

# Assessment of awareness and attitude of EMS personnel concerning pre-hospital stroke care based on American Stroke Association Guideline



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## Abstract

**Objective:** Emergency medical services (EMS) is a critical component of health care system and the forefront of stroke care. The prominent role of EMS in stroke care is timely and accurate diagnosis of acute ischemic stroke and transfer of the patients to stroke centers. The present study aimed to assess the "awareness" and "attitude" of EMS personnel concerning prehospital stroke care based on American Stroke Association (ASA) guideline in Rasht town.

**Methods:** This was an analytical cross-sectional study. The participants, consisted of all EMS personnel (n=115) in Rasht town in 2012, entered the study based on census method. Awareness and attitude of EMS personnel toward prehospital stroke care were assessed using a questionnaire based on ASA guideline. The questionnaire had two sections. The first part contained demographic data and the second part had multiple choice items (Likert-type scale response anchors) to assess awareness and attitude of the personnel. The questionnaires were filled out by the personnel. The collected data were analyzed using descriptive and inferential statistics using SPSS software version 20. *P* value less than 5% was considered significant.

**Results:** Ninety people participated in this study. The average of age and working experience of participants were  $36.84 \pm 8.02$  and  $11.36 \pm 5.71$ , respectively. Most of the participants had bachelor degree (n=33, 36.7%) and majored in medical emergency (n=43, 47.8%). Most of them were contract employees (47.8%). Mean scores of awareness and attitude of the personnel were 26.68 (the total number of score = 51) and 32.56 (the total number of score = 80), respectively.

**Conclusion:** Findings revealed poor awareness and attitude of EMS personnel toward prehospital stroke care based on ASA guideline in Rasht Town. We recommended retraining courses to promote awareness of EMS personnel.

**Keywords:** Awareness, Attitude, Stroke, Prehospital care

## Introduction

Ischemic stroke is a common neurological disorder and the leading cause of death worldwide. Studies have shown that 6.5 million people died of stroke, 25.7 million survived, and 10.3 million were just diagnosed with stroke in 2013 (1). Two percent of emergency calls were related to ischemic stroke in the prehospital system in the United States. This accounts for 1% of the calls in Iran (2). Emergency medical services (EMS) is the critical component of the health care system and the forefront of stroke care (3). The prominent role of EMS in stroke care is timely and accurate diagnosis of stroke and transfer of diagnosed patients to stroke centers (4). In addition to specific treatments for stroke, EMS personnel should be cautious of patients' movement while transferring them to the hospital, either with an ambulance or a helicopter.

If necessary, they should administer oxygen therapy, control fluid therapy, treat hypoglycemia, and monitor heart and blood pressure (5,6). Unfortunately, prehospital emergency personnel do not have enough knowledge to accurately differentiate ischemic stroke from ischemic stroke imitators. For example, the results of a study showed that a quarter of patients initially diagnosed with stroke and dispatched to the hospital by EMS personnel were treated and discharged from the hospital with other medical reasons (7,8). A study in Germany showed that 51% of ischemic stroke cases were diagnosed by EMS personnel (9). Therefore, it is essential to use an appropriate prehospital screening tool for timely and accurate diagnosis of ischemic stroke and quick transfer of patients to specialized centers (10). Several prehospital scales have been designed for the diagnosis of stroke.



The most common scales are Cincinnati Prehospital Stroke Scale (CPSS) and Los Angeles Prehospital Stroke Screen (LAPSS). Most of these scales encompass physical symptoms of middle cerebral artery stroke. CPSS evaluates facial palsy, arm weakness, and speech abnormalities. Any patient representing the above three symptoms is diagnosed with ischemic stroke based on CPSS (7,11). ASA guideline obliges EMS personnel to apply stroke assessment tools (e.g. CPSS and LAPSS) for diagnosis of stroke (12). Following release of Guidelines for the early management of adults with ischemic stroke, the American Heart Association (AHA) and the American Stroke Association (ASA) updated the guideline in 2008 in a supplementary strategic statement on prehospital stroke care for EMS personnel. The mentioned guideline obliged EMS personnel to dispatch stroke patients at the highest level of care in the shortest time possible. The ASA guideline suggests monitoring of blood glucose level, oxygen target saturation range (94%), and administration of isotonic saline in patients with systolic blood pressure <120. Since the onset of symptoms is critical in fibrinolytic therapy, EMS personnel should be notified of the last time the patient was seen to be normal (3). The relationship between care team members was evaluated and the poor communication between triage nurses and EMS personnel was detected. It is essential to closely monitor all phases of treatment including transfer of patients from the prehospital emergency unit to the emergency department in order to improve the quality of patient care in the emergency department. Poor communication between care team members necessitates educational interventions or changes in the process of transfer and dispatch of patients. Poor knowledge of triage nurses and EMS personnel on stroke care protocol is the most important issue in the transfer of stroke patients (13). Low sensitivity in diagnosis of stroke necessitates specific measures to increase awareness of dispatch personnel on diagnosis of stroke. Since diagnosis of suspicious cases or stroke cases by EMS personnel enhances the quality of prehospital care that serves as an evidence-based tool for early diagnosis of stroke symptoms and efficient transfer of patients, we decided to carry out this study to assess the awareness and attitude of EMS personnel (n=115) concerning prehospital stroke care based on ASA guideline in Rasht town.

