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Improving Five-level Triage Form According to the Experts Viewpoint; A Qualitative Study

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ABSTRACT

Objectives: To develop a clear criteria for classifying the patients in triage unit of a tertiary healthcare center according to five-level triage system.
Methods: This study is a qualitative study being conducted in five stages at Vali-Asr Hospital of Qom in 2013. After two survey, the experts were interviewed using focus group discussion (FDG) and study was continue with. Data were analyzed through studying the opinions of the specialized teams' members, summarizing and classifying the data in qualitative phase.
Results: Changes proposed in the triage form communicated by Iran's emergency department according to the participants' opinions include informing all the patients in the emergency department of some necessary information. Therefore, three parts of medical and medicinal history, vital signs and level of consciousness were added to the first part of the form and necessary emergency facilities were also added to the third level of triage.
Conclusion: Measuring each item added to the general part of the triage form provides more precise diagnosis and more scientific classification, since the level to which the patient belongs should be identified based on medical history, clinical signs and level of consciousness.

Keywords: Emergency severity index (ESI); 5-Level triage; Medical history; Vital signs; Level of consciousness.

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Introduction

The emergency department is the heart of the hospital and the arrangement of affairs in this unit can save many lives [1], since the patients referred to this unit are in critical physical conditions and it is important to consider their conditions as quickly as possible and with the highest quality [2,3]. The first experience of the patients is often related to the emergency department and since they need specific and urgent treatment and care, it is important to understand the patients' problem to satisfy them [4,5]. Therefore, a

steady and reliable process is required for the initial evaluation and prioritization of the referred patients. In the emergency department, this process is called triage [6]. The report of the Ministry of Health and Medical Education on evaluating the hospitals shows that not determining the emergency medical services through triage is one of the most important problems in the emergency departments [1]. Triage is the prioritization of the patients' care based on the severity of the injury and the implementation of the best treatment for most people in the shortest possible time [5], so as to ensure that patients with life-threatening conditions are quickly identified and treated [7]. Triage mainly aims to reduce mortality among the patients in the emergency department [8].

Triage is a complex process including unreliable decision-making in an ebullient environment due to the urgency and pressure in the workplace. A better understanding of the decision-making process makes the factors related to the identification of patients at high risk clearer and consequently, patients requiring faster intervention are timely identified and treated [9]. Placing the patient in an inappropriate triage acuity level leads to the increased mortality significantly affecting the patient's health care outcomes [9]. Although it may be difficult in busy parts of the emergency department, it is necessary to properly evaluate the patients and classify them based on the acuity of the illness, so that it precisely reflects the severity of the illness and the patient receives safe and timely care [9].

An ideal triage system should be capable of precisely identifying the patients requiring emergency care and providing the conditions for rapid access to diagnostic medical measurements through leading them to the suitable direction. An incorrect triage leads to the waste of resources, delay in the patient's treatment, his dissatisfaction and undesirable outcomes, while an appropriate triage can be effective in determining the patients' treatment procedure, facilitating the processes of stabilizing the patients' conditions and their admission. Therefore, achieving and using a suitable triage system are basic and primary requirements for appropriate and efficient management in an emergency department [10,11]. Various triage director systems have been developed in recent years, each of them provides an analytical approach for the triage process. 5-level triage system based on emergency severity index (ESI) is an example of triage director systems [10-13]. Today, this system is being used in the emergency department of hospitals in many countries of the world. ESI System is an American triage system [14]. Using a systematic approach, ESI provides a standard algorithm for the triage process and applies both intuitive and analytical methods for clinical decision-making [9]. The structure of this triage system is based on two criteria of acuity of illness and the patient's required resources; the first is determined by the existence or lack of life or limb threatening signs and the existence of warning signs as well as vital signs and the second is determined using experience and comparison with similar cases [14].

Using ESI, the triage nurse classifies the patients in 5 levels based on the acuity and required resources. Patients in acuity level 1 require immediate intervention to save their lives or limbs. Level 2 is related to patients at high risk requiring a treatment sensitive to time or consistent with predetermined criteria. Patients lacking the level 2 criteria are assigned to levels 3, 4 and 5. Transfer to lower acuity levels is estimated using resources; level 3, 4 and 5 require 2 or more resources, one resource and no resources, respectively [9,10,13].

