.3%) were aged between 41-65 years, and 537 (41%) were aged ≥65 years. Geriatric patient group (41%) ranked the highest among three age groups that applied to the ED. In patient group that was over 65 years of age, the number of female patients was significantly higher than those in the other two age groups ( $p=0.030$ ). The number of the patients that presented to the ED with a red color code was 159. When patients coded red and orange were grouped as critical emergent patients, and those coded yellow, green and blue were grouped as non-critical patients, there was no significant difference observed in the emergency status of patients in all three age groups. ( $p>0.05$ ). There was a significant difference between the age groups of the patients, and the rate of stay in the observation units ( $p=0.029$ ). When compared directly, the rate of patients 65 years or older admitted to the observation unit was found to be higher than that of the patient between 18 and 40 years of age ( $p=0.016$ ;  $p<0.05$ ). A similar difference was also observed between the age and the rate of stay at ICU ( $p=0.002$ ,  $p<0.01$ ), with the rate of ICU admission of the patients 65 years or older was significantly higher in

the 18-40-year and 41-65-year age groups ( $p=0.001$ ,  $p<0.01$ ).

Pneumonia, acute exacerbation of chronic obstructive pulmonary disease (COPD) and coronary atherosclerosis were the most common diagnoses in all age groups. In the 18-40-year age group, urticaria was the most common diagnosis, at a rate of 1.37%, followed by intestinal infection (1.22%) and suicide attempt (1.14%). In the 41-65-year age group, pneumonia (3.12%) was the most common diagnosis followed by muscle strain and coronary atherosclerosis (2.13%), and COPD (1.98%). In the group ≥65 years of age, pneumonia (5.3%), acute cerebrovascular disease (3.66%), and COPD (3.58%) were the most common diseases (Figure 1).

The patients were grouped as those discharged from the hospital within 24 hours and those discharged after 24 hours. The rate of patients who were discharged after the first 24 hours was significantly higher in ≥65 years of age group compared to other two age groups (18-40 and 41-65) ( $p=0.000$ ,  $p<0.001$ ). The patients who were not discharged within the 24 hours of initial intervention could not be admitted to the related clinics, and thus they were treated in the OCU of the ED.

The most frequent discharge diagnosis categories were similar for patients who stayed >48 hours and those that stayed <48 hours, although



**FIGURE 1:** The distribution of the diagnoses of the patients according to age groups.

ACD\*: Acute cerebrovascular disease; BPPV\*: Benign paroxysmal positional vertigo; COPD: Chronic obstructive pulmonary disease.

their relative frequencies varied ( $p < 0.001$ ) (Table 1). When compared by age, discharging times were significantly different according to the diagnosis categories in the group  $\geq 65$  years of age ( $p < 0.05$ ) (Table 2).

In our study, 625 patients (47.6%) were discharged, and only 55 patients (4.1%) could be transferred and hospitalized in the related clinics, while 86 patients (6.5%) were followed-up in the ICU, and 545 (41.5%) in the OCU at the end of initial 48 hours. Forty nine patients (56.9%) followed in the ICU were elderly patients comorbidities.

## DISCUSSION

The life expectancy of people has increased since the early 20<sup>th</sup> century due to reduced birth rate, improved nutritional intake, and better management of infectious diseases. As a result, the rate of elderly people became as high as 65% in developing countries like Turkey, and the number of geriatric patients that apply to the EDs also increased.<sup>1</sup> Only a few studies showed that geriatric patients comprise 20% of the patients presenting to EDs in the developed countries, and suggested that visits to ED should be considered as a normal outcome of aging.<sup>2,3</sup> Roberts et al. determined that 18% of the

ED patients were individuals over 65 years of age, and those over 75 years of age seemed to present to the EDs even more frequently.<sup>3</sup> Other reasons for overload of EDs are increased rates of older patients with chronic diseases, and avoidance of the admission of patients that need intensive care.<sup>4</sup>

