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- Sinan YENAL[1]
- Gökhan KESER[2]
- Aliye MANDIRACIOĞLU[3]
- Mehmet Akif YALÇIN[2]
- Başak BAYRAM[4]
- Fehmi AKÇİÇEK[2]

CORRESPONDANCE
Sinan YENAL
Dokuz Eylül University, Health Care Services Vocational School, İzmir, Türkiye

Phone: 02324124734
Fax: 02322770739
e-mail: sinan.yenal@deu.edu.tr

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[1] Dokuz Eylül University, Health Care Services Vocational School, İzmir, Turkey
[2] Ege University, Faculty of Medicine, Department of İnternal Medicine, İzmir, Turkey
[3] Ege University, Faculty of Medicine, Department of Public Health, İzmir, Turkey
[4] Dokuz Eylül University, Faculty of Medicine, Department of Emergency, İzmir, Turkey

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RESEARCH

THE DETERMINATION OF THE STATUS OF EMERGENCY DEPARTMENT USE BY ELDERLY PATIENTS AND OF THE INDICATORS FOR AMBULANCE USE

Abstract

Introduction: This study was prepared with the objective of determining the ratio of use of ambulances by the patients 65 years of age and older who applied to emergency department and the indicators for the use of ambulances.

Materials and Method: This cross-sectional research study, enrolled patients at least 65 years of age or older, who applied to the emergency department in Izmir Dokuz Eylül University Hospital. Two measurement tools were prepared with the objective of gathering the study data. The first measuring tool was prepared with the objective of evaluating the indicators of ambulance use by the patients, whereas the second measuring tool was for the situations of using emergency department.

Results: 555 patients were included in the study. Only 34.2% of these patients reported that they came to the emergency department with an ambulance. It was observed that patients living with their families, and those with medical emergencies, i.e. who did not experience a trauma or an accident, used ambulances less frequently for going to the emergency department ($p<0.05$). Among patients who came to the emergency department with private vehicles, 59.2% stated that they did not call an ambulance because they thought that it would be quicker to come with their own resources. On the other hand, among patients who came to the hospital with an ambulance, a ratio of 67.4% replied that they called the ambulance because of emergency.

Conclusion: The results of this study suggest that public awareness about 112 ambulance systems should be increased, especially for elderly patients.

Keywords: Geriatrics; Ambulance; Emergency Medical Services; Emergency Service, Hospital

ARAŞTIRMA

YAŞLI HASTALARIN ACİL SERVİS KULLANIM DURUMU VE AMBULANS KULLANIM BELİRLEYİCİLERİNİN SAPTANMASI

Öz

Giriş: Bu çalışma acil servise başvuran 65 yaş ve üzeri hastaların ambulans kullanım oranını ve ambulans kullanım belirleyicilerini saptamak amacıyla hazırlanmıştır.

Gereç Yöntem: Kesitsel tipte planlanan bu araştırmanın evrenini, İzmir Dokuz Eylül Üniversitesi Hastanesi'nin acil servis birimine başvuran 65 yaş ve üstü hastalar oluşturmuştur. Çalışmanın verilerini toplamak amacı ile iki adet ölçme aracı hazırlanmıştır. Birinci ölçme aracı hastaların ambulans kullanım belirleyicilerini, ikinci ölçme aracı ise AS kullanım durumlarını değerlendirmek amacıyla hazırlanmıştır.

Bulgular: Araştırmaya 555 hasta alınmıştır. Çalışmaya alınan hastaların %34.2'sinin acil servise ambulans ile geldiği bulunmuştur. Ambulans ile gelen hastalar ise, %67.4 oranında acil durum nedeni ile ambulansı aradıkları yanıtını vermiştir. Ailesi ile birlikte yaşayan ve non-travmatik hastaların, acil servise ulaşmak için daha az sıklıkta ambulans kullandığı görülmüştür ($p<0.05$). AS birimine özel araç ile gelen hastaların %59.2'lik kısmı, kendi olanaklarıyla gelmenin daha çabuk olacağını düşündükleri için ambulans aramadıklarını belirtmiştir.

Sonuç: Bu çalışma özellikle yaşlı hastalarda 112 Ambulans sistemi hakkında halkın bilinçlendirilmesi gerektiğini ortaya koymaktadır.

