http://jhmi.sums.ac.ir
Health Man & Info Sci 2022, 9(4), 236–242

HMIS
Health Management and Information Science

Original Article

Identification of the Information Needs of a Nurse-led Rapid Response Team to Design and Develop an Electronic Medical Record System

Mehrdad Karajizadeh[1]*, Reza Nikandish[2], Zahra Zalpour[3], Mahsa Roozrokh Arshadi Montazer[3], Mohammadbagher Soleimanijafarbiglo[4], Yaser Mazaher[5], Hamid Reza Saeidnia[6]

[1]Trauma Research Center, Shahid Rajaee (Emtiaz) Trauma Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
[2]Anesthesiology and Critical Care Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
[3]Medical Informatics, Trauma Research Center, Shahid Rajaee (Emtiaz) Trauma Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
[4]Computer Engineering, Trauma Research Center, Shahid Rajaee (Emtiaz) Trauma Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
[5]Critical Care Nursing, Shiraz Organ Transplant Center, Avicenna Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
[6]Information Management, Department of Knowledge and Information Science, Tarbiat Modares University, Tehran, Iran

Abstract

Introduction: This study aimed to identify the essential information needs in the rapid response team (RRT) electronic records of hospitals.

Methods: This cross-sectional study was conducted among 71 RRT members of Abu Ali Sina Organ Transplant Center in Shiraz, Iran. Data were collected using a researcher-made questionnaire by trained researchers. Descriptive (mean, frequency and percentage) and analytic (Mann Whitney U and Kruskal Wallis) statistics were used to analyze the data.

Result: The three data elements with the highest mean scores were blood pressure (4.8), heart rate (4.7), and respiratory rate (4.6). Among the top ten data elements according to Nursing Supervisor "Investigations (Most recent chest x-Ray)", "Investigations (EF)", and "Investigations (pulmonary function test)"; according to Head nurse "Investigations (EF)", "Laboratory (Arterial blood gas)" and "Laboratory (Hb)"; and according to RRT ICU Nurse "Laboratory (Hb)", "Laboratory (O2 saturation)" and "Laboratory (K)" were the most important data elements. Also, by opening the RRT Registered anesthesia nurse, "Physiology (BP)", "Physiology (RR)", and "Physiology (body temperature)" were the most important data elements. There was a statistically significant difference between different clinical roles in the relationship between important data elements ($P<0.05$). Also, there was a statistically significant difference between the registered group of RRT anesthesia nurses and other clinical role groups ($P<0.008$).

Conclusion: The identified information needs in this study can be used to inform the development and design of user-centered EMRs for nurse-led RRTs.

Keywords: Rapid response team, RRT, Electronic medical record, EMR, Information needs, Minimum dataset

Article History:
Received: 24 July 2022
Accepted: 10 November 2022

Please cite this paper as:
Karajizadeh M, Nikandish R, Zalpour Z, Roozrokh Arshadi Montazer M, Soleimanijafarbiglo MB, Mazaher Y, Saeidnia HR. Identification of the Information Needs of a Nurse-led Rapid Response Team to Design and Develop an Electronic Medical Record System. Health Man & Info Sci. 2022; 9(4): 236-242. doi: 10.30476/JHMI.2023.96214.1143.

***Correspondence to:**
Mehrdad Karajizadeh,
Trauma Research Center, Rajaee Hospital, 6th Floor, Chamran Ave. Postal code: 71948-15711, Shiraz, Iran
Tel/Fax: +98 71 36254206
Email: Mehrdad.karaji@gmail.com

Introduction

In-hospital cardiac arrests are unexpected and one of the challenging events in hospitals, associated with significant morbidity and mortality around the world (1). Each year, many cases of cardiac arrest are reported in hospitals (2, 3). Despite the use of traditional cardiopulmonary resuscitation (CPR) methods, the survival of patients has not changed significantly (3). Most CPR attempts for patients with organ failure, such as kidney and liver failure are unsuccessful (4, 5). Symptoms of cardiac arrest can appear two to six hours before the onset of cardiac arrest (6). Evidence shows that implementing a rapid response team (RRT) is one of the important strategies for preventing in-hospital cardiac arrests (6).

