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Research Article

Digital Future of Emergency Medical Services: Envisioning and Usability of Electronic Patient Care Report System

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Despite the efforts of emerging technologies in the healthcare system, there is still a slower rate of acceleration in prehospital settings compared with the hospitals in digital transformation adaptation. The acknowledgment that digital transformation is significant to healthcare is reflected in planning for the future of digital healthcare. Thus, this study aimed to measure the usability of the electronic patient care report (ePCR) system among emergency medical services (EMS) staff who work in prehospital settings. A descriptive cross-sectional correlation study was used. Two hundred fifty EMS staff who are working in the prehospital setting at Saudi Red Crescent Authority in the Kingdom of Saudi Arabia were surveyed, and the response rate was 79.2% (198). An adapted tool of the Computer System Usability Questionnaire survey was used to collect data. The data were coded numerically and subjected to descriptive and inferential statistical analysis including Pearson's correlation coefficient using the statistical software (SPSS 21). The majority of the participants rate their ePCR system as "useable" at a high level with a score of 3.41 (SD = 1.021). The overall mean of the ePCR system's three subscales: system usefulness, information quality, interface quality, and overall satisfaction were 3.39 (SD = 1.152), 3.30 (SD = 1.052), 3.57 (SD = 1.064), and 3.37 (SD = 1.239), respectively. The least liked aspect of ePCR system software was information quality 81 (40.9%). Furthermore, there was a significant correlation between the age of EMS staff and the usability of the ePCR system ($r = -0.150^{*}$, $P = 0.035$). The results suggest that healthcare institutions' policy and decision-makers pay close attention to performing standardized training for the staff on their ePCR system before going to the field to increase efficiency and productivity. Furthermore, the users in this study identified other system features that, if included, could have enhanced usability, and improved functions and capabilities of the design to meet the EMS staff's expectations.

1. Introduction

Emergency medical services (EMS) is a national network of services organized to deliver prehospital emergency and medical support through healthcare professionals' teams since the initial response to definitive care [1]. During the coronavirus disease 2019 (COVID-19) pandemic, the need for EMS significantly increased, and EMS suffered increased call volumes compared with before the pandemic [2]. The COVID-19 pandemic has triggered a huge change in the healthcare system, which has wide consequences for EMS field practice. The community start to rely more than before on EMS in delivering prehospital care due to the risk of communicable diseases. The COVID-19 pandemic led to change in the field of EMS practice and allowed adaption to digital transformation in the prehospital settings [3]. The integration between EMS, emergency department (ED), and hospital data systems is becoming increasingly essential [4].

Digital transformation in the health sector is being driven by the demand to enhance healthcare quality and decrease costs while gaining the value and efficacy of emerging technology in providing patient care and staff performance [3, 5]. The acknowledgment that digital transformation is significant to healthcare is reflected in planning for the future of digital healthcare. Digital transformation in healthcare affords us a framework for breaking down the obstacles and delivering patient care at an accurate time [6, 7]. Moreover, the need for EMS patient care

information is probable to witness acceleration, with the value of this information for the community safety and healthcare system in efficient operations. Such information can add benefit to enhance the performance of EMS and patient outcomes [8]. Recent data reveals that high-quality EMS care enhances patient outcomes [9–11].

Like other healthcare providers, paramedics need to do patient assessments and management and it is important to document what they do for the patients. EMS teams can deliver essential information to ED staff while they are enroute to the hospital, such as the status of patients, vital signs, medications, and patient treatment [12, 13]. However, if this essential information is not received before arrival at the ED, the ED staff must use the paper-based patient care report (PCR), which might be difficult to read or find [14]. Recent studies revealed the usefulness of paramedic PCR for the ED staff in improving patient safety and flow [12].

The PCR in the prehospital setting includes demographic information, vital signs, a patient evaluation, and every intervention that the EMS provider accomplished. The PCR could be paper-based, electronic, or both. Many organizations use records from the PCR to track data such as survival rates, research, legal issues, billing, quality assurance, and improvement [15]. An electronic patient care report (ePCR) will guarantee much better accessibility of the data and assist in reducing the amount of entered duplicated patient information [16]. Moreover, in the case of a complaint, ePCR can offer evidence regarding interventions and patient outcomes in the prehospital setting [13, 17].