Anahtar sözcükler: Geriatri; Ambulans; Acil Tıp Hizmetleri; Acil Hizmet, Hastane

INTRODUCTION

Just as elderly patients present to health centres, they present more frequently to emergency departments (EDs) for acute and complex problems. They feel the need to receive more intensive service and to be subjected to more diagnostic procedures. Consequently, they remain in EDs for a longer time. Prior studies have observed that the ratio of patients aged 65 years and older presenting to EDs in Turkey varied between 9% and 18% (1-6). Studies in different countries have reported that this ratio varied between 15% and 47% (7-10).

Patients presenting to EDs have been evaluated in various studies conducted in Turkey and worldwide, and these evaluations were generally based on information obtained from hospital records. Although the number of patients arriving at hospitals via an ambulance has been quantified, the number of studies that examined the reasons for in detail this is limited (11-13). It is important to determine the reasons patients presenting to EDs call or do not call an ambulance so that the use of 112 emergency medical services (EMS) can be optimised.

In this study, we aimed to determine the ratio of the use of ambulances by patients aged 65 years and older who presented to the ED of Dokuz Eylül School of Medicine and evaluated the indicators of ambulance use.

MATERIALS AND METHOD

This cross-sectional research study comprised patients aged 65 years and older who presented to the ED of Izmir Dokuz Eylül University Hospital between 1 August 2015 and 31 August 2015. Sampling was not done, and the study targeted the entire population. Patients whose general condition was such that were not suitable to attend interviews, who were sent to EDs at other polyclinics and who died in EDs were excluded. The first arrivals of patients who presented to the ED more than once within the study period were included. Of 9484 patients who presented to the ED of Dokuz Eylül University Hospital during the study period, 820 (8.6%) were 65 years and older. After excluding patients with repeat arrivals, 755 met the inclusion criteria. Of these, 84 (11.2%) refused to participate, 64 (8.4%) could not be contacted, 27 (3.5%) were in a poor general condition because of which information could not be obtained, 11 (1.5%) were excluded as they were directed from the ED to another polyclinic within the hospital and 14 (1.9%) died. Finally, 555 (73.6%) could be contacted and were included in this study.

By scanning the literature and obtaining the views of experts, two measurement tools were prepared that were suitable to the objective of the study. The first measurement tool determined the patients' individual attributes, economic status, social security information, educational status, reasons and conditions for presenting to the ED and reasons for calling an ambulance. The tool was filled through face-to-face interviews held with the patient or their relatives. The second measurement tool determined the outcome of elderly patients in the ED. In this tool, the reason (traumatic or nontraumatic) for patients presenting to the ED, status of care at the ED (outpatient or inpatient), time that patients remained in the ED, status of requesting a consultation and the unit (surgical or internal medicine unit) in which inpatients were admitted were obtained by entering the related information into the hospital computer system.

The elderyl patients in this study are divited in two groups. First is the ambulance group (112 EMS Ambulance, Private ambulance and Institution ambulance), the second it's the private vehicle group (own cars, taxies, public busses etc.).

Data were evaluated using SPSS for Windows 15.0 software. The "Chi-square (chi-sq)" test was used to compare the situations of patients presenting to the ED with their sociodemographic status and to compare variables that could influence

their presentation to the ED with their status of ambulance use. The independent samples *t*-test was used to compare the ages of patients presenting to the ED, distance travelled to present to the ED, onset of complaints that made presentation to the ED necessary and duration of ED stay with their status at presentation. Logistic regression analysis was used for variables that were significant at the end of single-variable analysis.

This study was approved by the Dokuz Eylül University, Noninterventional Research Ethics Committee dated 21 August 2015, protocol Number 2197-GOA and decision number 2015/19-43.

RESULTS

Of 190 patients (34.2%) who presented to the ED via an ambulance, most (*n*=177; 93.2%) presented via the 112 EMS (Table 1).

A comparison of the sociodemographic findings of patients presenting to the ED via an ambulance is shown in Table 2. Most elderly patients who preferred to present to the ED via a private vehicle were married (*P*=0.02) or lived with their families (*P*=0.01; Table 2).

