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Designing a Minimum Data Set of Triage Section in the Hospital Information System

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Abstract

Background: The triage process prioritizes emergency care patients as a first step, and distributes them to different levels of triage based on the severity of clinical conditions. Since this method depends on the memory of the triage performer, it may be affected by lack of time, complexity of triage, and bias, causing nurse confusion and ultimately affecting patient safety. One of the interventions that can improve the efficiency and quality of patient care in this unit is the use of electronic medical records, so the present study aimed to design a minimum data set to collect data in a uniform and standard way in the triage unit. Methods: This is a descriptive-analytic study that was performed in hospitals affiliated to Qazvin University of Medical Sciences that had emergency medicine specialty in 2018. The study population consisted of 15 emergency medicine specialty and triage nurse practitioners who were selected by convenience sampling. To collect data from was used a researcher-made questionnaire designed that Validity and reliability of checklists were assessed by emergency medicine specialty and triage nurse in pre-hospital emergency with Cronbach's alpha of 0.89. The results were analyzed using SPSS 21 and statistical indices. Results: The survey results indicate that 6 data elements should be considered as mandatory components of MDS for the triage department. These elements include basic triage information, timing, evacuation, accidents, life-threatening conditions and counseling. Conclusion: The findings of the study indicated that minimal data design can lead to standardization and effective management of data by providing comprehensive data elements for triage, thus improving the quality of care, speed of emergency services and reducing costs. And most importantly increase patient satisfaction. It will also allow comparisons of information at different levels of effective decision-making and policy-making and prevention of future injuries.

Keywords

Minimum Data Sets, Data Elements, Triage Section, Electronic Personal Health Record

Introduction

The triage process prioritizes emergency care patients as a first step, and distributes them to different levels of triage based on the severity of clinical conditions. So that the event caused by treatment delay and emergency performance in emergency patients and finally dead by delay in provide service will become minimum. Therefore, it improves resource efficiency, patient satisfaction, reduced length of stay and admission rate and ultimately better management of patient density in the emergency ward. [1,2]Triage has been a long-standing principle in emergency medicine, but standardized triage tools are relatively new. Canada, Australia, and the United Kingdom have created their own triage instruments and, in the United States, 72% of emergency department (ED) patient visits are assessed using the Emergency Severity Index (ESI) and its history in Iran dates back to several years [3]. Nowadays, most hospital emergency departments in the country have this unit in their structure and the nurses has responsibility to do it, this group of treatment staff plays a key role in this area.[4] Nurses complete triage forms manually for each patient (4); Since this method is dependent on the memory of the triage individual, it may be affected by the lack of time, complexity of triage and bias, as well as overcrowding and other triage tasks may confuse the nurse and interfere with the unit's process. Ultimately affects patient safety.[5] So It seems

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necessary replace the electronic form instead with the manual form. Replacing triage data in software can help determine indicators such as number of triage patients, time between triage and bed allocation, triage classification, patient length of stay, and also help to make evidence-based decisions [6]. As emergency medicine is widespread around the world, it is important to adopt strategies to improve the effectiveness of emergency care in hospitals. Among these solutions is the use of electronic medical records. Studies have shown that Electronic medical records (EMRs) can improve patient care and productivity [7].Establishing a minimum data set to collect information in a uniform and standardized manner at the national level can be the most important step in this field [8]. In information management, the minimum data set is considered to be a broad set of accepted words and definitions, providing access to accurate and unambiguous disease health data [9], and the purpose of this set is to make the key elements of health data, to make it possible to compare and adapt data using standard data items with identical definitions [10].An anonymous survey of users of the emergency department (ED) Dashboard was conducted in 188 end-users approached. Users agreed that the design features employed were important contributors to the system's success.[7] In the study of Dougas et al that was conducted between 25,198 (97 million weighted) adult emergency department visits from the 2009 National Hospital Ambulatory Medical Care Survey, They came to this conclusion that The Electronic Triage System (ETS) is a triage system based on the frequency of critical outcomes that demonstrate improved differentiation of patients compared to the current standard Emergency Severity Index (ESI).(4)Since in Iran minimum health data is not designed for triage section electronically, the present study aimed to design minimum triage section data set.