If the disease is not too severe (not triage levels 1 and 2), the nurse should classify the patient through estimating the facilities required for the patient in the emergency department. Considering the facilities required for the patient in the emergency department to determine the patient's level is the specific characteristic of ESI system. First, the triage undertaker (nurse) makes decision based on the possibility of threatening life or limb and the patient's stability. In the absence of conditions threatening life or limb or high-risk conditions, the undertaker (nurse) evaluates resources required in the emergency department based on the previous experiences obtained from other patients and system trainings [14].

Several studies have shown that clearer definition is required to separate the patients between the acuity levels. In addition, there is limited information to instruct the nurse or the physician on the patients' classification and some part of the evaluation depends on their ability to clinically make decision [9,12]. According to the triage form communicated by the country's emergency department, all patients referring to this department should be placed in one of 5 levels of triage based on only two cases of chief complaint and drug and food allergy. Then, the level of consciousness, vital signs and medial and medicinal history, and vital signs should be measured if the patient is in level 1, level 2 and level 3, respectively. On the other hand, the history of drug and food allergies (especially food allergies) being less important than medical and medicinal history should be measured in all patients. The decisions on referring or treating the Level 4 and 5 patients should be made by the trigger and the physician apparently based on the chief complaint and drug and food allergies. This study aims to apply the viewpoints of the experts and those having worked in the emergency department and the triage system to find clearer criteria to appropriately and exactly classify the patients.

Materials and Methods

The present study is a cross-sectional qualitative

study which was conducted in five stages at Vali Asr Hospital of Qom University of Medical Sciences in 2013. In the first stage, since the average patients' reference to the hospital during a day was 80 individuals, 200 patients were randomly selected from those who referring to the emergency department of the hospital for one week on the morning, afternoon and night shifts. For random sampling, from each 7 patients who entered the emergency department, 3 were selected with random numbers including the first patient, the fourth patient and the seventh one. This method continued as long as the number of 200 patients were included in the study. The triage form was completed by nurses for each patient and patients along with the triage form were referred to emergency physicians. The physicians were asked to, in case of each patient, firstly examine patients without considering the triage form and perform the initial diagnoses; then, by considering the available information in the triage form, record their diagnoses in the form.

In the second stage, physicians' satisfaction with the triage form was evaluated using questionnaires. The self-structured questionnaire contains 25 questions scored with a five-point Likert scale which assessed physicians' satisfaction with triage quality (an instance of the questions: the triage nurse provides the possibility of more accurate diagnosis by considering initial medical history and diagnoses). Copies of the questionnaire were distributed among five experts of the triage field and its validity was confirmed. In a pilot study, copies of the questionnaire were distributed among the emergency physicians and the coefficient of Cronbach's alpha was obtained as 86% which confirmed the reliability of the questionnaire.

In the third stage, the methods of investigating and identifying print (electronic) documents related to the instruction of the ESI triage, studying documents available in the department, and conducting careful and direct observation of the current processes of the department were used.

In the fourth stage, interviews with the experts of the hospital and pre-hospital triage, authorities and owners of processes in the triage department of Vali Asr Hospital of Qom were performed using the focus group discussions technique (FGD) as well as the brainstorming technique. The reason of using the focus group discussions technique was that the dynamics of a group should add the quantity and quality of data. The population of the study included all general practitioners and nurses in the emergency department who were familiar with ESI triage system and the ranking of providing emergency services, and had at least one year of doing services in the emergency department, triage nurses, nurses in Medical Response Center 115, and professors of emergency medicine and nursing fields. In the present study, purposive sampling method was used in such a way that members of the group of focus group discussions were selected by the researchers. In general, three sessions of focus group discussions were held with the presence of 2 five-member groups and a four-member group including 3 professors, 7 physicians, and 4 emergency nurses. Attending in the sessions was utterly voluntary and individuals attended in the sessions with complete satisfaction. Each session lasted about one hour. In these sessions, the triage form issued by Iran's Emergency Center was investigated and participants' ideas regarding the available items were collected in this form.

To determine the validity and reliability of the data, after constructing groups of focus group discussions and completing related checklists by the members of the group, the researchers gave the members of the group the obtained results as feedbacks, and they confirmed the accuracy of the obtained results. The stage of data analysis was taken by studying the ideas and statements of the members of specialized teams, summarizing and classifying the data. At the end of the held sessions, participants' ideas were classified into 3 domains of the level of consciousness, vital signs, and medicinal and medical records. These domains will be discussed in the findings section of the study.