Reasons for calling or not calling an ambulance by patients who presented to the ED via a private vehicle or an ambulance is shown in Table 3.

When the complaints of patients were considered, 468 (84.3%) presented to the ED due to nontraumatic complaints. The ratio of patients presenting to the ED via an ambulance was statistically significantly lower among those without traumatic complaints than among those with traumatic complaints (p=0.02; Table 4).

The comparison according to age, distance travelled for presenting to the ED, onset of complaints requiring presentation to the ED and duration of stay in the ED of patients coming via an ambulance or a private vehicle is shown in Table 5. Accordingly, patients who presented to the ED via an ambulance were statistically significantly older and remained in the ED for a significantly longer period than those who presented to the ED via a private vehicle (p<0.01 and p<0.01, respectively; Table 5).

Logistic regression analysis of the variables found to be significant after single-variable analysis is shown in Table 6. Accordingly, the rate of presenting to the ED via an ambulance was 13.07 (2.92–58.58)-fold higher for those living in a rest home and was 9.34 (6.20–14.06)-fold higher for those who called the 112 EMS within the past year. In contrast, the status of being married decreased the use of ambulances by 0.60 (0.40–0.93)-fold, and living together with family decreased it 0.57 (0.38–0.87)-fold.

Table 1. Status of patients presenting to the emergency department.

Status of presenting to the ED (*n*=555)	Total n	Total %*
Via a private vehicle	365	65.8
Via an ambulance	190	34.2
Via an ambulance (*n*=190)		
112 EMS ambulance	177	93.2
Private ambulance	6	3.1
Institution ambulance	7	3.7

* Column percentage

Table 2. Sociodemographic attributes of the patients and statuses of presenting to the emergency department.

Variable	Ambulance		Private vehicle		Total			
	n	%*	n	%*	n	%**	χ^2	p
Gender (*n*=555)								
Female	94	36.0	167	64.0	261	47.1	0.69	0.40
Male	96	32.7	198	67.3	294	52.9		
Marital status (*n*=549)								
Married	142	32.1	300	67.9	442	80.5	5.31	0.02
Single	47	43.9	60	56.1	107	19.5		
Status of living (*n*=542)								
With family	135	31.8	289	68.2	424	78.2	6.97	0.01↓
With children	30	38.5	48	61.5	78	14.2	0.57	0.45
Rest home	13	86.7	2	13.3	15	3.0	18.40	0.01↓
Alone	9	39.1	14	60.9	23	4.2	0.21	0.65
Caregiver	1	50.0	1	50.0	2	0.4	0.21	0.57***
Monthly income (*n*=512)								
1000 TL or less	42	32.1	89	67.9	131	25.6	0.01	0.94
1001–2000 TL	104	34.8	195	65.2	299	58.4		
2001–3000 TL	22	32.8	45	67.2	67	13.1		
3001 or more	4	26.6	11	73.4	15	2.9		
Social security (*n*=555)								
Emekli Sandığı[a]	71	34.8	133	65.2	204	36.8	0.05	0.83
SSK[b]	72	35.1	133	64.9	205	36.9	0.11	0.74
BAĞ-KUR[c]	30	30.6	68	69.4	98	17.7	0.69	0.40
Private Insurance	1	14.2	6	85.8	7	1.3	1.25	0.24***
None	14	38.9	22	61.1	36	6.5	0.37	0.54
Other	2	40.0	3	60.0	5	0.9	0.07	0.55***
Educational status (*n*=548)								
Illiterate	23	29.5	55	70.5	78	14.2	0.78	0.37
Primary school graduate	79	39.5	121	60.5	200	36.5		
Middle school graduate	42	33.1	85	66.9	127	23.2		
High school graduate	29	35.8	52	64.2	81	14.8		
University graduate	16	25.8	46	74.2	62	11.3		
Status of health of family (*n*=461)								
Yes	11	33.3	22	66.7	33	7.2	0.01	0.92
No	139	32.5	289	67.5	428	92.8		
Status of calling 112 within the past year (*n*=552)								
Yes	120	67.6	57	32.4	177	32.1	130	0.01↓
No	69	18.4	306	81.6	375	67.9		

*Line percentage ** Column percentage ***Fisher's Exact Test was applied.
[a]Pension Fund [b]Social Security Institution [c]Pension Fund for Artisans and Self-employed

Table 3. Reasons for calling or not calling an ambulance by patients who presented to the emergency department via a private vehicle or an ambulance.