RRT refers to a healthcare providers team who can swiftly deliver care for deteriorating patients (7). It has been shown that RRT interventions can decrease

the rate of cardiac arrest and patient mortality (8, 9). One of the most important interventions to improve the health status of patients with cardiac arrest are Electronic Health Records (EMRs) (10).

EMRs can improve the efficiency of health care and improve the patients' safety (11). Previous studies show that the acceptance of EMRs improve patients safety (10, 12). Aisadrah also stated that the implementation of EMRs led to different benefits for patients (raised the quality of health care systems, decreased errors, and improved diagnosis treatments and quicker health care decisions) and health care provider (enhanced information exchange between health care providers, reduced the costs and time, and increased the safety culture among primary care makers) (13).

Despite the many benefits of using EMRs, the use of comprehensive EMRs leads to high workload of healthcare providers (10). The information overload of EMRs leads to misdiagnosis and reduces the patients' safety (14). Generally, in EMRs, users are required to record a large amount of information (1). Also, the amount of information in EMRs is directly related to the burnout of healthcare providers, ultimately leading to a reduction in healthcare providers' efficiency (1). On the other hand, determining the users' information needs, based on their job status, can help reduce unnecessary documentation of data (15).

Commonly, only a single EMR format is developed for all hospitals providing different specialized services, and the users' information needs are not addressed. Different surveys have shown that identifying the information needs of end-users (healthcare providers) may reduce unrelated data documentation in EMRs (15-18). In this regard, Ellsworth et al. showed that the core dataset was essential for the clinical decision-making process (17). In developing an EMR interface, there may be a need to offer options for viewing the data, depending on the user's clinical role (17). Barwise et al. investigated the information needs in a physician-led RRT electronic clinical tool and concluded that physiology parameter (heart rate (HR), respiratory rate (RR), blood pressure (BP)), and resuscitation status were important information items in RRT. This finding can contribute to the current knowledge on how to improve the EMR interface for RRTs (19).

According to our literature review, it seems that many hospitals around the world are using nurse-led RRTs. However, to the best of our knowledge, there is no core dataset for a nurse-led RRT structure. Therefore, the present study aimed to identify the essential EMR information for RRTs from RRT nurses' perspective in the Organ Transplant Center.

Methods

This cross-sectional study was conducted to determine the necessary EMR information for RRTs to be used in clinical decision-making at Organ Transplant Center during 2020. Abu Ali Sina Organ Transplant Center is the referral organ transplant center in the Middle East (20). Liver, kidney, pancreas, heart, and bowel transplants are performed in this center. The RRT of this center consists of a registered nurse anesthetist and an ICU nurse. This team is managed by a nurse supervisor and guided by an ICU specialist daily. Nearly 80 patients receive RRT services every month.

This survey was conducted among RRT members, including the nursing supervisor, the head nurse, a registered RRT nurse anesthetist, and RRT ICU nurses. Census sampling was carried out among all RRT members (n=71) at Abu Ali Sina Organ Transplant Center.

To extract the data elements, an expert panel, consisting of an intensivist, attending intensivist, RRT supervisor, and a medical informatics expert reviewed the existing literature on EMRs and studied the implemented formats in well-known hospitals. A data extraction form was used to record the data. This form included the name data elements and references. After completing the data elements extraction and identification process, all identified data elements were placed in a checklist format and presented to experts. Some data elements were deleted or added by the expert panel, based on the structure of the hospital.

Finally, a questionnaire was designed based on data elements approved by experts. The questionnaire consisted of nine sections: demographic features (8 items), medical history (3 items), medical exams (4 items), laboratory tests (12 items), physiology (7 items), allergies (2 items), disposition status (1 item), early warning score (EWS) (1 item), and others (4 items). The answers to each question in the questionnaire were scored using a five-point Likert scale (ranging from not needed to absolutely necessary).