Prehospital care in the Kingdom of Saudi Arabia (KSA) is operated by the Saudi Red Crescent Authority (SRCA) [18, 19]. The SRCA recently introduced an ePCR system in KSA to serve society in the best way and to decrease the response time to emergency calls. This system was linked to hospitals, and it permits selecting the most suitable hospitals based on the patient cases. The ePCR system will participate in enhancing the efficiency of EMS and EDs by monitoring patients' interventions and conditions, giving a quick alert to health facilities, as well as supporting proactive decision-making for patient cases based on the type of emergency [20, 21].

The Saudi Arabia 2030 Royal Vision was formed around three themes: a vibrant society, a thriving economy, and an ambitious nation. A vibrant society is reinforced by empowering the community and healthcare system [22, 23]. A study conducted in Saudi Arabia revealed that there were important obstacles specified in the healthcare system, such as difficult access to health services. Therefore, different strategies were established to overcome these obstacles and improve the accessibility of healthcare services, especially EMS, by promoting related medical professions [23, 24]. Moreover, a study was conducted among 200 Saudi nationals in different learning organizations, healthcare, and government ministries located in Riyadh, Qassim, and Jeddah to assess factors that stand behind the acceptance of digital technologies. The study revealed that cybersecurity, trustworthiness, usage experience, and awareness among Saudi nationals are the main factors that stand behind Vision 2030's digital transformation. Therefore, the stakeholders need to implement an approach that considers usage experience, trust, and awareness among users [25].

The usability concept, in general, includes objective (e.g., learning rate) and subjective (e.g., satisfaction) outcome measures linked to performance [26]. The usability concept means that "the information delivered on/in an appropriate device/format." While when applied to health care, it means "the consisting of relevance accuracy and completeness, easy to use and organized" [7]. In ePCR, effectiveness means that it is easy to use to accomplish a specified aim. Also, efficiency means that the users can quickly achieve tasks, while satisfaction is correlated to the user's perception of effectiveness and efficiency [27]. A study conducted in Australia revealed that 98% of ED physicians and staff members would have preferred the ePCR [12].

The use of electronic medical records in Saudi Arabia is the topic of recent research. The researchers discovered that this ambitious goal still faces several challenges, such as the unfavorable views of some medical professionals toward electronic medical records systems. Poor computer literacy, a lack of system modification to meet hospital needs, and inadequate assistance and training from information technology staff are further impediments [28, 29]. The prehospital setting has been slower than hospitals in digital transformation [30]. The COVID-19 pandemic has triggered the need to adapt to digital transformation in the prehospital setting [3]. However, there are limited research concerning studying the technologies interaction of the EMS users [31]. Thus, our study aimed to measure the usability of the ePCR system among the EMS staff who work in prehospital settings at SRCA in the KSA and explore the association of ePCR system usability with age, level of education, years of experience, the type of training received in their ePCR system, and computer/Internet usage.

2. Methods

2.1. Study Design, Sample, and Setting. A descriptive cross-sectional correlation design was used to measure the usability of the ePCR system by the EMS staff and explore the association of ePCR system usability with age, computer/Internet usage, years of experience, and the type of training received on their ePCR system. The study was conducted from October 2021 to April 2022. Two hundred fifty EMS staff who are working in the prehospital setting at SRCA in KSA were surveyed. The inclusion criteria were the physicians, health assistants, administrators, and all levels of the EMS staff (basic, intermediate, and specialist).

The sample size was calculated using Cohen's 1992. One hundred participants will be needed depending on power $= 0.80$, alpha $(\alpha) = 0.05$, and medium effect size $= 0.25$. Oversampling will be utilized to minimize the dropout rate [32].

2.2. Instruments. This study utilized a two-part anonymous self-reported survey. Part one includes a demographic data page that contains questions designed to arouse information about participants' demographic characteristics, such as

their age, gender, level of education, job title, years of EMS experience, type of training received on ePCR systems, and computer/Internet usage.

The second part includes the computer system usability questionnaire (CSUQ) with a 5-point Likert-type response scale, ranging from "Strongly disagree" (1) to "Strongly agree" (5), and the higher scores specify a greater level of agreement. The CSUQ is a modified version of the poststudy system usability questionnaire (PSSUQ; Lewis, 1995). The current 16-item version of the CSUQ was used in this study. The CSUQ 16-items are divided into three subscales: system usefulness for items 1–6; information quality for items 7–12; interface quality for items 13–15; and overall satisfaction for item 16. The overall values of reliability and validity calculated for the questionnaires were 0.97 and 0.76, respectively [33–35]. In addition, there were two questions added (17 and 18) to list the most and least liked about this system software.