Reason	Total n	Total %*
Patients who presented to the ED via a private vehicle (*n*=363)		
1- Thought it would be quicker to come with their own resources	215	59.2
2- Thought that it was not an emergency that warranted calling an ambulance		
3- Did not think to call an ambulance	113	31.1
4- The fact that the ambulance may not go to the hospital he/she wanted	13	3.6
5- To not pay a fee		
6- Because the hospital was close	5	1.4
7- Other	4	1.1
	3	0.8
Patients who presented to the ED via an ambulance (*n*=181)	10	2.8
1- Due to an emergency situation		
2- To transport the patient		
3- Thought that they would come to the hospital quicker	122	67.4
4- Since it was an institutional ambulance	25	13.8
5- Since oxygen support was needed	13	7.2
6- Other	7	3.9
	4	2.2
	10	5.5

* Column percentage

Table 4. Variables that could influence patients presenting to the emergency department with the relationship of ambulance use.

Factor	Ambulance n	Ambulance %*	Private vehicle n	Private vehicle %*	Total n	Total %**	X^2	p
Reason for presenting to the ED (*n*=555)								
Non-traumatic	151	32.2	317	67.8	468	84.3	5.14	0.02
Traumatic	39	44.8	48	55.2	87	15.7		
Status of ED care (*n*=555)								
Outpatient	131	32.8	268	67.2	399	71.9	1.24	0.26
Inpatient	59	37.8	97	62.2	156	28.1		
Inpatient (*n*=156)								
Internal medicine unit (*n*=113)								
	39	34.5	74	65.5	113	72.4	1.91	0.16
Surgical unit (*n*=43)	20	46.5	23	53.5	43	27.6		
Status of requesting a consultation (*n*=555)								
Yes	128	38.5	204	61.5	332	59.8	6.85	0.01↓
No	62	27.8	161	72.2	223	40.1		

*Line percentage ** Column percentage

Table 5. Comparison according to some characteristics of the patients.

Characteristics	Ambulance (n=190) $\bar{X}$ ±sd	Private vehicle (n=365) $\bar{X}$ ±sd	t	p
Age (years)	78.2±7.9	76.0±7.3	−3.24	0.01↓*
Distance travelled for presenting to the ED (km)	20.8±25.7	19.1±18.2	0.79	0.43
Time from when the complaints started and to presenting to the ED (min)	21.8±38.4	26.5±36.0	−1.38	0.16
Duration of stay in the ED (min)	752.2±872.9	581.0±780.7	−3.44	0.01↓*

*The z value has been given.

Table 6. Significant variables that influence presentation to the emergency department via an ambulance and the logistic regression model.

Variable	Beta	p	OR[a]	95% CI[b]
Age (continuous)	0.038	0.01↓	1.04	1.02–1.06
Marital status (married)	−0.504	0.02	0.60	0.40–0.93
Living together with family	−0.557	0.01↓	0.57	0.38–0.87
Living in a rest home	2.571	0.01↓	13.07	2.92–58.58
Calling the 112 service within the past year	2.234	0.01↓	9.34	6.20–14.06
Reason for presenting to the ED (trauma)	0.478	0.02	1.61	1.01–2.57
Request for consultation	0.488	0.01↓	1.63	1.13–2.35

[a]Odds ratio [b]Confidence interval

DISCUSSION

To the best of our knowledge, our study is the first in Turkey to examine the reasons for patients 65 years and older presenting to the ED via an ambulance. The most basic reason for using ambulances was the thought that the patient was in an emergency situation. However, patients who presenting to the ED via private vehicles stated that they did not call an ambulance because they thought that it would be quicker to come via their own resources.

Among our study patients, 34.2% presented to the ED via ambulance. In various studies conducted in Turkey, the ratio of patients 65 years and older presenting to the ED via an ambulance varies between 5.6% and 40.0% (2,5,6,14,15).

