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RESEARCH

AETIOLOGY OF EMERGENCY DEPARTMENT ADMISSION OF THE ELDERLY: A RETROSPECTIVE STUDY IN KARS

ABSTRACT

Introduction: The demand for emergency services has been growing with increasing elderly population. This study aims to determine the underlying aetiologies of the emergency department visits by the elderly for proper planning of future services.

Materials and Method: The medical records of patients above the age of 65 years who visited the Emergency Department of the Health, Research and Training Hospital of Kafkas University between 1 January 2013 and 1 January 2015 were retrospectively analysed using the ICD-10 diagnostic codes for data classification.

Results: Geriatric patients rate amongst total number of emergency cases were 19.6%. The average age of patients included in this study was 74.29±7.04 and 53.6% of them were males. The majority of emergency department visits by the elderly were during summers, and 46.3% of them were included in the category red. Circulatory system diseases (46.3%); respiratory system diseases (15.6%); musculoskeletal diseases (9%); endocrine, nutritional and metabolic diseases (6.5%) and non-specific symptoms and abnormal clinical and laboratory findings (4.5%) were the top five causes for the emergency department visits by the elderly. In addition, our results indicated that 5.2% of the elderly patients were admitted mostly to the coronary intensive care.

Conclusion: Circulatory disorders were the most common cause of the emergency visits and hospitalization of elderly patients. These results highlight the need for new studies for prevention of circulatory system diseases, strategic planning for emergency care services and development of relevant protocols and policies.

Key Words: Emergency; Aged; Chronic Disease, Emergency Treatment.

ARAŞTIRMA

YAŞLILARIN ACİL SERVİSE BAŞVURMA NEDENLERİ: KARS'TA RETROSPEKTİF BİR ÇALIŞMA

ÖZ

Giriş: Yaşlı nüfusun artmasıyla birlikte acil hizmetlere de gereksinim artmaktadır. Bu çalışma hizmetlerin uygun şekilde planlanması amacıyla acil servise başvuran yaşlıların başvurma nedenlerinin belirlenmesidir.

Gereç ve Yöntem: Kafkas Üniversitesi Sağlık, Araştırma ve Eğitim Hastanesi Acil servisine 1 Ocak 2013 ve 1 Ocak 2015 tarihleri arasında başvuran 65 yaş üstü yaşlıların tıbbi kayıtları ICD-10 tanı kodları sınıflama sistemine göre retrospektif olarak analiz edilmiştir.

Bulgular: Toplam hastalar içinde acil servise başvuran yaşlı hasta yüzdesi 19,6'dır. Çalışmaya katılan yaşlıların yaş ortalaması 74,29±7,04, %53,6'sı erkek hastadır. Yaşlı hastalar en fazla yaz mevsiminde acil servise başvurmuştur ve %46,3'ü kırmızı odaya alınmıştır. Yaşlıların acil servise başvuru nedenleri arasında ilk beş sırada dolaşım sistemi hastalıkları (%46,3), solunum sistemi hastalıkları (%15,6), kas iskelet sistemi hastalıkları (%9), endokrin beslenme ve metabolik hastalıklar (%6,5), semptomlar ve anormal klinik ve laboratuar bulguları (%4,5) yer almaktadır. Ayrıca yaşlıların %5,2 sıklıkla en fazla koroner yoğun bakım ünitesine yatırıldığı belirlenmiştir.

Sonuç: Yaşlı hastaların acile başvuru ve yatış nedenleri arasında dolaşım problemleri birinci sırada yer almaktadır. Bu nedenle dolaşım sistemi hastalıklarına yönelik korunma amacıyla yeni çalışmaların yapılması, acil bakım hizmetlerinin planlanması ve protokol ve sistemlerin geliştirilmesi önerilmiştir.

Anahtar Sözcükler: Acil; Yaşlı; Kronik Hastalık; Acil Servis Tedavi.

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INTRODUCTION

There has been a rapid increase in the elderly population globally, including Turkey. According to data from Turkey Statistical Institute (TSI), the percentage of population aged 65 years or above has been predicted to increase from 8% in 2014 to 10.2%, 20.8% and 27.7% in 2023, 2050 and 2075, respectively, and the elderly dependency rate has been indicated to be 11.8% (1).Such a rapid increase in the elderly population in all age groups is associated with numerous problems, including health, economic and social issues, consequently increasing the need for emergency services as the elderly seek substantially more medical care. Karadag *et al.* reported that 20% of the patients visiting emergency departments were elderly (2). In addition, a report published in USA stated that emergency department visits increased with increasing age. The rate of these visits made by patients over the age of 65 years was 15% and rose to 54.3% for those aged 85 years and above (3).