Two researchers were given a one-day training on the purpose of the study, data privacy and confidentiality, respondents' rights, informed consent, and data collection techniques. The questionnaire was distributed in person from 1 to 12 July 2021 among the participants by the trained researchers. The participants were asked to rate 42 data elements on a five-point Likert scale (ranging from 'not needed" to "absolutely necessary"). Besides, the demographic information of the participants was gathered.

The questionnaire answers ranged from one to five. The mean score (MS) of each data element was calculated. The MS for each data element was presented based on respondent's clinical role. The survey responses were collected and tabulated in Microsoft Excel 2010.

Kruskal-Wallis test was used to compare the MS of the items between the four RRT groups. To determine significant differences among the clinical roles, adjusted by Bonferroni correction, we carried out a pairwise Mann-Whitney U test for six clinical role groups. First, the desired significance level (0.05) was divided by the number of comparisons (6); then, the calculated number was used as the P-value for determining the statistical significance (P=0.008). Statistical analysis was performed in SPSS 24.

Ethics Committee of Shiraz University of Medical Sciences approved this study (Code: IR.SUMS.REC.1399.147). The participants were assured that their personal information in the survey would not be disclosed.

Results

Table 1 shows the participants' characteristics. Most of the individuals were RRT ICU nurses. The median (SD) age of the participants was 29.84 (4.08) years (range: 24-45).

Figure 1 presents each of the data elements (n=42) with ascending mean. The five data elements with the highest mean were as follows: BP (physiology), HR (physiology), RR (physiology), O2 saturation (laboratory), and GCS (physiology). The median MS was measured to be 3.7 (maximum: 4.50). On the other hand, the five lowest-rated data elements were as follows: admission status (inpatient/outpatient), primary service (name and pager), location/room number, race, and nationality. In Figure 1, the frequency of respondents is shown. Physiology (BP) was ranked as an "extremely useful" data element by the majority of the respondents (n=58, 81.69%). Seven out of 42 items (16.67%) received an "extremely useful" rating by more than 50% of the respondents. On the other hand, demographics (location/room number) were rated as "not useful" by 28.17% of the respondents. The average, frequency, and percentage of all data elements are displayed in Appendix A.

Following the stratification of each data element score with respect to the clinical role (i.e., nursing supervisor, head nurse, registered RRT nurse anesthetist, and RRT ICU nurse), a change was observed in the order of the ten highest-ranked data elements, which may reflect the clinical role in the RRT (Table 2).

Figure 2 presents the distribution of MS for all data elements classified by the combined mean of clinical roles. Statistically significant differences were observed between various clinical roles based on comparisons using the Kruskal-Wallis test (P<0.05). There was strong evidence of a significant difference between the registered RRT nurse anesthetist group and other clinical role groups (P<0.008, adjusted by Bonferroni correction).

Table 1: The participants' characteristics (N=71)

Variable Name	Frequency (%*)
Sex	
Female	39 (54.90)
Male	32 (45.10)
Marital Status	
Single	35 (53)
Married	31 (47)
Position Rule	
Nursing Supervisor	10 (14.10)
Head Nurse	24 (33.80)
RRT anesthesia technician	7 (9.90)
RRT ICU Nurses	30 (42.30)

*Valid percent reported.