The initial resuscitation and subsequent care of critically ill elderly patients is an important component of emergency medicine practice. Researchers in the USA have shown that the volume and duration of stay of critically ill patients in the ED is increasing.<sup>5</sup> Most importantly, the quality of critical care provided in the ED, and the importance of time-sensitive interventions related to delayed admissions to the ICU from the ED affect outcomes of mortality and length of stay. Waiting greater than six hours in ED while waiting for a bed increased the likelihood of patients length of stay and mortality.<sup>6</sup> Accreditation Council for Graduate Medical Education suggested its intention to improve the quality of ED care by instituting a maximum length of ED stay of 4 hours for discharged patients, and less than 8 hours for those admitted to the hospital.<sup>7</sup> New Zealand and parts of Australia and Canada are trialing a similar target for their ED patients.<sup>8</sup> In Turkey, the regulation introduced in

**TABLE 1:** The most common discharge diagnosis categories in patients who stayed  $>48$  hours and  $\leq 48$  hours.

Diagnosis categories of the discharged patients	Overall prevalence	Stay greater than 48 hours	Stay less than or equal to 48 hours
		n: 237	n: 1073
Pneumonia	117 (8.9%)	41 (17.3%)	76 (7.1%)
Chronic obstructive pulmonary disease	75 (5.7%)	15 (6.3%)	60 (5.6%)
Coronary atherosclerosis	70 (5.3%)	14 (5.9%)	56 (5.2%)
Acute cerebrovascular disease	69 (5.3%)	13 (5.5%)	55 (5.1%)
Urinary tract infection	58 (4.4%)	8 (3.4%)	50 (4.7%)
Intestinal infection	45 (3.4%)	1 (0.4%)	44 (4.1%)
Muscle strain	42 (3.2%)	3 (1.3%)	39 (3.6%)
Fractures	37 (2.8%)	0 (0.0%)	37 (3.4%)
Congestive heart failure	32 (2.4%)	9 (3.8%)	23 (2.1%)
Urticaria	32 (2.4%)	0 (0.0%)	32 (3.0%)
Anemia	31 (2.4%)	0 (0.0%)	31 (2.9%)
Benign paroxysmal positional vertigo	31 (2.4%)	2 (0.8%)	29 (2.7%)
Essential hypertension	30 (2.3%)	4 (1.7%)	26 (2.4%)
Other	642 (49%)	127 (53.6%)	516 (48.0%)

Values are counts (percent). Diagnosis categories are listed in descending order, based on overall prevalence. The frequencies of discharge diagnoses between the two groups are statistically significantly different ( $p < 0.001$ ).

**TABLE 2:** \*Discharge time was significantly different, according to the diagnosis categories in the group of patients older than 65 years of age ( $p < 0.05$ ).

Diagnosis categories of the discharged patients	Overall prevalence	Age $\leq 65$		Age $>65$	
		Less than or equal to 48 hours	Greater than 48 hours	Less than or equal to 48 hours	Greater than 48 hours
		n: 670	n: 103	n: 403	n: 135
Pneumonia	117 (8,9%)	38 (5,7%)	13 (12,6%)	38 (9,4%)	28 (20,9%)
Chronic obstructive pulmonary disease	75 (5,7%)	22 (3,3%)	6 (5,8%)	38 (9,4%)	9 (6,7%)
Coronary atherosclerosis	70 (5,3%)	27 (4,0%)	5 (4,9%)	29 (7,2%)	9 (6,7%)
Acute cerebrovascular disease	69 (5,3%)	17 (2,5%)	3 (2,9%)	38 (9,4%)	11 (7,5%)
Urinary tract infection	58 (4,4%)	29 (4,3%)	2 (1,9%)	21 (5,2%)	6 (4,5%)
Other	922 (70,4%)	537 (80,1%)	74 (71,8%)	239 (59,3%)	72 (53,7%)
p		$>0,05$		$<0,05^*$	

2009 by the Turkish Ministry of Health on the use and practice of emergency care services by tertiary hospitals enforces that 'emergency care of patients admitted to ED should not exceed 24 hours'. In our study the rate of patients in the group of  $\geq 65$  years of age who were discharged after the first 24 hours was found to be significantly higher compared to other two age groups (18-40 and 41-65 years) ( $p=0.000$ ,  $p<0.001$ ).

