



## Original Article

# Utilization of Emergency Medical Services among Older People: A Case Study in Iran

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## ABSTRACT

### Article history

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**Introduction:** The need for emergency medical services (EMS) is growing because of the rapidly aging population. This study aimed to assess the utilization of EMS among older people in Tabriz, Iran.

**Methods:** This retrospective study used data from the missions carried out by EMS in 2014-15. All of EMS records were analyzed over a continuous 12-month period by choosing selected profiles from the middle month of each quarter.

**Results:** Among all 10940 missions accomplished in four months, 4175 (38.16 %) calls were for patients aged 60 years and older. A significant association was found between service characteristics and gender/age groups. Women and older people aged 80 - 84 years were more likely to use emergency services. Moreover, the older people had a higher proportion of histories for cardiovascular disease, respiratory difficulties, cerebrovascular accident, fall-related injuries, poisoning, and suicide.

**Conclusion:** Older people constituted a large proportion of EMS which mostly were transferred to emergency departments. As the older adult population grows, health systems should prepare appropriate services by making changes in training, operations, and equipment.

**Keywords:** Aging, Emergency Medical Services, Emergency Department, Iran

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## Introduction

The world's population is dramatically moving towards aging (1- 3). It is estimated that older people will use approximately half of emergency medical services EMS by 2030 (4). A study in a US emergency department (ED) reported that the proportion of patients using EMS to reach the ED increases steadily with age (4). This trend is international and highlights the growth of EMS needs for the older people and the importance of emphasizing elderly care in ED (5).

Furthermore, the growing recognition of multiple chronic conditions among older people may result several adverse outcomes such as increased health care needs which lead their demand for utilization of

medical services (5, 6). Health costs and demand for in-patient and hospitalized services will also arise along with other expenditures (7). Huang et al. analyzed the emergency calls in Taiwan and found that older people suffer from cardiovascular, cerebrovascular, end-stage renal disease, hypertension, diabetes, cancer, Parkinson's disease, and Alzheimer's disease. In addition, the elderly had significantly longer total transport time, poorer consciousness levels, more nontrauma reasons, and lower oxygen saturation than the nonelderly (8). A further study in Iran showed that common complaints of older people were chest pain, asthma and abdominal pain (9). Moreover, the most important

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reasons of hospitalization in Iran were cardiovascular disease, trauma, orthopedic, and respiratory difficulties (10).

The aging population will overwhelm emergency care systems at least partly because these systems are not adequately designed to meet the multifaceted needs of older adults. Despite these concerns and the volume of literature, the focus of much of the research in this area has been relatively less considered (11). Therefore, this study aimed to assess the utilization of EMS among older people.

## Methods

### Study design

This study is a secondary analysis of the emergency calls dealt between April and February 2014-15, by EMS in Tabriz, Iran. Based on retrospective approach and the missions carried out by EMS. All of records were analyzed over a continuous 12-month period, Iranian calendar, by choosing selected profiles from the middle month of each quarter.

### Measures

According to national protocols approved by the National Disaster Management Organization, information on demographics, service characteristics, and reasons for calling the EMS were used to collect the data.

### Ethical considerations

All procedures performed in study were in accordance with the ethical standards of the Tabriz University of Medical Sciences (IRB approval no: TBZMED.REC.1394.1183) and the national research ethics committees. As we applied a retrospective data analysis, patient informed consent was abandoned. Neither patient human rights nor welfare was also affected.

### Data analysis

Data were analyzed using descriptive statistics and Chi-squared test. For this study, the 95 % confidence level was calculated and a p-value of 0.05 was used to represent statistical significance.

## Results

The number of services allocated to older people between late April and late May were 923, late July and late August 1001, late October and late November 1111, late January and late February 1140 respectively. The mean age of older adult users in total was 74.61 years, and, 74.49 and 74.72 years old for men and women respectively. In the four selected months of 2014, a total of 10940 missions were accomplished by the EMS. Of these entire missions,

4175 missions (38.16 %) were allocated to old adults 60 years and older. Moreover, 2116 of cases (50.7 %) were old women and 2059 of cases (49.3 %) were old men. Table 1 summarizes the distribution of utilization of EMS among older people based on gender and age groups.