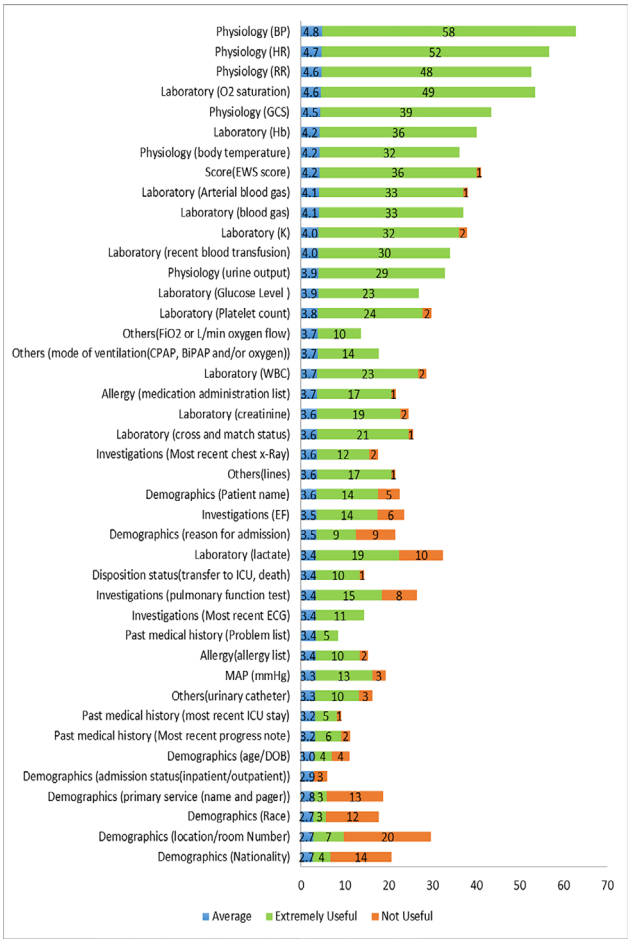

Figure 1: The MS distribution for each data element stratified.

Table 2: Top-ten data elements stratified by clinical role

Order	Nursing Supervisor	Head nurse	RRT ICU Nurse	RRT Registered anesthesia nurse
1	Investigations (Most recent chest x-Ray)	Investigations (EF)	Laboratory (Hb)	Physiology (BP)
2	Investigations (EF)	Laboratory (Arterial blood gas)	Laboratory (O2 saturation)	Physiology (RR)
3	Investigations (pulmonary function test)	Laboratory (Hb)	Laboratory (K)	Physiology (body temperature)
4	Laboratory (Arterial blood gas)	Laboratory (O2 saturation)	Laboratory (WBC)	Investigations (Most recent chest x-Ray)
5	Laboratory (Hb)	Laboratory (K)	Physiology (HR)	Laboratory (Hb)
6	Laboratory (O2 saturation)	Laboratory (blood gas)	Physiology (BP)	Laboratory (O2 saturation)
7	Laboratory (lactate)	Physiology (HR)	Physiology (RR)	Laboratory (K)
8	Laboratory (WBC)	Physiology (BP)	Physiology (body temperature)	Laboratory (WBC)
9	Physiology (HR)	Physiology (RR)	Physiology (urine output)	Laboratory (blood gas)
10	Physiology (BP)	Physiology (body temperature)	Physiology (GCS)	Laboratory (cross and match status)

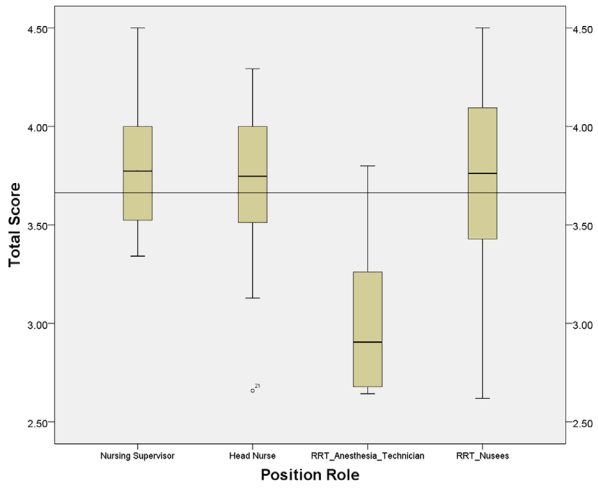

Figure 2: The box graphs (median, interquartile range, and range) total score by provider position

Discussion

The first step in developing a nurse-led RRT EMR system is to identify the users' information needs. Therefore, in this study, the RRT members were surveyed to better understand their clinical information needs for better decision-making and to design and develop a more effective software for used by RRT. To the best of our knowledge, this survey is the second research on the RRTs' information needs and the first study in a nurse-led RRT setting. The present findings demonstrated that physiological parameters (HR, BP, and RR) received the highest ranking among the data elements. In other words, of the ten highest rated data elements, five were related to physiological parameters, four to laboratory parameters, and one was often associated with EWS. On the other hand, of the ten lowest-rated data elements, six were related to demographic characteristics. Evidently, RRTs need quick access to critical information for the clinical decision-making process; therefore, information about the physiological parameters can lead to timely and better decisions.