Methods

This is a descriptive-analytic study that was performed in hospitals affiliated to Qazvin University of Medical Sciences that had emergency medicine specialty in 2018. The study population consisted of 15 emergency medicine specialty and triage nurse practitioners who were selected by convenience sampling. To collect data from was used a researcher-made questionnaire designed based on goals through a library resource review, Web of Science, Science Direct, Pubmed, Sid, and Springer databases and emergency unit triage files. Validity and reliability of checklists were assessed by emergency medicine specialty and triage nurse in pre-hospital emergency with Cronbach's alpha of 0.89. The results were analyzed using SPSS 21 and statistical indices. The designed questionnaire consisted of identity information bases, triage baseline information, timing, discharge information, consultation, and the participants were asked to rate their agreement on each of the elements in the scale. Five Likert options (strongly agree, agree, disagree, disagree, strongly disagree) were also asked at the end of the open question to write the suggested elements and opinions of the research participants. The results were analyzed using descriptive statistics and frequency distribution. Also, according to the research team, using data from Delphi technique, data obtained by over 60% of experts were accepted.

Result

In total, 15 experts responded to the list and questionnaire. These participants consisted of 8 emergency medicine specialists and 7 nurses. According to Table 1, 62% of respondents were faculty members. Most doctors (54%) were working in private and organizational hospitals, and also, most respondents had 30-39 years of work experience (43%). Of the 43 information element data surveyed, 28 of them were identified as the main elements with the agreement of more than 60% in the range of high and very high were excluded from the elements list of personal health records of triage ward patients.

Table 1: Demographic Information about Respondents on the Dataset of Electronic Personal Health Records of Triage Ward Patients

Profile		Frequency	Percentage
Gender	Female	3	20
	Male	12	80
Age	30	6	29
	39- 30	4	43
	49-40	3	21
	50 ≤	1	7
Specialty	Emergency Medicine	8	54
	Nurse	7	46
Working conditions	Faculty Member	7	62
	Masters	2	15
	Bachelor	3	23

The main information data elements were finally verified in 7 categories, each of which has sub-categories and were used in His system. (Table 2)

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Table 2: Minimum Data Set of Personal Health Records of Patients with Triage Ward Patients

Main Information Data Elements	Details
Demographic information	first name, surname, father's name, gender, age, national code, nationality, date of birth, place of birth (province or city), phone number, job, address
The first triage information	the patient's condition on arrival, the main complaint of the patient, possible diagnosis, the patient's level of consciousness, vital signs, degree of pain, health history, drug allergies, level of triage, treatment at the scene, name of resident physician
Timing	Patient arrival time, hour of first appointment by physician, time to enter the ward, the first time the nurse executes the instructions, duration of patient status determination, referral time to the laboratory, date and time to receive an answer testing, referral time to radiology, date and time to receive an answer radiology, exit time (under 12 hours, over 12 hours), time to get ECG
Discharge	Type of discharge (prescription medication, personal consent discharge, transfer to another hospital or death), transfer to ward or operating room
Accidents	Accident city, accident area, accident location, accident outcome, type of accident
Life-threatening conditions	Level 1 (airway hazards, shock symptoms, respiratory distress, cyanosis, spo2), Level 2 (lethargy and drowsiness, risky conditions, pain or distress), Psychiatry (suicidal and other thoughts, irritability, verbal aggression and violence, thoughts of harming oneself and others, history of suicide attempt, probability of escape)
Consultation	Date of consultation request, date of consultation, specialty consulted, consultant's name

In the first information of triage survey, the experts stated that the most important items in terms of patient's main complaint(100%), probable diagnosis(93%), patient's level of consciousness(93%), vital signs(93%), patient status on arrival(86%), Level of triage(86%) and medical history(80%) respectively and did not consider other items necessary(Table 3).

