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Original Article

Challenges of Emergency Medical Services Utilization by Older Adults in Tabriz, Iran: Data from Health Status of Aged People in Tabriz (HSA-T Study)

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Abstract

Objectives: To evaluate the awareness of older adults in Tabriz of Emergency Medical Services (EMS) and the terms of services.

Design: Cross-sectional study.

Setting(s): Tabriz, the capital city of East Azerbaijan Province, in northwestern Iran.

Participants: A representative sample of≥60 years old noninstitutionalized population containing 1071 participants (514 males and 557 females) in the health status of aged people in Tabriz (HSA-T) study was selected using the probability proportional to the size (PPS) sampling method. Out of all the participants in the HAS-T study, 1062 participants (514 males and 548 females) completed the questionnaire regarding the awareness and knowledge of EMS.

Outcome measures: Service awareness means being informed about the existence of the EMS. Knowledge about EMS is defined as knowing the EMS phone number and knowledge about its free and 24-hour services.

Results: Forty-seven percent of the older adults were not familiar with the EMS system. The awareness of EMS in males was higher than that in females (63.4% vs. 44.4%, $P<0.001$), and it was also higher among those born in cities than those in rural areas (61.2% vs. 46.1%, $P<0.001$). Furthermore, individuals who hold primary, secondary, and higher education had a higher chance of awareness of EMS compared with illiterate people by more than 2, 4, and 12 times, respectively Odds ratio (OR)=2.53; 95% confidence interval (CI): 1.81–3.52, OR=4.69; 95% CI: 2.79–7.91, and OR=12.09; 95% CI: 4.88–29.94).

Conclusions: Due to the high rate of illiteracy and low public awareness, older adults do not have appropriate knowledge about the facilities, conditions, and terms of using EMS and may not be able to demand some of their essential services; therefore, notifying and increasing the older adults' awareness of the available services is necessary.

Keywords: Emergency department, Geriatric care, Health service use, Effectiveness assessment, Paramedics

Introduction

Iran will experience rapid population changes in the coming decades.[1, 2] Population aging has major consequences for the health system,[3] and emergency invasive diagnoses are more prevalent for older patients.[4] The condition of the aged people is usually more acute and is accompanied by co-morbidities.[5] Emergency Medical Service (EMS) plays a crucial role in the timely provision of health care, especially in life-threatening conditions such as trauma, acute coronary syndromes, stroke, and loss of consciousness. Compared to the other ways, EMS provides the fastest means of transportation to the Emergency Department (ED) and the best chance to be treated early.[6]

Although societies have prepared community-based health and support services to support older adults, the provided services are underutilized, and one of the obstacles to their use is the lack of awareness of such services.[7] The awareness and use of services were highly correlated.[8, 9] The first meaning of service awareness is knowing that the intended services exist, but service awareness or lack of it is more complex than knowing that the intended services exist. Awareness is defined as being conscious of, having knowledge of, or being informed about it.[10] The distinction between knowledge and awareness of services is suggested by Krout. Although awareness is a general understanding that a service exists, knowledge is "used to refer to information that is, to a greater or lesser extent, detailed and factual".[11] Further, knowledge includes knowing "what the program is or does, where it is located, or how one gets involved with it".[12]

Krout's study has shown that the utilization rate of existing services is extremely low among older adults.[12] Various social, psychological, economic, and physical factors can influence healthcare utilization.[13] Generally, older adults underutilize required preventive health services more than any age group, which enhances their quality of care.[14, 15] The study on Canadians aged 65 and over demonstrated that the awareness of health agencies affected the pattern of use more than other factors.[16] The possibility of older adults' unawareness of the recommended services for their age group, unawareness of being free, or insurance coverage of services are some reasons that older adults fail to get regular clinical preventive services.[15, 17] Awareness is a general understanding that a service exists, and the unawareness of service availability is considered a reason for the nonuse of services.[7, 11] The main purpose of community support services is to help people retain social functioning and quality of life; however, the lack of awareness of these services is troublesome.[18, 19]