### Methods

In this analytical cross-sectional study, after obtaining the ethical code (IR.GUMS.REC 1396.312) from Guilan University of Medical Sciences and give informed consent, the study was started. All EMS personnel (n=115) in Rasht in 2012 entered the study based on census method. Awareness and attitude of the personnel concerning prehospital stroke care were assessed based on ASA guideline. In order to collect data, we used the questionnaire designed by Soltani et al (14).

The questionnaire had two sections. The first section included demographic information (age, gender, field of study and education, marital status, working experience, employment type and training hours in the last year). The second section contained 33 multiple choice items in order to assess awareness and attitude of EMS personnel toward prehospital stroke care. Among the 33 multiple choice items, 17 items were related to the assessment of "awareness" based on a three-point Likert type scale. Regarding the scoring of this domain, the correct answer was scored as 3, I do not know scored as 2, and incorrect answer scored as 1. The total score varied from 17 to 51. Concerning the "attitude" of EMS personnel, 16 items were related to this domain and assessment was done based on a five-point Likert scale (I completely agree, I agree, I have no idea, I do not agree, I completely disagree). The total score varied from 16 to 80.

The questionnaires were filled out by the personnel. In order to determine the content validity of the questionnaire, we obtained the opinions of 3 experts in the field of emergency medicine and 1 neurologist and based on their comments some modifications were made to the instrument accordingly. To determine the face validity, the questionnaire was pilot-tested and 10 questionnaires were completed and consequently, vague or unrelated items were revised. The reliability of the questionnaire was calculated using Cronbach's alpha. The Cronbach's alpha was 0.87 for the awareness of teaching method and learning goals. Also, it was 0.75 and 0.67 for satisfaction/interest, and facilities/physical condition, respectively. The overall Cronbach's alpha of the questionnaire was calculated to be 0.71.

The collected data were entered in SPSS Software (version 21.0). Chi-square test (for comparison between qualitative data) and Student *t* test (for comparison between quantitative data) were used for data analysis. In all cases  $P < 0.05$  was considered as significant.

### Results

In this study 90 males participated. Average age and working experience of participants were  $36.84 \pm 8.29$  and  $11.36 \pm 5.71$ , respectively. Most of the personnel had bachelor degree (n=33, 36.7%) and majored in medical emergency (n=43, 47.8%). Most of them were contract employees and had participated in more than 10 hours of training courses with the content of stroke care (Table 1). The mean of score for the awareness of prehospital stroke care was  $26.08 \pm 4.54$  (the total number of score = 51). The mean of awareness score was compared with demographic variables using independent t-test and one-way ANOVA tests. Findings revealed significant relationships between education (lower than diploma, diploma, bachelor, and higher than bachelor degree) and employment type (contract and project-based) with "awareness". Conversely, we did not observe a significant relationship between marital status, working experience and training hours

**Table 1.** Frequency of demographic variables in the emergency personnel of Rasht

	Variable	No.	%
Marital status	Single	19	21.1
	Married	63	70
	Divorced	3	3.3
	Widowed	5	5.6
Education level	Diploma and lower degrees	21	23.3
	Associate degree	34	37.8
	Bachelor degree	33	36.7
	Master degree	2	2.2
Major	Surgical technology	6	6.7
	Anesthesiology	8	8.9
	Nursing	12	13.3
	Emergency medical service	43	47.8
	Physician assistant	19	21.1
	Accounting	1	1.1
	Mathematics	1	1.1
Type of employment	University student	2	2.2
	Contractual	43	47.8
	Apprenticeship	9	10
	Semi-permanent	14	15.6
	Permanent	22	24.4
Number of training hours during the previous year	8	7	7.8
	8-16	37	41.1
	16-24	46	51.1

with “awareness” ( $P > 0.05$ ).

The mean of score for the attitude of the personnel concerning prehospital stroke care was  $32.56 \pm 9.84$  (the total number of score = 80). The mean of attitude score was compared with demographic variables using independent t-test and one-way ANOVA tests. Results indicated a significant relationship between education and the attitude of personnel (Table 2).

**Discussion**

Prehospital emergency personnel have a critical role in the health care system. They deal with stroke patients and are responsible for immediate assessment, quick stability and evaluation of neurological status of patients.