Some of the top ten data elements, stratified by clinical roles, were the same as the overall top ten data elements (BP, HR, RR, O_2 saturation, and hemoglobin), with different rankings. On the other hand, some data elements were among the top ten ranked items by different clinical role groups, but they were not ranked among the overall top ten data elements (e.g., urine output, WBC, potassium level, cross-match compatibility status, latest chest X-ray, ejection fraction, and pulmonary function). The results of comparisons between the clinical role groups showed significant rating differences between the

registered RRT nurse anesthetists and other clinical role groups. However, the results demonstrated that the total mean score of the registered RRT nurse anesthetist group was lower than that of the other clinical role groups. Such comparisons can lead to the development of suitable health information technologies to meet different clinical needs (17).

In a study by Barwise et al., physiological data, including HR, RR, and BP, had the highest MS and were ranked as the top three data elements; this finding is consistent with the results of the present study with different ranking orders. Also, in our study, demographics were among the five lowest-ranked data elements. In the study by Barwise et al., the five lowest-rated data elements were the admission type, specialist consultation, stress test, urinary catheter, and pulmonary function tests (19). In their study, the ranking of the data elements depended on the clinical role in RRT. This finding shows that EMR systems for RRTs should be designed based on the structure and clinical roles of the team. Therefore, obtaining relevant data during RRT activities may improve the clinical decision-making process, considering the time restrictions for deteriorating patients.

In the present study, demographic data received the lowest ranking among the items, which is not consistent with the study by Barwise et al. (19). It should be noted that the demographics are documented at the time of admission in our hospital and are automatically available in the hospital EMR; this may be the reason for the lower scores of these items in the current study. Also, in the study by Brawise et al. (19), resuscitation status was highly important for 85% of individuals prospectively. However, RRT has not been yet implemented as a safety measure by the Iranian Ministry of Health to reduce hospital cardiopulmonary arrests. Moreover, the definition of the end-of-life care is not clear yet, and "do-not-resuscitate" orders have not been legally approved in Iran. Therefore, we eliminated the resuscitation status from the list of items although knowledge of the code status is one of the major determinants of resuscitation attempts.

The present study is the first to examine the information needs of RRTs in a model consisting of non-physician members. Since many RRTs have a nurse-based structure around the world, the development of information needs a system with this RRT structure, which can be the strength of our study. Also, our survey had a high response rate of 100%, and the participants had four distinct clinical roles (head nurses, RRT ICU nurses, nursing supervisors, and registered RRT nurse anesthetists). However, in the study by Barwise et al., the response rate was 24.5% (19). It should be noted that they sent emails to the RRT members, while in our study, a questionnaire was completed by the RRT members on call.

There were some limitations to the present study. Firstly, this survey was carried out in a single center, and the results may not have direct applications in other settings with different RRT structures. Secondly, since Abu Ali Sina Organ Transplant Center is the only center with an active RRT in Iran, it was not possible to conduct a multi-center study. Thirdly, although some of the participants were not direct members of the RRT, they were intimately involved in the RRT activities and planning. Fourthly, we only assessed the information needs of the end-users in this survey. Since RRT was implemented as a pilot in our hospital, other stakeholders, such as insurance companies and financiers, were not defined. Finally, we used a quantitative method (i.e., questionnaires) to assess the RRT's information needs, while qualitative methods, such as ethnography, may also be useful (21, 22). Therefore, further research, especially studies with a qualitative methodology, is needed to determine the needs of RRTs. It is also suggested to conduct similar studies in other settings for generalizing the results.

In this study, information needs of a nurse-led rapid response team to design and develop an electronic medical record system for patients with cardiac arrests were identified. Clinical data, including BP, HR, and RR, were ranked as the top three data elements by most RRT providers. Overall, knowledge about the information needs of RRTs can help improve the EMR interface, depending on different team structures. It also provides real-time information, including physiological and laboratory data, which can be useful for deteriorating patients. Moreover, identifying important parameters in the design and development of an electronic medical record can also lead to faster development of this technology and saves labor, time, and money.