Acute and chronic conditions ailing elderly patients are important during visits to the emergency department. The prevalence of chronic diseases among elderly, which depends on their environment, ranges from 51% to 92.2% (4-6). Cardiovascular diseases leading to sudden death are the most common of all the chronic diseases in the elderly (7-9). Moreover, the utilization of drugs for chronic diseases is also high and varies between 84.9% and 86% according to different studies (6-7). Other important causes of the emergency department visits are falls; fractures and severe soft tissue injuries (which are serious) in 10%–25% of the elderly individuals (10). Sütoluk *et al.* reported that elderly were more prone to home accidents and falls comparison with other age groups (11). Chronic obstructive pulmonary disease (COPD) is an important cause of morbidity and mortality among the elderly, and acute respiratory tract infections commonly precipitate COPD exacerbation. Furthermore, infectious diseases are a significant cause of the emergency department visits by the elderly. They are more severe and associated with higher mortality rates in the elderly than in the younger age groups (12). One study reported upper respiratory tract infections (34.3%) as the main cause of the emergency department visits by the elderly (9).

Compared with younger patients, evaluation of the elderly at emergency department presents more challenges as their health issues are more complex and atypical. In addition, they may not easily express their feelings or convey the problems they might be experiencing, and tend to be more satisfied with the service they have received (13). They are also more likely to be confused due to dementia, Alzheimer's disease, delirium or circulatory disorders and are more likely to suffer from sensory or perception disorders. Furthermore, they require more extensive laboratory and radiological processing and have to stay longer at the emergency department (4). Therefore, ensuring that a sufficient time is available for a more comprehensive and age group-specific evaluation is critical in addition to the development of an age specific training for evaluating the elderly in emergency department settings (14). Nonetheless, in the current health system, the services for elder care, the number of trained personnel in this field and the protocols and policies are insufficient. Therefore, this study aimed to provide necessary information regarding staff training, strategic planning and development of protocols and policies for elderly care in the emergency department settings.

MATERIALS AND METHOD

Kars is located in the Eastern Anatolian region of Turkey at an altitude of 1768 metres above the sea level. The average coldest and hottest temperatures in Kars are -12.1 °C and 17.5 °C, respectively, with an average annual temperature of 4.1 °C and ample rain throughout the year. The health care system in Kars can be classified as primary, secondary and tertiary level health care, reflecting health services administered across Turkey. Emergency health services are provided at secondary and tertiary health care facilities. Patients who cannot be treated at the secondary care facilities are directed to a tertiary hospital or to a more advanced one. According to data obtained from Kars Public Health Unit, the elderly comprised 7.6% of the population in Kars. They are given priority in provision of health services across the country, and these services are legally guaranteed.

Additionally, in 2009, Turkish Ministry of Health mandated a three level emergency triage scale intending to designate the severity of the case which were categorized with the colours of red, yellow and green (Table 1).

In Kars, two emergency units, a second stage and a third stage, are affiliated with two separate hospitals. The Emergency Department of the Health, Research and Training Hospital of Kafkas University started accepting patients in November 2012. The nearest university hospital is located in Erzurum, about 3 hours away. Therefore, information gained from this study will provide a critical database for future planning.

Table 1— Emergency Triage Scale

TRIAGE COLOR	DESCRIPTION OF CATEGORY	CLINICAL DESCRIPTORS (MODEL CASES)
RED	Conditions that are threats to life (or imminent risk of deterioration) and require immediate aggressive intervention.	Cardiac arrest Respiratory arrest Immediate risk to airway Major multi trauma Respiratory rate < 10/min BP < 80 mmHg (adult) or severely shocked child/infant Unresponsive or responds to pain only Ongoing / Prolonged seizure IV overdose and unresponsive or hypoventilation Chest pain of likely cardiac nature
	The patient's condition is serious enough or deteriorating so rapidly that there is the potential of threat to life, or organ system failure, if not treated within ten minutes of arrival	Extreme respiratory distress or pulse oxymetry <90 Airway risk-severe stridor or drooling with distress Circulation compromise - Clammy or mottled skin, poor perfusion - HR <50 or >150 - Hypotension with hemodynamic effects Acute hemiparesis/dysphasia Fever with sign of lethargy (any age) Acid or alkali splash to eye – requiring irrigation Severe localised trauma – major fracture, amputation Very severe pain – any cause Significant sedative or other toxic ingestion Behavioral/Psychiatric: - Violent or aggressive - Immediate threat to self or others