**Table 1. Distribution of older adults using EMS based on gender and age groups**

Age group	Gender		Total
	Male	Female	
60-64	372	335	707 (16.9 %)
65-69	313	277	590 (14.1 %)
70-74	328	386	714 (17.1 %)
75-79	326	376	702 (16.8 %)
80-84	383	409	792 (19.0 %)
85-89	215	198	413 (9.9 %)
90≤	122	135	257 (6.2 %)
<b>Total</b>	2059 (49.3 %)	2116 (50.7 %)	4175 (100 %)

Table 2 indicates the distribution of old adult's using EMS based on gender, age group and interventions such as deceased before EMS, outpatient and dispatched to ED. As can be seen, 387 of cases (9.1 %) were deceased before attaining EMS. Outpatient cases consisted 2074 (49.9 %) of old adults and there was no need for transferring them to hospitals. Furthermore, 1714 of cases (41.0 %) were transferred to ED. A significant association was found between service characteristics and gender/age groups (Table 3).

The older people had a higher proportion of histories for cardiovascular disease, respiratory difficulties, cerebrovascular accident, fall-related injuries, poisoning, and suicide (Figure 1). Moreover, about 80 percent of the problems associated with item 'others' and were uncertain difficulties.

## Discussion

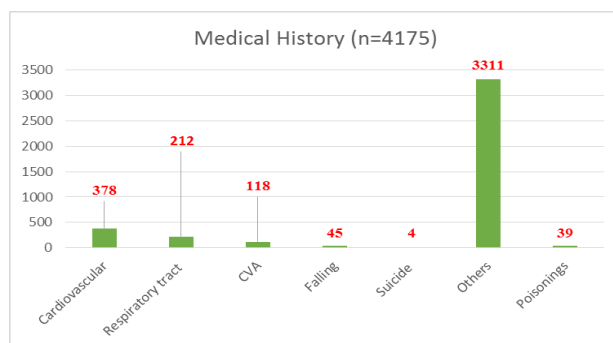
The structural changes in the Iranian population have indicated a rapid movement towards senility. The mentioned procedure represents the high need and demand for health and EMS for the old population in the near future. Due to the increasing rate of old adult population in Iran in the next decades, the Iranian healthcare system will face massive pressures. These difficulties are mainly because of the high burden of disorders in elderly, the increasing use of EMS and unpredicted consequences and needs of old adults (12).

**Table 2. The distribution of old adults using EMS based on gender/age groups and service characteristics**

Variables		Service characteristics			
Gender	Age group	Deceased	Outpatient procedures	Transferred to ED	Total
<b>Male</b>	60-64	36(9.7)	154 (41.4)	182 (48.9)	372 (8.91)
	65-69	35(11.2)	129 (41.2)	149 (47.6)	313 (7.50)
	70-74	30(9.1)	156 (47.6)	142 (43.3)	328 (7.86)
	75-79	27(8.3)	161 (49.4)	138 (42.3)	326 (7.81)
	80-84	54(14.1)	175 (45.7)	154 (40.2)	383 (9.17)
	85-89	30(14.0)	107 (49.7)	78 (36.3)	215 (5.15)
	<b>90≤</b>	20(16.4)	57 (46.7)	45 (36.9)	122 (2.92)
<b>Female</b>	60-64	13(3.9)	160 (47.8)	162 (48.3)	335 (8.02)
	65-69	9(3.2)	183 (66.1)	85 (30.7)	277 (6.63)
	70-74	25(6.5)	210 (54.4)	151 (39.1)	386 (9.25)
	75-79	29(7.7)	199 (52.9)	148 (39.4)	376 (9.01)
	80-84	42(10.3)	204 (49.9)	163 (39.8)	409 (9.80)
	85-89	24(12.1)	101 (51.1)	73 (36.8)	198 (4.74)
	<b>90≤</b>	13(9.6)	78 (57.8)	44 (32.6)	135 (3.23)
<b>Total</b>		387 (9.1%)	2074 (49.9%)	1714 (41%)	4175 (100%)