According to previous studies, the rate of using emergency services by aged patients is high,[20-26] and more resources are needed.[21,24-26] Pre-hospital providers are involved in older patients' transportation as they usually need to receive assistance for transportation to the ED.[27] Thirty-eight percent of EMS transports in the US were dedicated to people aged 65 and above from 1997 to 2000, although the proportion of the old population transported to the hospitals by EMS is estimated to exceed half of the transportation in the following decades.[28,29]

Existing evidence indicates that only a small proportion of aged patients admitted to EDs are dispatched to use EMS in Tabriz.[30] The previous studies have focused on access, ambulance equipment, employee skills, type of care programs, service quality, proper transfer, dispatch, and communications network.[31,32] However, the awareness of services as a prerequisite for using existing services has not been given enough attention. Accordingly, the present study aimed to examine older adults' awareness and knowledge of EMS, its terms of use, and the associated factors in Tabriz.

Methods

This study was embedded within the health status of aged people in Tabriz (HSA-T) study, which was conducted as a representative sample of non-institutionalized older people (≥ 60 years) in Tabriz, Iran.

Study Setting

The study was conducted in Tabriz, the East Azerbaijan Province of Iran, from June 2015 to August 2015. East Azerbaijan Province is located in the northwest of Iran. Tabriz, the capital city of the province, is the largest economic hub and the most populated city in northwest Iran. According to the general population and housing census, the population aged 60 years and above in Tabriz was about 174000 (more than 11% of the city's population).[33]

Study Population

The current study is a cross-sectional one, and its population included all ≥ 60 years old community-dwelling older adults in Tabriz. Inclusion criteria were being at least 60 years old, free-living, not staying in residential institutions, and consenting to participate in the study. Cognitive impairment was the exclusion criterion.

Sample Size and Sampling Method

In the HAS-T study, 1071 participants (514 males and 557 females) were selected using the probability proportional to the size sampling method. This method is a sampling procedure, in which the probability of a unit being selected is proportional to the size of the ultimate unit, giving larger clusters or blocks a greater probability of being selected [34].

As a first step, to ensure that all units in the population have the same probability of selection irrespective of the size of their cluster, 107 out of 8531 urban blocks were selected randomly as follows: The sampling interval was calculated by dividing the total population by the number of selected blocks. The first block was selected using a random number table. Then, the consecutive blocks were determined utilizing a randomized systematic sampling process. The next step was the random selection of 10 participants from each selected block. Of the total of 1071 participants in the HAS-T study, 8 participants were excluded due to impaired cognition which was evaluated by the Mini-Mental State Examination. Finally, data collection and data analysis were carried out on 1062 community-dwelling older adults (514 males and 548 females) in the HSA-T study. Details on the sampling method have been described elsewhere.[35]

Measures

In the line with the objective of the study, the awareness and knowledge of EMS have been examined among older adults. Service awareness or lack of it is regarded as being informed about the existence of the EMS. Knowledge

about EMS is defined as knowing the EMS phone number and knowledge about its free and 24-hour services. In addition, the participants were asked about the ability to call the EMS and the history of requesting service.

Data Collection and Data Analysis

The tool for data collection was a self-developed questionnaire consisting of two sections: the sociodemographic section and the other section that was relevant to the objective of the study. The items used to assess awareness and knowledge of EMS included the awareness of the existence of EMS, knowing the EMS phone number, and knowing the free and 24-hour service of EMS. In addition, they were asked about the ability to call EMS, the history of requesting service, as well as the satisfaction rate with the arrival time and behavior of EMS personnel. The questionnaire was completed by trained interviewers. Descriptive data were presented as frequency and percentages for categorical variables. To assess the association between two categorical variables, the Chi-square test was applied. Further, Multiple Logistic regression was used to predict factors that influence the awareness of EMS. Statistical analyses were done using IBM SPSS-20 (Chicago, IL, USA). A *P*-value of <0.05 has been considered statistically significant.

Results

The average age of the population was 70.19 years old. In terms of marital status, the highest proportion (71%) was related to married participants, and the lowest proportion (0.7%) was related to those who were never married. More than 54% of the older adults were illiterate (unable to read or write). In terms of family type, almost 58% were living in extended families followed by nuclear families and living alone in the second and third places, respectively.