This study was conducted by retrospective medical record analysis of patients visiting the Emergency Department of the Health, Research and Training Hospital of Kafkas University over a 2-year period between 1 January 2013 and 1 January 2015. Demographic data, including age and gender, seasons of visits, triage categories, diagnoses and prognoses of elderly patients were investigated utilizing the ICD-10 coding system. The study was approved by the Ethics Committee Presidency of Clinical Research of the School of Medicine at Kafkas University. Data were represented as numbers with percentages and/or means±standard deviation, and $^{-2}$ test was used for further analysis with SPSS 20.0 software (IBM, USA).

RESULTS

46.559 patients applied to emergency care unit during the study period. A total of 9140 patients visited the emergency department during the study period. Geriatric patients rate amongst total number of emergency cases were 19.6%. The average age of the elderly was 74.29±7.04, and 53.6% of them were male. The average hospital stay of elderly patients was 8.30±7.50 hours. No relationship was detected between the age and the length of stay at the emergency department (r=0.00, p=0.57).

Table 2 shows the gender and season distribution among elderly patients visiting the emergency department. Statistical analysis determined that the emergency department visits by the elderly were more frequent during summers (28.1%) compared with other seasons (28.1% versus 23.5% winter and spring). However, there was no relationship between seasons, gender and diagnosis (p=0.17).

Further analysis revealed that 46.3% of the elderly patients were taken to the category red, and 52.7% of them were

Table 2— Season That the Elderly Patients Applied to the Emergency Department, by Sex

Seasons	Sex						
	Male		Female		Total		
	Number	Percent	Number	Percent	Number	Percent	$\chi 2=5.022$ p=0.17*
Spring	1193	55.6	953	44.4	2146	23.5	
Summer	1363	53.0	1208	47.0	2571	28.1	
Autumn	1221	53.6	1055	46.4	2276	24.9	
Winter	1125	52.4	1022	47.6	2147	23.5	
Total	4902	53.6	4238	46.4	9140	100.0	

* Chi-square test was used.

Table 3— Distribution of Triage Category Cases of the Elderly Applying to the Emergency Department, by Sex

Triage Category	Sex						
	Male		Female		Total		
	Number	Percent	Number	Percent	Number	Percent	$\chi 2=16.090$ p=0.00*
Red	2230	52.7	2000	47.3	4230	46.3	
Yellow	1945	55.8	1539	44.2	3484	38.1	
Green	712	50.8	689	49.2	1401	15.3	
Unknown	15	52.4	10	47.6	21	0.3	
Total	4902	53.6	4238	46.4	9140	100	

* Chi-square test was used.

male. The number of male elderly patients admitted to the triage area was significantly high (p=0.00, Table 3).

As seen in Table 4, there was no relationship between diagnosis and gender. Circulatory system diseases (46.3%); respiratory system diseases (RSDs, 15.6%); musculoskeletal diseases (9%); endocrine, nutritional and metabolic diseases (ENMDs, 6.5%) and non-specific symptoms and abnormal clinical and laboratory findings (4.5%) comprised the five most common causes of the emergency department visits by the elderly (Table 4). Also urogenital diseases were the sixth most common cause of the emergency department visits by the elderly (Table 5). Among circulatory system disorders, the rates of ischemic heart disease, hypertensive disease, cerebrovascular disease, pulmonary heart and circulation disorders and other forms of heart disease were 61.9%, 26.4%, 4.4%, 3.7% and 3.6%, respectively.

The analysis of distribution of the diagnostic groups according to age group, as shown in Table 5, revealed that the number of visits were higher for those between the ages of 65 and 74 years.

Finally, as shown in Table 6, 78.5% of the elderly patients were discharged or transferred; in addition, 5.2% of the elderly patients were admitted to the coronary intensive care.

