

Research Paper



Comparing Satisfaction of Emergency Medical Services Personnel in Using Electronic Forms Instead of Paper Forms in 2020

Payman Asadi¹, Nazanin Noori Roodsari², Habib Eslami Kenarsari³, Nikta Razi³, Majid Pourshaikhian^{4*}

1. Guilan Road Trauma Research Center, Poursina Hospital, Guilan University of Medical Sciences, Rasht, Iran.

2. Poursina Clinical Research Development Unit, Poursina Hospital, Guilan University of Medical Sciences, Rasht, Iran.

3. Clinical Research Development Unit, Poursina Hospital, Guilan University of Medical Sciences, Rasht, Iran.

4. Social Determinants of Health Research Center, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran.



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ABSTRACT

Background: Emergency Medical Technician (EMT) can play a vital role in decreasing morbidity and mortality. Due to the increasing development of electronic systems, their use can be effective in improving the quality of services and reducing costs. This study aimed to assess the satisfaction of EMTs with electronic forms.

Materials and Methods: This cross-sectional analytical study was conducted on 99 EMTs in Rasht City, Iran. Data was collected via a questionnaire, including demographic characteristics (age, sex, work experience, type of employment, level of education, field of study, and retraining course) and 17 questions about the satisfaction of personnel in using electronic forms. The validity and reliability of the questionnaire were assessed by 7 emergency medicine specialists via a pilot study. The questionnaire had a Likert scale to respond with Cronbach's alpha of 0.83. Data were analyzed using SPSS software v. 22.

Results: The Mean±SD age of participants was 36.08±0.73 years. Most of them had a bachelor's degree (71.7%), contractual employment (40.4%), and Bachelor of Science (BSc) in nursing (46.5%) or emergency technician (42.4%). Their average work experience was 10.45±0.69 years. The level of satisfaction of most EMTs (65.7%) in using the electronic form was moderate, which statistically had a significant relationship with their employment status ($P<0.05$).

Conclusion: According to the average satisfaction of EMTs in using electronic forms, it is necessary to increase the level of use and satisfaction of electronic forms by holding appropriate retraining programs on how to use and benefits of electronic forms.

* Corresponding Author:

Pourshaikhian Majid, Associate Professor.

Address: Social Determinants of Health Research Center, School of Nursing and Midwifery, Guilan University of medical sciences, Iran, Rasht.

E-mail: pourshaikhian_m@yahoo.com

1. Introduction

Prehospital emergencies are vital to saving lives [1]. Two important factors, such as time and data, play a crucial role in emergency performance. Registering the patient's condition and accessing and transferring data quickly and correctly to the relevant centers can increase the patient's chances of recovery. Therefore, many processes of the treatment system are dependent on information. However, many health centers suffer from shortcomings, such as manual data entry and mismanagement [2, 3].

Prehospital emergency service providers, who are the first line of response to clients' calls, assessment, care, and initial treatment, are also responsible for accurately recording patient information [4, 5]. This information includes their primary care and their response to treatment. Many emergency workers only remember vital information and postpone the registration of information until the end of the mission or work shift. Therefore, failure to accurately record the procedures performed or the initial condition of the patients can cause a problem [6]. Obtaining a history and recording information in the emergency room is often based on short-term memory, and given that human memory is associated with factors, such as fatigue, attention span, stress, and multitasking; as a result, recording information based on memory can affect the quality of information [7, 8]. The World Health Organization (WHO) notes that incorrect initial information can lead to inadequate treatment and harm to the patient [9]. One of the solutions to solve these problems is to use electronic registration [6].

One of the critical challenges is the lack of an electronic system to enter and manage pre-hospital data, the type of data, and how to record and process them. Manual data entry has low speed and variety and has a poorer performance compared to the electronic system [10].

In one study, physicians were satisfied with the ability to send messages electronically, access them outside the workplace, and speed up work. The electronic system is a good platform to record, retrieve and analyze patient data and provide more support to health workers [11]. One of the benefits of electronic data registration is quick and easy access to medical records and essential patient data. Hence, the speed and quality of decision-making for the patient in critical situations increases [12, 13].