Ethics approval: Code: IR.SUMS.REC.1399.147

Funding/Support: None declared.

Financial Disclosure: None declared.

Conflict of Interest: None declared.

References

1. Babbott S, Manwell LB, Brown R, Montague

E, Williams E, Schwartz M, et al. Electronic medical records and physician stress in primary care: results from the MEMO Study. *J Am Med Inform Assoc*. 2014;21(e1):e100-6. doi: 10.1136/amiajnl-2013-001875.
2. Andersen LW, Holmberg MJ, Berg KM, Donnino MW, Granfeldt A. In-Hospital Cardiac Arrest: A Review. *JAMA*. 2019;321(12):1200-10. doi: 10.1001/jama.2019.1696.
3. Hussein MR, Shams AB, Apu EH, Mamun KAA, Rahman MS. Digital surveillance systems for tracing COVID-19: Privacy and security challenges with recommendations. *arXiv preprint arXiv:200713182*. 2020.
4. Stotts MJ, Hung KW, Benson A, Biggins SW. Rate and predictors of successful cardiopulmonary resuscitation in end-stage liver disease. *Dig Dis Sci*. 2014;59(8):1983-6. doi: 10.1007/s10620-014-3084-8.
5. Saeed F, Adil MM, Malik AA, Schold JD, Holley JL. Outcomes of In-Hospital Cardiopulmonary Resuscitation in Maintenance Dialysis Patients. *J Am Soc Nephrol*. 2015;26(12):3093-101. doi: 10.1681/ASN.2014080766.
6. Bedell SE, Delbanco TL, Cook EF, Epstein FH. Survival after cardiopulmonary resuscitation in the hospital. *N Engl J Med*. 1983;309(10):569-76. doi: 10.1056/NEJM198309083091001.
7. Jones DA, DeVita MA, Bellomo R. Rapid-response teams. *N Engl J Med*. 2011;365(2):139-46. doi: 10.1056/NEJMra0910926.
8. Garretson S, Rauzi MB, Meister J, Schuster J. Rapid response teams: a proactive strategy for improving patient care. *Nurs Stand*. 2006;21(9):35-40. doi: 10.7748/ns2006.11.21.9.35.c6408.
9. Lee HY, Lee J, Lee SM, Kim S, Yang E, Lee HJ, et al. Effect of a rapid response system on code rates and in-hospital mortality in medical wards. *Acute Crit Care*. 2019;34(4):246-54. doi: 10.4266/acc.2019.00668.
10. Chuang T-YA, Yii N, Nyandowe M, Iyer R. Examine the impact of the implementation of an electronic medical record system on operating theatre efficiency at a teaching hospital in Australia. *International Surgery Journal*. 2019;6(5):1453-7.
11. Lin HL, Wu DC, Cheng SM, Chen CJ, Wang MC, Cheng CA. Association between Electronic Medical Records and Healthcare Quality. *Medicine (Baltimore)*. 2020;99(31):e21182. doi: 10.1097/MD.0000000000021182.
12. Campanella P, Lovato E, Marone C, Fallacara L, Mancuso A, Ricciardi W, et al. The impact of electronic health records on healthcare quality: a systematic review and meta-analysis. *Eur J Public Health*. 2016;26(1):60-4. doi: 10.1093/eurpub/ckv122.
13. AlSadrah SA. Electronic medical records and health care promotion in Saudi Arabia. *Saudi Med J*. 2020;41(6):583-9. doi: 10.15537/smj.2020.6.25115.
14. Rand V, Coleman C, Park R, Karar A, Khairat S. Towards Understanding the Impact of EHR-Related Information Overload on Provider Cognition. *Stud Health Technol Inform*. 2018;251:277-80.
15. Kroth PJ, Morioka-Douglas N, Veres S, Babbott S, Poplau S, Qeadan F, et al. Association of Electronic Health Record Design and Use Factors With Clinician Stress and Burnout. *JAMA Netw Open*. 2019;2(8):e199609. doi: 10.1001/jamanetworkopen.2019.9609.
16. Herasevich V, Ellsworth MA, Hebl JR, Brown MJ, Pickering BW. Information needs for the OR and PACU electronic medical record. *Appl Clin Inform*. 2014;5(3):630-41. doi: 10.4338/ACI-2014-02-RA-0015.
17. Ellsworth MA, Lang TR, Pickering BW, Herasevich V. Clinical data needs in the neonatal intensive care unit electronic medical record. *BMC Med Inform Decis Mak*. 2014;14:92. doi: 10.1186/1472-6947-14-92.
18. Pickering BW, Gajic O, Ahmed A, Herasevich V, Keegan MT. Data utilization for medical decision making at the time of patient admission to ICU. *Crit Care Med*. 2013;41(6):1502-10. doi: 10.1097/CCM.0b013e318287f0c0.
19. Barwise A, Caples S, Jensen J, Pickering B, Herasevich V. Information needs for the rapid response team electronic clinical tool. *BMC Med Inform Decis Mak*. 2017;17(1):142. doi: 10.1186/s12911-017-0540-3.
20. Malek-Hosseini SA, Habibzadeh F, Nikeghbalian S. Shiraz Organ Transplant Center: The Largest Liver Transplant Center in the World. *Transplantation*. 2019;103(8):1523-5. doi: 10.1097/TP.0000000000002581.
21. Reddivari S, Asaithambi A, Niu N, Wang W, Xu LD, Cheng J-RC. Ethnographic field work in requirements engineering. *Enterprise Information Systems*. 2017;11(1):137-59. doi: 10.1097/TP.0000000000002581
22. Sutcliffe AG. Requirements analysis for socio-technical system design. *Information Systems*. 2000;25(3):213-33. doi: 10.1016/S0306-4379(00)00016-8.