According to the findings, in the case of needing medical emergency, the older adults were using different patterns to refer to the ED. The most popular way to reach medical services was by referring to descendants (46.3%). The next most common way was a taxi (18%). Using EMS was in third place with 17%, and the remaining used other ways. Interestingly, 32 people (3%) announced that they did not refer to any hospital in any case.

The relationship between EMS awareness and demographic variables was examined using the Chi-square test. As depicted in Table 1, the relationship between awareness and all of the variables including gender, age, marital status, education, place of birth, kind of family, and household size was significant ($P<0.001$).

Regarding familiarity with EMS, some significant findings were found. Only 572 (53%) of the older adults were aware of EMS, and a considerable number of them were not aware of the terms of use and way of contact. Although using EMS among the population who were aware was significantly higher than that among the uninformed population (79.5% vs. 20.5%; $P<0.001$), less than one-third of informed people had a history of calling EMS.

Table 1. Awareness of EMS Existence and Demographic Variables of Older People

Characteristics	Awareness of EMS Existence			*P* Value*
	Aware No. (%)	Unaware No. (%)	Total No. (%)	
Gender				
Male	326 (63.4)	188 (36.6)	514 (48.0)	<0.001
Female	246 (44.2)	311 (55.8)	548 (52.0)	
Age				
60-64	223 (66.2)	114 (33.8)	337 (31.1)	
65-69	117 (57.4)	87 (42.6)	204 (0.19)	
70-74	88 (44.4)	110 (55.6)	198 (0.18)	
75-79	84 (51.9)	78 (48.1)	162 (0.15)	<0.001
80-84	39 (35.8)	70 (64.3)	109 (0.10)	
85-89	15 (35.7)	27 (64.3)	42 (0.04)	
≥90	6 (35.7)	13 (64.3)	19 (0.02)	
Marital status				
Never married	4 (57.1)	3 (42.9)	7 (0.01)	
A married	468 (60.9)	301 (39.1)	769 (0.72)	<0.001
Divorced	3 (20.0)	12 (80.0)	15 (0.01)	
Widow/Widower	97 (34.6)	183 (65.4)	280 (0.26)	
Education				
Illiterate	213 (36.5)	370 (63.5)	583 (0.55)	
Primary	190 (65.7)	99 (34.3)	289 (0.27)	<0.001
Secondary	107 (81.7)	24 (18.3)	131 (0.12)	
Higher education	62 (91.2)	6 (8.8)	68 (0.06)	
Place of birth				
Village	255 (46.1)	298 (53.9)	553 (0.52)	<0.001
Town	317 (61.2)	201 (38.8)	518 (0.48)	
Kind of family				
Extended	341 (55.0)	279 (45.0)	620 (0.58)	
Nuclear	186 (57.0)	136 (42.2)	322 (0.30)	<0.001
Loneliness	43 (35.2)	79 (64.8)	122 (0.11)	
Other	29 (28.6)	5 (71.4)	7 (0.01)	
Household size				
1	44 (36.1)	78 (63.9)	122 (0.12)	
2	183 (51.7)	171 (48.3)	354 (0.33)	<0.001
3-5	307 (61.9)	189 (38.1)	496 (0.46)	
≥6	38 (38.4)	61 (61.6)	99 (0.09)	

Note. EMS, Emergency medical services; * Chi-square test.

As illustrated in Table 2, among the population who were aware of EMS, almost 38% were not aware of the EMS phone numbers, 38% were not aware of the provided free services, and more than 28% could not use the telephone independently to call EMS and request a service. Moreover, the satisfaction rate with the arrival time and behavior of EMS personnel in the population who had received service was 149 (85%) and 147 (84%), respectively.