According to experts, the first visit by the triage physician (86%), the patient arrival time (73%), the referral time to the laboratory (73%) and the radiology referral time (73%) respectively, were the highest timing priorities respectively. Other items were not important to experts (Table 3).

Table 3: Frequency Distribution of the Fist Triage Information

Frequency distribution	Very agree		Agree		50-50		Disagree		Very disagree	
first triage information	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Patient status at entry	11	73	2	13	2	13				
The main complaint of the patient	12	80	3	20						
Possible diagnosis	7	50	6	43	1	7				
Patient's level of consciousness (A V P U)	13	86	1	7	1	7				
Vital Signs bp,pr,t,bp,bs, spo2	13	86	1	7	1	7				
Degree of pain	6	40	4	26	4	26	1	7		
Medicinal allergies	7	46	4	26	1	7	2	13	1	7
medical record	4	27	8	53	3	20				
Number of Facilities Required	3	20	2	13	9	60	1	7		
Triage Level: (Level 1, Level 2, ...)	11	73	2	13	2	13				
Treatment at the scene	2	14	6	43	2	14	2	14	2	14
Name of resident physician	2	14	4	28	2	14	1	7	5	35

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Table 4: Frequency Distribution of Timing Data

Frequency distribution	Very agree		agree		50-50		disagree		Very disagree	
timing data	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
atient arrival time	8	53	3	20	3	20	1	7		
The first appointment by a triage physician	11	73	2	13	1	7	1	7		
Time to enter the ward	5	33	5	33	3	20	1	7	1	7
Time of first execution by the nurse	7	47	3	20	2	13	1	7	2	14
Assignment time	3	20	3	20	5	33	1	7	2	14
Referral to the laboratory	3	20	8	53	1	7	1	7	2	14
Date and time received	1	7	2	13	8	53	2	13	2	14
Refer to radiology	3	20	8	53	1	7	1	7	2	14
Exit time	3	20	3	20	3	20	3	20	2	14
Time to obtain ECG (first and second ...)	2	13	2	13	4	27	3	20	2	14

According to the experts, the city of the accident, the area of the accident, the location of the accident and the type of accident were irrelevant.(Table 5)

Table 5: Frequency Distribution of Accident Data

Frequency distribution / Accident	Very agree		agree		50-50		disagree		Very disagree	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Accident City					8	53	4	27	2	13
Accident area			1	7	8	53	3	20	2	13
The place of the accident			1	7	8		3		2	
Type of incident	3	20	7	47	1	7	2	13	1	7

According to the survey, respiratory distress (94%), cyanosis (93%), spo2 (93%), high risk conditions (93%), airway hazards (87%), shock symptoms (87%), lethargy and drowsiness (87%)) Had the highest percentage and suicidal ideation (67%), irritability, aggression and verbal violence (61%), suicide attempt (53%), self-harm and others (47%) had less the percentages.

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Table 6: Frequency Distribution of Life Threatening Data

	Very agree		agree		50-50		disagree		Very disagree	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Airway Hazards	12	80	1	7	1	7				
Symptoms of shock	13	87			1	7	1	7		
respiratory distress	13	87	1	7						
Cyanosis	12	80	2	13						
Spo2 <90	12	80	2	13						
Lethargy and drowsiness	12	80	1	7	1	7				
Risky Conditions	12	80	2	13						
Severe pain or distress	10	67	3	20	1	7				
Suicidal thoughts and Homocide	4	27	6	40	5	33				
Irritability, aggression and verbal violence	4	27	5	33	3	20	1	7	1	7
Thoughts hurting yourself and others	4	27	3	20	6	40	1	7		
History of attempted suicide	5	33	3	20	5	33			1	7

Participants did not agree on the minimum data for the consulting section with consulting request items, consulting date, consulting expertise, and consultant's name (Table7).