In addition to the above, in the case of electronic registration of patient data, while facilitating the exchange of information between health providers, policy-making, resource distribution and budgeting will also be promoted [14]. On the other hand, a delay of more than an hour in accessing patient information reduces their clinical value [15]. Therefore, these systems can potentially improve the quality and reduce the cost of medical care [16].

However, the value and positive impact of this system depends on the satisfaction and continued use of health care workers [17].

The use of electronic systems is not very popular all over the world [11]. The most important factor hindering the success of these systems is the resistance of users to their constant use [18]. Emergency service providers are highly satisfied with the ease of use of wearable cameras and the improved quality of the recorded information [8]. In the electronic system of medical data system, the evaluation of patients' improvement improves with increasing speed; however, using this system does not have a reducing effect on the number of visits, waiting time, the number of tests requested, costs, and improvement of the quality of patients' treatment [19].

In one study, the level of initial satisfaction with the electronic registration system in the first year of its implementation in the emergency department was reported to be moderate. The highest level of satisfaction was related to reliability and performance and the level of satisfaction was not related to the demographic characteristics of age, physician, and nurse [20]. The use of electronic systems was underreported due to the lack of time to enter information. However, such a result was predictable because health workers used the paper system as before and therefore saw no need to use the electronic system. User satisfaction was also reported to be low due to poor Information Technology (IT) system support, shared computer use, power outages, and poor quality of the electronic system [21].

Therefore, due to the increasing development of electronic systems in the health system and EMS in recent years, the different results of studies, and limited studies in this field, this study was conducted to determine the satisfaction of pre-hospital emergency personnel in Rasht City in using electronic forms instead of paper forms in 2020.

2. Materials and Methods

Participants

The present study was a cross-sectional analytical study conducted in 2020. The study population was the operational personnel of pre-hospital emergency centers in Rasht and the data were collected via a researcher-made questionnaire. Sampling was done by convenience method and based on the article by Chisolm et al. [20]. The sample size was 92 people. The inclusion criteria included operational personnel of pre-hospital emergency centers who used electronic forms and the exclusion criteria included personnel who had no experience in using electronic forms. To conduct the study, after obtaining the ethics code from the Research Ethics Committee of [Guilan University of Medical Sciences](#) (IR.GUMS.REC.1399.481), personnel data was collected by attending their workplace.

Tools

The study tool was a two-part questionnaire. The first part included 7 questions about personal and job characteristics, such as age, gender, type of employment, level of education, the field of study, work experience, and participation in retraining course and the second part included satisfaction of EMS personnel to use electronic forms instead of paper forms.

To determine the validity of the questionnaire using the content validity method, the questionnaire was provided to 7 emergency medicine specialists. The content validity ratio (CVR) of each question was 0.88 based on the answers. Therefore, 17 questions remained in the questionnaire. For the content validity index (CVI), all questions had a CVI value above 0.8 and a CVI index of 0.931. Then, using a pilot study and completing the questionnaire by 35 emergency personnel, the reliability of the questionnaire was obtained.

The reliability of the questionnaire was calculated to be 0.83 by Cronbach's alpha test. They had to choose one of the options "strongly agree", "agree", "undecided", "disagree" and "strongly disagree". Participants' scores were calculated as, 4 points for the strongly agreeing, 3 points for the agreeing, 2 points for the undecided, 1 point for the disagreeing, and 0 points for the strongly disagreeing option. The highest score for each person was 68 and the lowest score was zero. Scores between zero and 34 (50% of scores) showed poor satisfaction, scores between 34 and 48 (50 to 70% of scores) moderate satisfaction, and scores between 48 and 68 (70% above scores) good

satisfaction. The collected data were analyzed by SPSS v. 22 statistical software. Frequency tables and statistical graphs were used to describe the data and Fisher's exact test at a 5% error level was used to investigate the relationship between emergency personnel satisfaction scores and demographic characteristics.