Furthermore, multiple logistic regression models were used to examine the association between some

Table 2. The Distribution of EMS Knowledge and History of Use

	Yes No. (%)	No No. (%)	Total No. (%)	*P* Value
Knowing the EMS phone number	356 (62.2)	216 (37.8)	572 (100)	<0.001
Known about Free EMS	360 (62.9)	212 (37.9)	572 (100)	<0.001
The ability to dial EMS	410 (71.7)	162 (28.3)	572 (100)	<0.001
History of contact with EMS	175 (30.6)	397 (69.4)	572 (100)	<0.001

Note. EMS, emergency medical services.

characteristics and the awareness of EMS. The adjusted model included age, gender, education, marital status, place of birth, kind of family, and household size. Findings showed that the awareness of EMS among educated older adults was much higher than that of illiterates (65.7%, 81.7%, and 91.2% vs. 36.5%). The logistic regression models demonstrated that higher education increased awareness of EMS. As presented in Table 3, the primary, secondary, and higher education respectively increased the chance of awareness of EMS by more than two, four, and twelve times compared to the illiterate population (Odds ratio (OR) = 2.53; 95% confidence interval (CI): 1.81–3.52, OR = 4.69; 95% CI: 2.79–7.91, and OR = 12.09; 95% CI: 4.88–29.94).

Discussion

Our study revealed a high prevalence of unawareness of EMS, terms of EMS use, EMS phone numbers, and free services among Iranian older adults, especially females. The global trend of population aging and the increasing need for emergency medical care with increasing age make the older adults need to access EMS even more evident.[36, 37] Older adults are categorized by several health conditions, functional and cognitive impairment, atypical presentations of common diseases, and related social problems at the ED. Compared to the other age groups, older people use more EMS, have a more significant level of urgency visits, have more extended stays in the ED, and are more likely to be admitted to ED. They also face many adverse health outcomes after discharge.[21, 38, 39] Thirty-eight percent of ED elder patients have arrived via EMS, and it is projected to increase to 50% by 2030.[40]

Older adults are more severely ill than others who arrived via EMS[26, 29, 41]. EMS usage increased with age, and in this way, about 60% of those over 85 years arrived at the ED using EMS.[28] In addition, older patients more frequently needed medications and life-saving interventions. For this reason, EMS providers must have specialized training in caring for older adults to provide more intensive EMS care. Therefore, these patients were also more likely to die in the ED or intensive care unit admission compared to those arrived by other means.[29,41,42]

The findings of this study on low awareness of services were in agreement with the findings of others. Previous studies have demonstrated that the awareness of existing services is much lower than what was thought.[7, 38, 43] Being aware of EMS services is important as lack of awareness

Table 3. Logistic Regression Analysis o+f the Relationship between Awareness of EMS and Risk Variables in Older Adults

Variables	Awareness		OR	95 % CI	*P* Value
	Aware	Unaware			
Gender					
Male	326	188	1.00	0.54-1.03	0.08
Female	246	311	0.75		
Age					
60-64	223	114	1.00		
65-69	117	87	0.64	0.43-0.95	0.030
70-74	88	110	0.44	0.29-0.66	<0.001
75-79	84	78	0.73	0.47-1.13	0.163
80-84	39	70	0.48	0.28-0.81	0.006
85-89	15	27	0.42	0.19-0.89	0.023
≥90	6	13	0.46	0.15-1.37	0.165
Marital status					
Never married	4	3	1.00		
A married	468	301	0.64	0.12-3.21	0.591
Divorced	3	12	0.12	0.01-1.08	0.060
Widow/Widower	97	183	0.42	0.08-2.08	0.291
Education					
Illiterate	213	370	1.00		
Primary	190	99	2.53	1.81-3.52	<0.001
Secondary	107	24	4.69	2.79-7.91	<0.001
Higher education	62	6	12.09	4.88-29.94	<0.001
Place of birth					
Village	255	298	1.00		
Town	317	201	1.21	0.90-1.62	0.196
Kind of family					
Extended	341	279	1.00		
Nuclear	186	136	1.18	0.72-1.92	0.502
Loneliness	43	79	1.10	0.38-3.18	0.850
Other	2	5	0.63	0.10-3.99	0.628
Household size					
1	44	78	1.00		
2	183	171	0.94	0.30-2.90	0.923
3-5	307	189	1.38	0.48-3.99	0.543
≥6	38	61	0.75	0.23-2.37	0.628

Note. EMS, emergency medical services; OR, odds ratio; CI, confidence interval; The OR represents each unit increase in the variable.

may lead to failure of access.[7, 43-45] One of the most frequent reasons for not using available services is the caregiver's unawareness of the services.[7, 38]