In addition, they are involved in the triage and quick transfer of patients to the nearest treatment center which has an ischemic stroke department to deliver advanced treatment services (15-17). The present study aimed to assess the “awareness” and “attitude” of 115 EMS personnel concerning prehospital stroke care. The average age of participants in this study was  $36.84 \pm 8.29$  and their average working experience was above 11 years. No females participated in this study since all prehospital emergency personnel are males in Rasht town. The results indicated that the awareness of EMS personnel regarding the prehospital care was unsatisfactory based on ASA guideline (Table 3). However, higher level of awareness was expected since most of the participants were undergraduates, had a bachelor degree, and received above 16 hours of training over the past year. The low score of EMS personnel concerning “awareness” can be due to inefficient practical teachings, deficient assessment tools, and lack of opportunities to participate in comprehensive training courses or high cost of these courses.

The results of the study by Althubaity et al are in line with the findings of our study. Almost half of the prehospital emergency personnel had two years of working experience in the former study. Six percent of the participants did not know about stroke symptoms. Only 3% of them knew five or more than five stroke symptoms. Nine of them did not use any specialized tools to diagnose stroke and 98% of them transferred the patients to the nearest hospital regardless of available specialized stroke care services in that center (18). Proper and efficient training can improve stroke treatment, decrease stroke mortality rates and prevent disabilities in stroke patients (19-21).

EMS personnel are the forefront of stroke care. Therefore, it is essential to increase their knowledge regarding the timely and accurate diagnosis of stroke patients as well as stroke guidelines and protocols (22). Various studies have shown different levels of knowledge for prehospital emergency personnel regarding the diagnosis of stroke. Some studies have reported high accuracy for diagnosis of stroke by prehospital personnel (12,23), while others have reported lower accuracy of diagnosis (11,24,25). These confounding results are due to the difficulty in the early diagnosis of stroke. Bahrampouri et al proposed

**Table 2.** Comparison the level of personnel education with their attitude

(I) Education level	(J) Education level	Mean Difference (I-J)	Std. Error	P value	95% Confidence interval	
					Lower bound	Upper bound
Diploma degree and lower	Associate degree	6.26	2.67	0.056*	-0.12	12.64
	Bachelor degree and higher	4.70	2.66	0.187	-1.64	11.05
Associate degree	Diploma degree and lower	-6.26	2.67	0.056*	-12.64	0.12
	Bachelor degree and higher	-1.55	2.32	0.781	-7.09	3.98
Bachelor degree and higher	Diploma degree and lower	-4.70	2.66	0.187	-11.05	-1.64
	Associate degree	1.55	2.32	0.781	-3.98	7.09

\* Up to 90% is acceptable

**Table 3.** Comparison the level of personnel education with their awareness

(I) Education level	(J) Education level	Std. Error	Mean Difference (I-J)	P value	95% Confidence Interval	
					Upper Bound	Lower Bound
Diploma degree and lower	Associate degree	1.22	2.38	0.132	5.3080	-0.5377
	Bachelor degree and higher	1.21	3.20	0.027	6.1164	0.3026
Associate degree	Diploma degree and lower	1.22	-2.38	0.132	0.5377	-5.3080
	Bachelor degree and higher	1.06	0.82	0.719	3.3603	-1.7115
Bachelor degree and higher	Diploma degree and lower	1.21	-3.20	0.027	-0.3026	-6.1164
	Associate degree	1.06	-0.82	0.719	1.7115	-3.3603

standard tools for the diagnosis of ischemic stroke to improve diagnosis in the prehospital phase (20). A significant relationship was found between academic education and awareness of personnel on stroke (Table 3). Most participants had an academic degree in medical emergency or nursing. Therefore, they were able to use the theoretical leaned materials (stored in the long-term memory). They were also willing to be informed of new tools and strategies. This issue has a positive and significant role in increasing the knowledge of personnel and making them use their knowledge (training courses on stroke) in the field. Contract employees were also more aware of stroke care than project-based employees due to higher years of working experience. They were optimistic about job promotion and future career due to having contract with the employer. Soltani et al showed a significant difference between education and awareness in EMS personnel in Birjand (14). Findings of this study showed poor awareness and attitude of EMS personnel. They can obtain only 26 score from 51 in awareness part and 32 score from 81 in attitude. Shire et al also indicated that most EMS personnel did not have enough knowledge about ischemic stroke imitators, prehospital management as well as treatment of stroke in Dubai (26).

### Conclusion

The results showed poor awareness and attitude of EMS personnel toward prehospital stroke care based on ASA guideline in Rasht town. Given the critical role of prehospital personnel in the accurate, early diagnosis and treatment of stroke and due to inadequate knowledge of personnel on all phases of stroke treatment, it is essential to design comprehensive training courses to increase the awareness of personnel on stroke care based on EMS standard training protocol as well as prehospital stroke care protocols.

### Authors' contributions

SMZZ, PA and VMK designed the research; AN wrote and corrected the article; SB collected data. all authors approved final version.

### Ethical issues

This study was conducted after obtaining the ethical code number IR.GUMS.REC 1396.312 from Guilan University of Medical Sciences.

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