Discussion

To our knowledge, this is a novel study that examined the emergency department visits by the elderly in the Eastern Anatolian region of Turkey. However, our study has several limitations. The study encompassed data from only one health care facility. In addition, data regarding medications used by patients, means of their arrival to the emergency department (i.e. ambulance) and number of emergency department visits were not included in the final analysis.

The seasonal differences in the visits shown by this study have been shown by other groups as well (15-18), and the dif-

Table 4— Diagnosis, Groups of Elderly Patients, by Sex

Diagnosis Groups	ICD-10 Codes	Sex					
		Male*		Female*		Total**	
		Number	Percent	Number	Percent	Number	Percent
Diseases of the circulatory system	I00-I99	2232	52.7	2000	47.3	4232	46.3
Diseases of the respiratory system	J00-J99	802	56.4	620	43.6	1422	15.6
Diseases of the musculoskeletal system and connective tissue	M00-M99	427	52.1	392	47.9	819	9.0
Endocrine, nutritional and metabolic diseases.	E00-E90	283	48.0	307	52.0	590	6.5
Symptoms, signs and abnormal clinical and laboratory findings	R00-R99	218	52.5	197	47.5	415	4.5
Diseases of the genitourinary system	N00-N99	264	65.0	142	35.0	406	4.4
Other reasons		665	54.0	570	46.0	1230	13.4
Unknown		11	52.4	10	47.6	21	0.2
Total		4902	53.6	4238	46.4	9140	100.0

*Line percentage was used.

** Column percentage was used.

Table 5— Distribution of Diagnosis Groups Was Examined by Age Group*

Diagnosis Groups		Age Groups					
		65-74		75-89		90 ↑	
		Number	Percent	Number	Percent	Number	Percent
Diseases of the circulatory system	I00-I99	2349	55.5	1757	41.5	126	3.0
Diseases of the respiratory system	J00-J99	808	56.8	584	41.1	30	2.1
Diseases of the musculoskeletal system and connective tissue	M00-M99	536	65.4	266	32.5	17	2.1
Endocrine, nutritional and metabolic diseases.	E00-E90	330	55.9	244	41.4	16	2.7
Symptoms, signs and abnormal clinical and laboratory findings	R00-R99	251	60.5	152	36.6	12	2.9
Diseases of the genitourinary system	N00-N99	204	50.2	193	47.5	9	2.2
Other reasons		692	55.5	510	40.9	43	3.45
Unknown		12	57.1	9	42.9	-	-
Total		5182	56.7	3715	40.6	243	2.7

*Line percentage was used.

ferences in outcomes among the studies are suggested to be due to seasonal, environmental and socio-economic conditions. The emergency department visits by the elderly in Kars were predicted to increase during winters. One possible explanation for this contrary outcome would be temporary translocation of the elderly to warmer provinces due to difficult living conditions and transportation problems in the villages and towns around Kars in winters.

In our study, nearly half of the elderly patients visiting the emergency department were taken to the category red according to triage coding. Previous studies did not include information on triage cases involving the elderly; however, the

Table 6— Prognoses of Elderly Patients Applying to the Emergency Department

Prognoses of Elderly Patients Applying to The Emergency Department	Number	Percent
Discharge/Dispatch	7184	78.5
Coronary Intensive Care Unit	474	5.2
Internal Medicine and Internal Medicine Intensive Care Unit	453	5.0
Cardiology and Angiography Unit	289	3.2
General Surgery and General Surgery Intensive Care Unit	192	2.1
Neurology and Neurology Intensive Care Unit	116	1.3
Orthopedy	111	1.2
Chest Diseases	90	1.0
Cardiyovascular Surgery and Cardiovascular Intensive Care Unit	81	0.9
Urology	44	0.5
Nephrology	32	0.4
Brain Surgery	28	0.3
Infection Diseases	19	0.2
Other	23	0.2
Death	4	0.1
Total	9140	100.0

high rate of category red triage cases in this study could be due to more complex cases transferred to our centre, which is located within the highest-level hospital in the province.