2.3. Measurement. The instrument's psychometric properties were translated from English to Arabic and back translated and used in a study in Kuwait. The study shows an overall Cronbach's alpha value of 0.964 and is highly satisfactory for construct validity and face validity [36]. In another study held in Jordan, the instrument was translated from English to Arabic and back translated and showed high internal consistency, with an overall Cronbach's alpha value of 0.956. In addition, the validity assessment revealed a high level of validity, where the scale-content validity index value was 0.931 and the scale-face validity index value was 0.975 [37].

A pilot study was conducted to examine the instrument's psychometric properties and the time needed to finish the survey. Reliability revealed an alpha coefficient of 0.961.

2.4. Ethical Considerations and Data Collection. This study was approved by the Institutional Review Board (IRB) of Imam Abdulrahman Bin Faisal University (IRB: 2021-03-404). The guidelines of the Declaration of Helsinki were followed in this study. Before enrollment, potential participants were informed about the risks and benefits of the study. Researchers explain the purpose of the study and that participation in the study is voluntary. Furthermore, all participants were informed about the anonymity and confidentiality issues and the option of voluntary termination at any time without any repercussions on their current or future work. If the participant gives his consent, then he/she will be enrolled in the study and asked to fill out the required surveys. With IRB's permission, the researcher seeks permission from the designated directors/managers to conduct the study. Completing and returning the survey implies the participant's consent to participate in the study.

2.5. Data Analysis. Data were analyzed using the statistical package for social science (SPSS) for windows version 21. Descriptive statistics (frequency and proportions) were used to describe the sample characteristics and other categorical variables. The Pearson correlation was used to measure the EMS staff usability of the ePCR system in correlation with age, level of education, years of experience, the type of training received on their ePCR system, and computer/Internet usage. Statistical significance was set at $P < 0.05$.

3. Results

A total of 250 questionnaires were distributed, and 198 (79.2%) were returned. The age of the majority of participants was more than 30 years old 128 (64.6%). Participants were predominately male 179 (90.4%), EMS specialist level 77 (38.9%), with a diploma degree 101 (51%) and had less than 6 years of experience in the profession 76 (38.4%). However, the study revealed that 138 (74.2%) of the participants had some training on their ePCR system, while 51 (25.8%) had none, and 130 (65.7%) of participants often use computer/Internet as shown in Table 1.

To measure usability, the survey relied on 16 questions adapted from the CSUQ. The questions focused on three domains related to interacting with the software in the field: system usefulness, information quality, and interface quality. The scores on each domain were used to calculate an overall usability score from one to five, with five being the highest. In addition, there were two questions added (17 and 18) to list the most and least liked about this system software. Moreover, we use 5 points-Likert scale which ranges from (1) up to (5) with an interval to describe the level of agreement as shown in Table 2 [38].

The overall mean ePCR system usability score was 3.41 (SD = 1.021), meaning that EMS staff rated their ePCR system as "useable" and considered a high level, since a high level interval (3.40–5) as shown in Table 2. The overall mean ePCR system usability scores for three subscales: system usefulness, information quality, interface quality, and overall satisfaction were 3.39 (SD = 1.152), 3.30 (SD = 1.052), 3.57 (SD = 1.064), and 3.37 (SD = 1.239), respectively, as shown in Table 3. The previous mean scores suggest that EMS staff rate their ePCR system subscales at a moderate level for system usefulness and information quality. Also, they rate the interface quality subscale at a high level. Moreover, as we mentioned previously in the method section, we added questions (17 and 18) to list the most and least liked about this system software. The results revealed that the least liked about the ePCR system usability software was information quality 81 (40.9%) as shown in Table 4. This reinforces the result that appeared in the questionnaire for the information quality subscale, as the participants gave it the lowest mean score {3.30 (SD = 1.052)}.

3.1. System Usefulness. The overall mean of the system usefulness subscale was 3.39 (SD = 1.152). Participants reported that the highest scores related to system usefulness were question number 5 and 2 "It was easy to learn to use this system" and "It was simple to use this system" with a mean of 3.61 (SD = 1.288) and 3.51 (SD = 1.237), respectively. Participants reported the lowest scores for question number 3 "I am able to complete my work quickly using this

Table 1: Demographic characteristics of participants. ($N = 198$).