Findings showed that a small proportion of patients were dispatched to ED by EMS. Similar to the other studies, these results confirmed that EMS has been used by informed older adults more than those who were uninformed.[7-9, 38] As demonstrated in previous literature, there was a high correlation between awareness and use of services,[8, 9] and most often being uninformed about existing services was an obstacle to utilization of services.[7, 38]

Contrary to this study which showed a greater lack of awareness among women than among men, some previous studies have indicated that male caregivers were more likely to be unaware of the available services.[7, 8, 18, 44, 46]However, some studies reported no significant difference between gender and awareness of health services.[16, 26, 45]

The high prevalence of unawareness of EMS among aged women compared with men lies in the differences in their education. In addition to the high rate of illiteracy among Iranian older adults, there is a significant gender inequality in Iran's illiteracy rate among this population. The illiteracy rate among older women is higher than that among older men (73.1% vs. 40.7%).[33] Nowadays, thanks to the improvement of social conditions, despite inequality during a long period in the past, the literacy rate of women under 30 years is more than their male peers.[33]

Literate people are more likely to remember the correct numbers of service provider centers, including EMS. Moreover, public campaigns improve the overall recall of EMS phone numbers.[38] Therefore, different campaigns need to advertise the EMS number on television, adverts, symposia, hospital waiting rooms, public boards, and the like to increase the general public's awareness of the EMS number to call.[47]

According to the findings of the present study, literacy level had the greatest impact on the awareness of EMS, terms of EMS use, and EMS phone numbers. Strain and Blandford and Alabdali reported similar results as the caregivers with less education are more likely to be unaware of the availability of services.[7, 38] According to the results of the National Population and Housing Census in 2016, the literacy rate for the population aged 60 and above was less than 50 percent in Iran.[33] Educational attainment is linked to many aspects of a person's well-being, and illiteracy is a crucial issue in the demographic characteristics of older adults. It seems that the high illiteracy rate among Iranian older adults can be an explanation for the high prevalence of unawareness of EMS and its availability. This population might not be able to seek some of their essential services due to unawareness.

The high rate of illiteracy and the increasing number of older adults living in nuclear families far from their children could increase the importance of aged people's empowerment. In this regard, preparing educational packages for older adults with local dialects along with the participation of authorities as well as broadcasting educational programs through provincial broadcasting centers are recommended. Providing more information about EMS to the general population, especially older adults such as EMS phone numbers and how the system works can be effective in this field.[45] It also seems that for the older adults who are mostly illiterate giving any information about the services should be in the local language of the region so that they can get to know the services better and more fully.

Study Limitations

This study has several strengths, including the representative sample and large sample size. In addition, the present study also had a number of limitations, including the inability to make causal inferences, the completion of the questionnaire by self-declaration, and the possibility of recall error regarding the history of requesting and receiving EMS. Hence, using EMS center reports can be helpful for a better understanding of EMS utilization by older adults.

Conclusions

As specified, one of the obstacles to service use is the lack of awareness of such services. Therefore, notifying and increasing awareness of the present services to older adults are necessary for the effectiveness of health services. This study indicated that to increase the effectiveness of EMS programs and services, special attention should be paid to all aspects of processes, even obvious and seemingly settled issues. Accordingly, to improve the awareness of the EMS system, public guidance, training programs, community-based education, as well as social media support are needed to be utilized to improve the aged community's knowledge.

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Author Contributions

RR-G conceptualized the study, conducted the analysis, and wrote the manuscript. MHS conceptualized the study and reviewed the manuscript. AM analyzed the data and reviewed the manuscript. ZP conceptualized the study and reviewed and edited the manuscript. MY reviewed and edited the manuscript. AA-Z conceptualized the study, conducted the analysis, and wrote the manuscript. The authors read and approved the final manuscript.

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Data Availability Statement

Data gathered for the study is available from the corresponding author.

Ethical Approval

This study was reviewed and approved by the deputy of the Research Ethics Committee of the Tabriz University of Medical Science (TBZMED.REC.1394.1183). Informed consent was obtained from

all participants, and they were assured of the confidentiality of personal information.

Consent for Publication

Not applicable.

Conflict of Interests

The authors declare that they have no conflict of interests.

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