Appendix A: Average, frequency and percentage of data elements

Data Elements	Average	Extremely Useful frequency (%)	Very useful Frequency (%)	Moderately useful Frequency (%)	Slightly useful frequency (%)	Not Useful [frequency (%)	Number of responders(%)
Physiology (BP)	4.77	58(81.69)	10(14.08)	3(4.23)	0(0)	0(0)	71(1oo)
Physiology (HR)	4.66	52(73.24)	13(18.31)	4(5.63)	1(1.41)	0(0)	70(98.59)
Physiology (RR)	4.6	48(67.61)	16(22.54)	6(8.45)	0(0)	0(0)	70(98.59)
Laboratory (O2 saturation)	4.56	49(69.01)	14(19.72)	4(5.63)	3(4.23)	0(0)	70(98.59)
Physiology (GCS)	4.45	39(54.93)	25(35.21)	7(9.86)	0(0)	0(0)	71(100)
Laboratory (Hb)	4.21	36(50.70)	20(28.17)	7(9.86)	7(9.86)	0(0)	70(98.59)
Physiology (body temperature)	4.2	32(45.07)	23(32.39)	10(14.08)	4(5.63)	0(0)	69(97.18)
Score (EWS score)	4.17	36(50.70)	13(18.31)	17(23.94)	2(2.82)	1(1.41)	69(97.18)
Laboratory (Arterial blood gas)	4.13	33(46.48)	17(23.94)	17(23.94)	2(2.82)	1(1.41)	70(98.59)
Laboratory (blood gas)	4.1	33(46.48)	15(21.13)	18(25.35)	4(5.63)	0(0)	70(98.59)
Laboratory (K)	4.01	32(45.07)	18(25.35)	13(18.31)	6(8.45)	2(2.82)	71(100)
Laboratory (recent blood transfusion)	3.99	30(42.25)	18(25.35)	15(21.13)	8(11.27)	0(0)	71(100)
Physiology (urine output)	3.93	29(40.85)	16(22.54)	14(19.72)	10(14.08)	0(0)	69(97.18)
Laboratory (Glucose Level)	3.92	23(32.39)	21(29.58)	25(35.21)	2(2.82)	0(0)	71(100)
Laboratory (Platelet count)	3.75	24(33.80)	16(22.54)	19(26.76)	8(11.27)	2(2.82)	69(97.18)
Others(FiO2 or L/min oxygen flow)	3.74	10(14.08)	36(50.70)	16(22.54)	6(8.45)	0(0)	68(95.77)
Others (mode of ventilation(CPAP, BiPAP and/or oxygen))	3.73	14(19.72)	27(38.03)	25(35.21)	4(5.63)	0(0)	70(98.59)
Laboratory (WBC)	3.71	23(32.39)	21(29.58)	11(15.49)	13(18.31)	2(2.82)	70(98.59)
Allergy (medication administration list)	3.65	17(23.94)	22(30.99)	18(25.35)	10(14.08)	1(1.41)	68(98.77)
Laboratory (creatinine)	3.64	19(26.76)	20(28.17)	18(25.35)	10(14.08)	2(2.82)	69(97.18)
Investigations (Most recent chest x-Ray)	3.62	12(16.90)	28(39.44)	25(35.21)	4(5.63)	2(2.82)	71(100)