3. Results

In this study, all 99 participants were male with a mean age of 36.08 ± 0.73 . The level of education of 71.7% of the participants was a bachelor's degree. The educational field of 42.4%, 46.5%, and 9.1% of the participants was associate or bachelor's degree in emergency care, nursing, or anesthesia, respectively. In terms of work experience, 51.5% were less than 10.45 years and the mean work experience was 10.45 ± 0.69 years. Type of employment 10.1%, 40.4%, 12.1%, 27.3%, and 10.1% of participants were temporary, contracted, corporate, contractual, or official, respectively. All study participants were trained in the use of electronic forms.

The results of the study showed that the level of satisfaction of emergency personnel in using electronic forms instead of paper forms, 29.3%, 65.7%, and 5.15% were poor, moderate, and good, respectively and the mean score was 46 (Figure 1).

Findings of the study using the Fisher's test showed that the level of satisfaction of pre-hospital emergency personnel in using electronic forms had no significant relationship with age, level of education, and field of study (Table 1).

The results of the study using the Fisher test showed that the level of satisfaction of prehospital emergency operating personnel in using electronic forms instead of paper forms had a statistically significant relationship with the type of employment ($P=0.029$) (Table 2).

The results of the study using the Fisher's test showed that the level of satisfaction of emergency personnel in using the electronic form had no significant relationship with work experience and passing the training course on the use of electronic forms (Table 3).

4. Discussion

Prehospital emergency care providers are the first line of response to medical emergencies in trauma and acute illness and play a vital role in reducing mortality and morbidity [4, 5]. Since May 2017, the Emergency

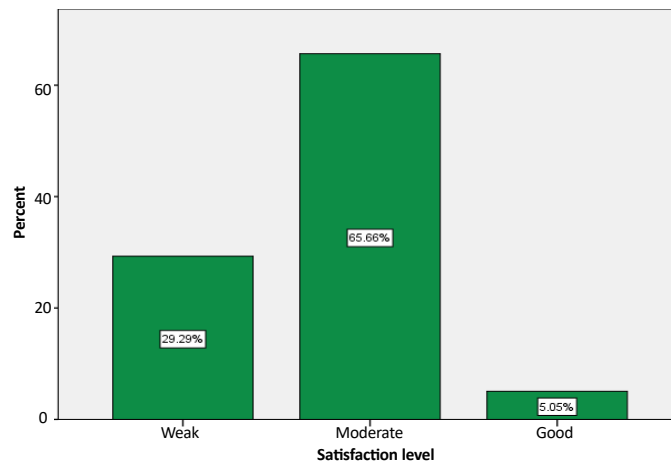


Figure 1. Frequency distribution of satisfaction level of Emergency Medical Services (EMS) personnel in using electronic forms

Medical Services (EMS) of the Guilan province have implemented a plan to replace the paper form with an electronic form for registering emergency data. This study aimed to evaluate the level of satisfaction of EMS personnel with the electronic form. In this study, all employees were male. In the Iran EMS, female employees are not present for delivering emergency care on the scene. The Mean±SD age of the personnel was 36.08±0.73 years. It shows the use of young personnel in EMS. The level of education of the majority of personnel was a bachelor's degree. In terms of field of study, 46.5% and 42.4% were nursing and emergency care, respectively. In terms of the type of employment, the ma-

majority of personnel were contracted or contractual, and the Mean±SD work experience was 10.45±0.69 years. This indicates that in the present study, participants with higher experience are employed on emergency bases.

According to the study, the level of satisfaction of EMS personnel in the use of electronic forms in 65.7%, 29.2%, and 5.1% of personnel was moderate, poor, and good, respectively. In Tilahun's study on 406 physicians, nurses, secretaries, laboratory personnel, and pharmacists, the level of people's satisfaction with the use of electronic systems was reported to be low due to users' dissatisfaction with their simultaneous

Table 1. Distribution of satisfaction level in using electronic forms by age, education and course study

Variables	Total	No. (%)			P
		Good	Moderate	Weak	
Age	>36.08	4(8)	28(56)	18(36)	0.114
	<36.08	1(2)	37(75.5)	11(24.4)	
Education	AD	2(7.1)	16(57.1)	10(35.7)	0.502
	BSc	3(4.2)	49(69)	19(26.8)	
Course study	Emergency cares	4(9.5)	25(59.5)	13(31)	0.207
	Nursing	0(0.0)	34(73.9)	12(26.1)	
	Anesthesia (AD or BS)†	1(11.1)	5(55.6)	3(33.3)	
	O.R. technician*	0(0.0)	1(50)	1(50)	
Total	99	5(5.1)	65(65.7)	29(29.3)	

* Operation Room Technician; † Associate degree or Bachelor of Science.