In the fifth stage, after holding group discussions sessions and summarizing ideas, the suggested changes in the triage form were applied and new forms for the patients' triage were submitted to nurses. Then, 200 patients were randomly selected (as in case of the pilot study) during one week and in each three morning, afternoon, and night shifts by the researchers in order that the effectiveness of the information of the new form in the practitioners' diagnoses be evaluated. The amended triage form for each patient was completed by nurses and the patient along with the triage form were referred to the physicians. The physicians were asked to, in case of each patient, firstly examine them without considering the triage form and perform the initial diagnoses and then, by considering the available information in the triage form, record their diagnoses in the form. Finally physicians' satisfaction with the triage form was evaluated using self-structured questionnaire.

Results

In the first stage of the research, the triage form for each patients was completed by nurses and then, patients and the triage form were referred to physicians. In case of each patients, physicians firstly examined patients without considering the triage form and performed initial diagnoses; then, by considering the available information in the triage form, recorded their diagnoses in the form. After matching these two diagnoses, it was identified that in case of 178 patients, physicians' diagnoses without considering the available information in the triage form did match with their diagnoses based on the information available in the form, and physicians

obtained the final diagnoses without considering the triage form. In the second stage of the research, 20% of the physicians were satisfied with triage quality and in third it was identified that the information available in the auxiliary form could not contribute to their diagnoses.

The results of the fifth stage indicated that in case of 189 patients, physicians obtained the final diagnoses based on the information available in the amended triage form and the information recorded by triage nurses was the basis for physicians' diagnoses. After amending the triage form, the degree of physicians' satisfaction with triage quality was 85%. Changes proposed in this study according to the participants' opinions and experiences mainly include informing all the patients in the emergency department of some necessary information. Accordingly, the first part of the form including two cases of chief complaint and food and drug allergy in the country triage form was enriched and three following cases were added to it:

1. *Medical and medicinal history*: Medical and medicinal history considered only for level 2 patients is asked of all patients.
2. *Vital signs*: Vital signs including blood pressure (BP), pulse rate (PR), respiratory rate (RR), temperature (T), blood oxygen saturation (SPO2) and blood sugar (BS) were considered necessary only for level 2 and 3 patients, but the changes proposed in this study include measuring vital signs for all patients referred to the emergency department.
3. *Level of consciousness*: Measuring the level of consciousness based on AVPU scale is defined only for level 1 patients including - based on the definition - patients faced with life-threatening conditions. Changes proposed in this study include transferring the level of consciousness scale to the general part at the beginning of the sent triage form to measure it for all level 1, 2 and 3 patients.

In addition, resources considered as emergency resources based on the ESI triage algorithm (including tests, imaging, fluid therapy, etc.) were classified case-by-case in three levels to reduce the possibility of error in classifying the patients besides increasing the accuracy.

Discussion

After comparing the results of nurses' initial triage based on the initial form, physicians' diagnoses and the inconformity between them, it was identified that the triage form provided dispersed and incomplete information for physicians, and physicians' diagnoses were performed without relying on the information available in the form, and there was no conformity between them. Conducting the fifth stage of the research indicated that in fact, regarding each patient, basic and necessary information about patients was collected and recorded in the amended triage form by nurses. After patients' references, physicians reviewed available information and recorded their diagnoses and necessary instructions based on it.

1. Medical and medicinal history:

The patient's medical history is an important criterion to classify the patients (e.g. patients with diabetes or a history of IHD, etc.). Disease history, medical history and operations in the past are useful to diagnose the existing problem and take necessary actions. The history of blood pressure or angiography will be determinant for a patient with chest pain [15]. Emphasizing the collection of the patients' medical-medicinal histories is not a new phenomenon but is rooted in medicine history. Studies show that ancient Egyptians have been among those using such information for the treatment before taking any actions [15]. Only about 12.8% to 20% of the physician's time is spent to collect and record the patient's medical-medicinal histories [16]. Studies show that having precise information about the patients' medical history is useful to predict cardiac syncope in patients with and without heart disease [17,18]. Despite rapid advances in diagnostic and therapeutic technology, cardiologists in important academic centers in America highly trust medical history to diagnose heart disease [19]. The patient's medical history along with physical examination is considered as the most important component to diagnose rheumatoid arthritis and congestive heart failure [20]. Results of a study conducted among medical students show that the possibility of false diagnosis among the students not considered the patient's medical history is 5 times more than those accurately diagnosed based on the diseases history [21]. Results of a study conducted by Cossar et al. in Turkey show that the primary diagnosis of seizures becomes easier through collecting the exact medical history of the patient [22].