Laboratory (cross and match status)	3.62	21(29.58)	15(21.13)	23(32.39)	11(15.49)	1(1.41)	71(100)
Others(lines)	3.6	17(23.94)	18(25.35)	26(36.62)	8(11.27)	1(1.41)	70(98.59)
Demographics (Patient name)	3.57	14(19.72)	27(38.03)	16(22.54)	6(8.45)	5(7.04)	68(95.77)
Investigations (EF)	3.51	14(19.72)	29(40.85)	10(14.08)	10(14.08)	6(8.45)	69(97.18)
Demographics (reason for admission)	3.46	9(12.68)	36(50.70)	12(16.90)	4(5.63)	9(12.68)	70(98.59)
Laboratory (lactate)	3.43	19(26.76)	21(29.58)	11(15.49)	9(12.68)	10(14.08)	70(98.59)
Investigations (pulmonary function test)	3.41	15(21.13)	20(28.17)	22(30.99)	5(7.04)	8(11.27)	70(98.59)
Disposition status(transfer to ICU, death)	3.41	10(14.08)	18(25.35)	32(45.07)	8(11.27)	1(1.41)	69(97.18)
Investigations (Most recent ECG)	3.4	11(15.49)	19(26.76)	27(38.03)	13(18.31)	0(0)	70(98.59)
Past medical history (Problem list)	3.39	5(7.04)	28(39.44)	28(39.44)	10(14.08)	0(0)	71(100)
Allergy(allergy list)	3.35	10(14.08)	20(28.17)	25(35.21)	12(16.90)	2(2.82)	69(97.18)
MAP (mmHg)	3.3	13(18.31)	16(22.54)	19(26.76)	16(22.54)	3(4.23)	67(94.37)
Others(urinary catheter)	3.26	10(14.08)	21(29.58)	19(26.76)	17(23.94)	3(4.23)	70(98.59)
Past medical history (most recent ICU stay)	3.23	5(7.04)	19(26.76)	29(40.85)	12(16.90)	1(1.41)	66(92.96)
Past medical history (Most recent progress note)	3.22	6(8.45)	15(21.13)	37(52.11)	8(11.27)	2(2.82)	68(95.77)
Demographics (age/DOB)	3.03	4(5.63)	20(28.17)	25(35.21)	18(25.35)	4(5.63)	71(100)
Demographics (admission status(inpatient/outpatient))	2.93	0(0)	18(25.35)	33(46.48)	17(23.94)	3(4.23)	71(100)
Demographics (primary service (name and pager))	2.84	3(4.23)	10(14.08)	20(28.17)	12(16.90)	13(18.31)	69(97.18)
Demographics (location/room Number)	2.73	7(9.86)	13(18.31)	11(15.49)	13(18.31)	20(28.17)	71(100)
Demographics (Race)	2.73	3(4.23)	16(22.54)	28(39.44)	12(16.90)	12(16.90)	67(94.37)
Demographics (Nationality)	2.68	4(5.63)	14(19.72)	23(32.39)	15(21.13)	14(19.72)	69(97.18)