Cardiovascular disease is the most common cause not only of the use of health care services but also of morbidity and mortality among the elderly (19). According to a report published in 2013 by the American Heart Association, 66% of the cardiovascular deaths occurred at or after the age of 65 years (20). According to a study data in 2009, in Turkey, cardiac diseases were the most common cause of overall death at 39.8% (21), and circulatory system diseases and cardiac issues were the most common cause of the emergency department visits by the elderly (8,15,17,18). Similarly, in our study, circulatory system problems were the most common cause of the emergency department visits by the elderly. These findings are in agreement with the results of our literature review which indicated circulatory system diseases as the most common cause of emergency department visits (8,22). The rates of cardiovascular diseases observed in our study are higher than those observed in other studies. As Kars is a high-altitude city in Eastern Anatolian region of Turkey with a cold climate, both the young and old individuals tend to stay indoors with subsequent decreased activity.

Respiratory system diseases (9.8%) constitute the third most common cause of death in Turkey (21). While there are no studies on RSDs or COPD prevalence in the elderly in Turkey, COPD prevalence reaches 15-20% above 40 ages (23). Our results showed RSD as the second most common cause of the emergency department visits by the elderly, which ranged between 9.5% and 17% in other studies (8,15). The high rate of RSD-related emergency visits to our facility was noticeable given the lack of industry in Kars. One reason might be the utilization of biomass, which is a significant indoor air pollutant, during the long winter season in Kars due to the low socio-economic level.

Musculoskeletal diseases increase with age and are a source of debilitating pain that adversely affects quality of life of the elderly. Thus, musculoskeletal diseases are predicted to constitute a significant portion of the emergency department visits by the elderly. In our study, musculoskeletal diseases were the third most common cause, which was in agreement with previously reported range of 6.6%–16.7% (8,9,15). One underlying reason may be the distinct and variable environmental conditions. Further, as mentioned above, vitamin D deficiency as well as lack of exercise and social opportunities in the elderly may be a significant risk factor for this outcome.

The most important ENMD of the emergency department visits by the elderly was diabetes mellitus (DM). While comprehensive data on the prevalence of DM in the elderly in

Turkey is lacking, our results indicated ENMDs as the fourth most common cause for the emergency department visit by the elderly, and this finding is not in agreement with previous studies. For example, endocrine disorders were reported as the tenth most common cause (4.7%) and fifth most common cause (4.2%) in the studies by Baz *et al.* and Kılınç *et al.,* respectively. Furthermore, they were the fifth most common cause (5.1%) in a study conducted by Nur *et al.* that included 112 emergency medical services (8,15,17). There are several potential reasons for the higher rate of ENMDs in our study than in the earlier studies, which include increased incidence of DM, insufficient patient education on DM, increased acute or chronic complications due to failure in treatment compliance and socio-economic or socio-cultural differences.

Elderly healthcare is a major health issue in Turkey. The city of Kars does not have any nursing homes, and the elderly usually live with their children. While there is no study investigating the quality of elderly care in a family environment, the deficiency of elderly care at a society level has been acknowledged. In our study, the presence of a subset of the elderly visiting the emergency department due to abnormal clinical findings may indicate problems with in-house care.

Urogenital diseases tend to occur more commonly in older people than in younger people due to a number of reasons (24). In our study, urogenital diseases were the sixth most common cause. Studies have reported urogenital diseases among the five most common causes of the emergency department visits by the elderly (range, 8.5%–13.5%) (9,15); however, our study, in contrast to other studies, showed a lower incidence for urogenital diseases. One reason for this outcome may be the transfer of patients to another hospital due to lack of a dialysis unit at our hospital.

Finally, the majority of elderly visiting our emergency department were either discharged or transferred. The literature review revealed that 39%–93% of the elderly received outpatient treatment (8,25). Internal medicine, surgery, cardiology and intensive care services were the most frequently utilized services by hospitalized patients (8,18). In our study, the mortality among the elderly was very low; again, we predict that one primary reason was the transfer of more complex cases to other health care facilities.

In summary, the need for emergency services will grow with the increase in the elderly population. In our study, circulatory system problems were the most common cause of visits to the emergency department, at a rate that appeared to be considerably higher than that reported in other studies. Therefore, public awareness for the protection and prevention from circulatory system diseases should be increased, and emergency medical service planning should be prioritized accordingly. Finally, relevant protocols should be developed, and appropriate staff training should be provided.

Disclosure Statement

The authors declare that they have no conflict of interests.

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