AD: associate degree; BS: bachelor of science; O.R: operation room.

Table 2. Level of satisfaction of emergency medical services (ems) personnel in using electronic forms by type of employment

Variables	Total	No. (%)			P
		Good	Moderate	Weak	
Temporary	10	1(10)	3(30)	6(60)	0.029
Contracted	40	2(5)	29(72.5)	9(22.5)	
Corporate	12	1(8.3)	7(58.3)	4(33.3)	
Contractual	27	1(3.7)	22(81.5)	4(14.8)	
Official	10	0(0)	4(40)	6(600)	
Total	99	5(5.1)	65(65.7)	29(29.3)	

use of paper forms, lack of time, lack of other organizations reportedly used a shared electronic system to record patient information, poor quality of the existing electronic system, and poor support [21]. However, Chisolm stated that the level of satisfaction of 60% of EMS employees in using the electronic form was satisfactory, mainly due to the personnel’s proficiency in working with the electronic system [20]. In Joos’s study, the level of satisfaction with the replacement of the electronic form was reported at a high level and the majority of participants considered the use of electronic forms reliable and were satisfied with the support of the electronic form company [11]. This difference in the level of satisfaction of the present study compared to other studies can be due to various reasons. In pre-hospital electronic forms, it is possible to quickly and accurately record vital signs and some examinations. While typing and recording descriptive information is done faster than in a written form. However, in emergency missions, environmental stress is high in most cases and the speed of patient care is crucial. The continuous use of electronic forms requires user satisfaction with existing electronic systems and a suitable platform for inter-organizational information transfer; paying attention to this issue by programming

companies and applying users’ opinions in improving electronic services as much as possible can motivate employees to use electronic forms and increase satisfaction. Further research seems to be useful to investigate the causes of dissatisfaction of EMS personnel with electronic forms.

Based on the results of the present study, the satisfaction of emergency personnel in using electronic forms had no significant relationship with age, level of education, the field of study and work experience, and passing training courses but a statistically significant relationship was observed with the type of employment. So that the majority of participants were poorly satisfied with their official and temporary (2 years) employment, but the majority of contractual and contracted employees were moderately satisfied. Although other studies do not confirm the relationship between the level of satisfaction with the use of electronic forms and the type of employment, this difference may be due to less work experience in project personnel and shorter use of electronic forms and their relative mastery. On the other hand, employees with official employment, who have more work experience and age, are less satisfied due to their habit of the pa-

Table 3. Level of employee satisfaction in using electronic forms based on work experience

Variables	Total	No. (%)			P	
		Good	Moderate	Weak		
Work experience	y<10.5	51	3(5.9)	32(62.7)	31(31.4)	0.834
	y>10.5	48	2(4.2)	33(68.8)	13(27.1)	
Total		99	5(5.1)	65(65.7)	29(29.3)	

per registration system and the difficulty of working with electronic tools. In separate studies by Chisolm and Joos, the level of satisfaction of emergency personnel with demographic and academic characteristics was not statistically significant [11, 20]. Therefore, the interpretation of the results in these cases should be done with caution.

5. Conclusion

The level of satisfaction of EMS personnel with electronic forms was moderate. Therefore, it is necessary to increase the use and satisfaction of electronic forms by holding appropriate retraining programs on how to use and benefits of electronic forms.

Ethical Considerations

Compliance with ethical guidelines

Necessary explanations about the purpose of the study were provided to the study participants and they were studied with informed consent.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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