In addition, the history of drug allergy or using a specific drug is highly important to diagnose and classify the patients, so that some diseases are side effects of medicines (bleeding following using warfarin) or medication helps to classify the diseases in patients not stating an appropriate history.

2. Vital Signs:

Knowing the patient's clinical symptoms may reveal the hidden disease and prevent triageUnder. There may be a patient with a simple headache but his main disease becomes detected through a comprehensive evaluation and determination of vital signs. The difference between history and vital signs is that the chief complaint (CC) and history are not the symptoms of a specific disease and a set of diseases can have a common symptom, while using the patient's clinical symptoms along with CC further limits the set of diseases and makes the diagnosis easier. ESI triage research team believes that vital signs are not always efficient to determine the initial level, but the objective evaluation of the patient including investigating the chief complaint is sufficient to classify the patient in acute and high-risk level (level 1 and 2) and low risk level (3,4 and

5). The Australian College for Emergency Medicine says that the vital signs at triage should be measured only if they are necessary to determine the disease urgency or there is enough time to perform the measurement [14]. In addition, the Canadian Triage and Acuity Scale (CTAS) implies that the vital signs can be measured only when they are necessary to determine the triage level just in level 3, 4 and 5 patients to the extent that there is no time limit [23]. Kohr *et al*., [24] studied the effect of measuring vital signs on decision-making in triage among 14000 patients triaged in 24 emergency departments by 625 nurses. In 1050 children under two years of age, the level of the triage selected for the patient by the nurse had been improved after measuring the vital signs, i.e. the severity of illness was further highlighted. In addition, 19% of the determined levels had been transferred to two or more levels higher after determining the vital signs. If triage is not associated with measuring the vital signs, it won't adequately indicate the urgency of the patient's problem.

The arterial blood oxygen saturation (SPO2) is a vital sign to diagnose a fifth of childhood diseases in the emergency triage unit [25]. More than 90% of 313 specialist physicians stated in a study conducted in America that vital signs are the most important components to diagnose hypertension [20]. Vital signs predict the patient's general condition. Therefore, it is logical to immediately report the patient's abnormal vital signs to the physician to immediately assess the patient's need for emergency measures [26]. Measuring vital signs is always important to determine the severity of the illness and the patient's rapid evaluation based on the existence of vital signs will be to some extent unnatural. In fact, the patient's chief complaint, vital signs and his disease history will be among the first order modifiers [27].

3. Level of consciousness:

Diagnosing the level of consciousness based on AVPU scale is efficient for all patients, since the disease AVPU may be changed measuring the level of consciousness in the patient. Many patients suffering a respiratory and cardiac arrest in the hospital observe changes in routine observations, such as vital signs and level of consciousness during past 24 hours [28]. In addition, resources considered as emergency resources based on the ESI triage algorithm (including tests, imaging, fluid therapy, etc.) were classified in three levels to reduce the possibility of error in classifying the patients besides increasing the accuracy.

Finally, the following suggestions are stated to make the triage form efficient and use the results of this study:

1. Investing the findings of this study by the Emergency Medicine Department of Ministry of Health through forming a technical working group to review the country's triage form.
2. Applying the findings of this study and including them in the country's triage form and communicating them to all health centers around the country.
3. Applying the comments suggested by the experts in health centers around the country.
4. Requiring the hospitals to set up a hospital triage unit and assign a fixed triage nurses to perform triage and complete its form.
5. Training the triage nurses on ESI triage principles and how to complete the form.
6. Periodically reviewing the completed forms of the hospitals by the Vice-Chancellor for Treatment in the Universities of Medical Sciences, identifying the problems and deficiencies of the patient and taking a proposed corrective action to resolve it.
7. Investigating the triage statistics of the hospitals in terms of its five levels by the Vice-Chancellor for treatment in the Universities of Medical Sciences

In conclusion, measuring each of the four items of medical history, medicinal history, vital signs and level of consciousness generally provides more precise diagnosis and more scientific, justified and easier classification, since the level to which the patient belongs should be identified based on a set of clinical histories and symptoms**.** Faster and more accurate diagnosis of the disease in the emergency patient in the early moments of evaluating the patient in triage plays an efficient role in selecting the therapeutic method, its effectiveness and preventing future complications.

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