**Table 3. Association between outcomes/service characteristics and gender/age groups (n=4175)**

Variable		Outcomes/Service characteristics								
		Deceased			Outpatient procedures			Transferred to ED		
		Yes N (%)	No N (%)	p	Yes N (%)	No N (%)	p	Yes N (%)	No N (%)	p
<b>Gen der</b>	<b>Male</b>	232 (11.3)	1827 (88.7)	0.001	939 (45.6)	1120 (54.4)	0.001	893 (43.4)	1166 (56.6)	0.031
	<b>Female</b>	155 (7.3)	1961 (92.7)		1135 (53.6)	981 (46.4)		826 (39.0)	1290 (61.0)	
<b>Age groups</b>	<b>60-64</b>	49 (6.9)	658 (93.1)	0.011	314 (44.4)	393 (55.6)	0.015	345 (48.8)	362 (51.2)	0.021
	<b>65-69</b>	44 (7.5)	546 (92.5)		312 (52.9)	278 (47.1)		236 (40.0)	354 (60.0)	
	<b>70-74</b>	55 (7.7)	659 (92.3)		366 (51.3)	348 (48.7)		295 (41.3)	419 (58.7)	
	<b>75-79</b>	56 (8.0)	646 (92.0)		360 (51.3)	342 (48.7)		286 (40.7)	416 (59.3)	
	<b>80-84</b>	96 (12.1)	696 (87.9)		379 (47.9)	413 (52.1)		317 (40.0)	475 (60.0)	
	<b>85-89</b>	54 (13.1)	359 (86.9)		208 (50.4)	205 (49.6)		151 (36.6)	262 (63.4)	
	<b>&gt;=90</b>	33 (12.8)	224 (87.2)		135 (52.5)	122 (47.5)		89 (34.6)	168 (65.4)	



**Figure 1. Comparison of the reasons for calling EMS (n=4175)**

The present study aimed to assess old adult's quota in non-accidental missions at Tabriz EMS center in 2014 and also the interventions provided for them. Results indicate that old adults by being less than 10 % of the population were responsible for 38 % of non-accidental EMS. Other studies have reported elderly's abundant use of emergency services (13-15). A literature review indicated that the old adult population has seriously challenged the emergency care system. The system is not completely qualified for the extensive and complicated needs of older people (11). The results of the present study regarding men's higher emergency status in comparison to women are in consist with other studies (16, 17). In comparing age groups, 80-84 years old individuals were more likely to use emergency services which were not approved by similar studies (12, 18-20).

### Conclusion

Despite the impending confrontation with the phenomenon of aging, deserving procedures have not been accomplished for overcoming upgrading needs of older people and their relatives. Thus, in the next decades the present EMS are not responsive. In this regards, we present the following recommendations:

The successful experiences of other countries should be applied in Iran. Development of appropriate infrastructure and health care needs of the elderly also should be considered (21). Furthermore, it is important to assess EMS demand procedures, analyze annually consecutive data, referral pattern to emergency medical centers, and the kind of services provided.

Statistics and information from features provided by the EMS is the best tool to aid decision-makers, providers, and managers. On the other hand, the accuracy of the information may deliver suitable services for older people suffering from different multi chronic difficulties. To do this, EMS managers should provide detailed information about health problems, reasons for calling, and needs of their patents.

### Study limitations

In the present study, only non-accidental missions taking place in the disaster and medical management center of Tabriz, Iran were assessed. As mentioned before, about 80 percent of the health problems associated with item 'other', therefore the results could not be generalized to whole the community.

### Conflict of interest

The authors declare no potential conflicts of interests with respect to the authorship and/or publication of this article.

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