Individuals who were married came to the hospital ED less frequently with an ambulance (OR=0.60). In the study made in Australia by Clark et al. in 1999, they found that in persons 65 years of age and older, being married decreased to a significant extent the use of an ambulance (PR=0.69) (11). In the

study made in Australia by Kerr et al. in which they evaluated the situations of coming to the hospital with an ambulance of all age group patients who had had a heart attack, it was found that 59% of the married patients came to the hospital with an ambulance (16). This difference can be explained with societal understanding. It was thought that the presence in Turkey of persons who would assist the patient would sometimes be the reason for paying insufficient attention to the other aid choices. It was found to be statistically significant that individuals who lived in a rest home came to the ED more frequently with an ambulance. It was thought that the result was also influenced by using institutional ambulances for persons living in a rest home.

It was observed that within the past year, the request for an ambulance in the situation of requesting aid from the 112 EMS had increased to a significant extent (OR=9.34). These known behaviors can be explained as a repetition. It was observed that persons who had requested help from the Ambulance services would also increase the probability of requesting an ambulance later in their lives.

Most patients who presented to the ED via private vehicles thought that 'it would be quicker to come with their own resources'. If they can provide for this with their own resources, they present to the ED as soon as possible without requesting aid.

The most important reason for preferring to present patients to the hospital ED via an ambulance is the thought that the patient is in an emergency. This situation can be interpreted in two ways. First, they could request ambulance assistance as they really think that their situation is an emergency. Second, they believe that the hospital would take more interest in patients who present to the ED via an ambulance or that they would not experience problems when being admitted to the hospital.

When the complaints of patients were evaluated, 84.3% presented to the ED due to nontraumatic complaints. The ratio of nontraumatic patients presenting to the ED via an ambulance was statistically significantly lower and the frequency of ambulance use by patients with trauma was high (OR=1.61). In 1999, Clark et al. found that the use of ambulances for trauma in people 65 years and older significantly increased (11).

Of the patients who came to the ED, consultations were requested from various units for 59.8% of the patients during treatment. It was found that more consultations were requested for patients who came to the hospital with an ambulance (OR=1.63). In the study made by Loğoğlu et al., consultations were requested for 43.4% of the elderly patients who came to the ED. It was observed that has the age increased, there was also an increase in the ratios of requesting consultations (17). In the study made by Sinoff et al., it was found that of all the consultations requested in the ED, 49.3% were requested for patients in the geriatric age group (18). The results found in this study were generally found to be in conformity with the other studies.

When the times remaining in the ED of patients who came to the ED were examined, it was observed that the patients who came with an ambulance remained for a longer time to a significant extent in the ED. In the study made by Loğoğlu et al., the time of remaining in the ED was found to be 2.9 hours (17). In the study made by Young et al., the time of elderly patients remaining in the ED was found to be 3.5 hours (9). In the study made by Kennelly et al., the time of elderly patients remaining in the ED was found to be 9.2 hours (12). In the study made by Ross et al., the time of elderly patients remaining in the ED was found to be 6.53 hours (19). In this study, the average time of elderly patients remaining in the ED was found to be 10.8 hours. In general, the time of remaining in the ED was in harmony with the other studies. The patients who came with an ambulance remained in the EU for a longer time in a statistically significant manner compared to the patients who came with a private vehicle. The reason for this could be that the health conditions of the patients who came with an ambulance could

be more severe compared to the others. More help is requested from the 112 EMS for patients who are more severe and in worse condition.

The fact that our study included a fixed period (only one month) and that it coincided with the summer season could be a limitation from the aspects of period and time. The study was conducted using data from patients presenting to only the ED of the Dokuz Eylül University Hospital. Consequently, generalisations related to the results are unsuitable. Furthermore, as the study was cross-sectional, the results were limited in the explanation of the relationships.

According to the conclusions of this study, the main reason for calling an ambulance by the patients who came to the ED with an ambulance was the thought that "there was an urgent situation". The main reason for not calling an ambulance by the patients who did not come with an ambulance was the thought that "it would be quicker to come with their own resources". It was found that married patients and those with medical emergencies, i.e. without history of accidents and traumas used ambulances less frequently for coming to the ED. The results of this study suggest that public awareness about 112 EMS should be increased, especially for elderly patients.

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