According to a study performed in 2002 by Ay et al., the majority of the patients presenting to the ED in Turkey were in 21-25 year age group, and upper respiratory tract infections and tonsillitis were the most common discharge diagnosis.<sup>9</sup> In our study, pneumonia and COPD were the most frequent discharge diagnoses in patients who stayed  $>48$  hours and  $< 48$  hours. A significant portion of COPD and pneumonia patients' length of stay in our ED was due to waiting for a bed, and management of the patients with respiratory disturbances is becoming increasingly difficult. This is understandable in Turkey, because COPD and pneumonia are the leading causes of mortality and morbidity.<sup>10,11</sup> Similarly, the hospitalization rate of the same age group patients in the ICU was significantly higher, and these patients were followed up longer than 48 hours in that unit, which may have been due to increasing number of elderly people in Turkey (the population over 65 years of age has been rising). The rate of population in this age group is estimated to be 20% by 2020.<sup>1</sup> In that case, in developing countries like Turkey, overcrowding

in EDs and associated problems will be inevitable. Therefore, treatment of patients with severe diseases and/or injury will be delayed.

The Centers for Medicare & Medicaid Services currently defines observation services as "a well-defined set of specific, clinically appropriate services, which include ongoing short term treatment assessment, and reassessment before a decision can be made regarding whether patients will require further treatment as hospital inpatients or if they are able to be discharged from the hospital ED". Wiler et al. reported that numerous clinical problems were successfully managed in observation units like diseases to respond to a brief course of therapy, undiagnosed conditions undergoing lengthy testing which, if normal, would result in discharge, problems needing prolonged observation that should resolve within 48 hours.<sup>12</sup> In our study, at the end of initial 48 hours, 625 patients (47.6%) were discharged while 545 patients (41.5%) were followed-up in the OCU by emergency physicians. Numerous studies have shown that ED crowding is primarily caused by delays in the transfer of the patients to the related clinics after emergency care.<sup>13</sup>

We could not identify any studies in the medical literature describing the subset of patients who stay in an ED  $>48$  h, and their impact on patient flow and crowding. Considering these findings, it was determined that longer than 48-hour delay in transferring the patients to the related clinics and the patients aged  $\geq 65$  years of age were the most

important reasons for overcrowding and prolonged length of stay in the ED. The patients staying longer than 48 hours block new patients from entering the ED, as there are no available beds. Both patients to be admitted and patients to be eventually discharged with prolonged length of stays contribute to ED crowding.

Our study's main limitation is that it has been performed at a single institution. We do not know whether our results can be generalized to other EDs that have patients whose length of stay is longer than 48 hours. The a priori choice of a 48 hours threshold was based on the mean of our ED length of stay. Data could be obtained only for three months of the year; the results for the rest of the year may have been different.

## CONCLUSION

ED OCU have to offer the ability to avoid "long stay" admissions (above 48 hours) while mitigating the risk of immediate discharge from the ED for the patients who require ongoing care or treatment beyond ED stabilization. To avoid overcrowding and prolonged length of stay in ED, certain precautions should be taken for OCU's:

- Development of admission criteria including whether the patient requires observation or treatment less than 48 hours,
- Development of discharge criteria
- Management responsibility that lies with the ED

- A focus on rapid and frequent multidisciplinary assessment and short term therapy and observation.

Facilitating transfer and admission of emergency patients to the clinics will contribute to efficient use of ED as well as decreased mortality and morbidity.

ED overcrowding is a hospital-wide problem, and the age distribution suggests that the elderly patients represent a large burden of visits, the extent of which is poorly defined. It would be enlightening to know the significance of this elderly group in terms of size, resource consumption, and effect on ED crowding. It is known that there is a need for improvement of training of physicians in the care of geriatric patients in the ED. It was proven that some attempts reduced admission rates and length of stay for older people. Wright et al. stated that these attempts included early senior doctor and specialist input in areas such as geriatrics, and timely access to therapist assessment.<sup>14</sup> Comprehensive Geriatric Assessment followed by appropriate interventions has been shown to reduce the length of the initial hospital stay, and subsequent readmissions.<sup>14</sup> In the follow-up and treatment of particularly geriatric patients, a geriatric consultation team in the ED can assess the needs of elderly patients regarding hospital admission, and community services.<sup>15</sup> Another solution is the transferring elderly patients to the palliative care units or nursing homes. Palliative care units can manage end of life care, and admit patients for symptom management.

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