Table 7: Frequency Distribution of Consulting Data

	Very agree		agree		50-50		disagree		Very disagree	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Consultation request date	3	20	7	47	2	13	2	13	1	7
Date of consultation	1	7	7	47	2	13	2	13	1	7
Specialty consulting	2	13	7	47	1	7	2	13	1	7
Name of consultant physician	1	7	1	7	3	20	2	13	6	40

Discussion

The triage process prioritizes emergency care patients as a first step, and distributes them to different levels of triage based on the severity of clinical conditions. Recently, e-triage has been used in some countries to help triage and inpatient care providers continue to receive the best quality patient care [11,12]. It is necessary that the design of a minimal data set in triage makes it easy to access information in an organized manner ([3]. Due to the lack of minimum standard triage data, in the present study, after the survey, a table was designed for the minimum dataset

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to design the triage electronic file. Due to the lack of minimum standard triage data, in the present study, after the survey, a table was designed for the minimum dataset to design the triage electronic file. According to the findings, the minimum essential information content of the electronic patient records in the emergency, including patient demographic information (for identification and follow-up), baseline triage information, timing, accident data, life-threatening data and consulting. Demographic information includes: first name, surname, father's name, age, nationality, phone number, job were necessary to record in electronic records. About triage baseline information; patient status at admission, patient's main complaint, probable diagnosis, patient's level of consciousness(AVPU), vital signs bp, pr, t, bp, bs, spo2, pain degree, drug allergies, medical history ,Triage level: (level 1, level 2, ...), treatment at the place of accident. In the timing data section: patient arrival time, the first appointment by a triage physician, ward entry time, time of first execution by nurse, time of referral to laboratory, time of referral to radiology. Life-threatening conditions data included: airway hazards, shock symptoms, respiratory distress, cyanosis, Spo2 <90, lethargy and drowsiness, high-risk conditions, pain or severe distress, suicidal thoughts and suicides, and counseling data including: consultation request date and specialty consulting, they considered it necessary. According to the results of this study, In the case of demographic information, first name, surname, father's name, age, nationality, phone number, job were necessary to record in Electronic records. This results was matched with studies of Abbasi [14] and Latha [15]. In the similar studies have included other items for demographic information such as passport number (for non-Iranian patients), home telephone number, province, city and residential address, but this study we tried to use essential demographic information according to the World Health Organization guidelines about medical records and electronic health records [16, 17], ideally, to identify a person when a national identification number is not used, institutions need to determine what piece of information is not likely to be changed. Shahbazi et.al conducted a study entitled as " Determining the Minimum Data Set for Uveitis Patients' Electronic Health Records in Iran" In the designed system, five groups expressed of demographic information, patients' clinical records, laboratory information, type of uveitis, treatment guidelines, and the information of ophthalmic pictures. In another article, an MDS of orthopedic injuries were assigned to two categories: administrative category with six classes(Demographic data, Provider (Organizational, Personal) identification data, Place data, Insurance data, Legal data, Cause data) including 142 data elements, and clinical category with 17 classes(Diagnostic data, Emergency data, Anesthesia data, Procedure data, History, Consultations, Orders, Follow up, Death data, X-rays, Lab-tests , Medications, Instrument, Blood products, Nursing note, Conditions of discharges, Conditions of discharges) including 250 data elements [18]. In the study of Ahmadi et al., Who had designed the minimal data set of the radiology reporting system. Name, ID and address of imaging institute, name, surname, specialty, ID, address and telephone, date, time and digital signature of referring physician, admissions physician, radiologist and anesthesiologist, reason for referral, number of visits, hospital ward (In case of hospital admission) and informed consent were selected as important management information elements [19]. Moeil Tabaghdehi et al in their study, demographic information, health history, general physical examinations, biochemical data, hematological data, immunological data, pharmaceutical data, blood transfusion data, physical tests data, vaccination, dental care were considered as minimum data set of personal health records of patients with thalassemia major [20-22].

Conclusion

Collecting standard and required data from diverse health information systems can help to create more comprehensive health records such as population health record (PopHR) and community health record (CHR). These can provide a comprehensive vision of population health status and the factors that influence it by exchanging or receiving data from many national data sets and systems such as HISs and EHR. Moreover they can be used by public health agencies in each country.

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Conflict of interest

The authors declare that there is no conflict of interest.

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