	N	%
Age		
24 years old	22	11.1
24–30 years old	48	24.2
30 years old	128	64.6
Gender		
Male	179	90.4
Female	19	9.6
Level of education		
Less diploma degree	12	6.1
Diploma degree	101	51
Bachelor's degree	75	37.9
Higher degree	10	5.1
Job title		
Physician	15	7.6
EMS—specialist	77	38.9
EMS—intermediate	72	36.4
EMS—basic	6	3
Health assistance	11	5.6
Administrator	17	8.6
Professional experience		
6 years	76	38.4
6–12 years	68	34.3
12 years	54	27.3
Type of training		
No training	51	25.8
Classroom instruction, no software interaction	48	24.2
Classroom instruction, with software interaction	64	32.3
Instruction from a field training officer	35	17.7
Computer/Internet usage		
Often (4–7 days per week)	130	65.7
Occasional (1 − ≤ 3 days per week)	37	18.7
Rare (<1 day a week)	31	15.7

system," (3.19 (SD = 1.314)), and question number 6 "I believe I became productive quickly using this system" (3.30 (SD = 1.329)), question number 4 "I feel comfortable using this system" (3.36 (SD = 1.324)), and question number 1 "Overall, I am satisfied with how easy it is to use this system" (3.39 (SD = 1.273)), respectively, as shown in Table 3.

3.2. Information Quality. The overall mean of the information quality subscale was 3.30 (SD = 1.052). Participants reported that the highest scores related to information quality were question numbers 12 and 11. "The organization of information on the system screens is clear" and "The information is effective in helping me complete the tasks and scenarios" with a mean of 3.52 (SD = 1.265) and 3.40 (SD = 1.217), respectively. Participants reported the lowest scores for question number 8 "Whenever I make a mistake using the system, I recover easily and quickly" (3.08 (SD = 1.303)), question number 7 "The system gives error messages that clearly tell me how to fix problems" (3.23 (SD = 1.373)), question number 9 "The information (such as online help, on-screen messages, and other documentation) provided with this system is clear" (3.23 (SD = 1.305)), and question number 10 "It is easy to find the information I needed." (3.34 (SD = 1.275)), respectively, as shown in Table 3.

3.3. Interface Quality. The overall mean of the interface quality subscale was 3.57 (SD = 1.064). Participants reported that the highest scores related to interface quality were question numbers 13 and 14 "The interface of this system is pleasant" and "I like using the interface of this system," with a mean of 3.71 (SD = 1.132) and 3.62 (SD = 1.177), respectively. Participants reported the lowest scores for question number 15. "This system has all the functions and capabilities I expect it to have" [3.37 (SD = 1.231)] as shown in Table 3.

3.4. Relationship between Demographic Data and Usability of ePCR System among the EMS Staff. Results of the correlation coefficient between age, level of education, years of experience, the type of training received on their ePCR system, computer/Internet usage, and usability of the ePCR system among the EMS staff are given in Table 5.

There was an inverse and significant correlation between the age of the EMS staff and the usability of the ePCR system ($r = -0.150^{*}$, $P = 0.035$). There was a direct, weak, and nonsignificant correlation between level of education, the type of training received on their ePCR system {($r = 0.067$, $P = 0.347$), ($r = 0.137$, $P = 0.054$)}, respectively, and the usability of the ePCR system. Furthermore, the results showed an inverse and nonsignificant correlation between years of experience, computer/Internet usage {($r = -0.122$, $P = 0.087$), ($r = -0.063$, $P = 0.382$)}, respectively, and usability of the ePCR system as shown in Table 5.

4. Discussion

Users can best detect and articulate any inconsistencies between their workflow and a system's design. This will assist in achieving the primary objective of creating excellent health information systems which improve EMS field practice to enhance patient outcomes. This study aimed to measure the usability of the ePCR system among EMS staff who work in prehospital settings at SRCA in the KSA and explore the association of the ePCR system usability with age, level of education, years of experience, the type of training received in their ePCR system, and computer/Internet usage. In this study, the EMS staff rate their ePCR system as "useable" at a high level. Similarly, the majority of the EMS staff were moderately satisfied with system usefulness, information quality, and overall satisfaction. Our findings are consistent with [39, 40] studies. While contrary to our study's findings, other research has found low levels of satisfaction and usability issues with data entry, poor system support for workflow, and poor visual display [41, 42]. This might refer to the witness acceleration of technology, digital transformation, the increased use of smart applications, and society's acceptance of digital transformation compared to the past decades [3, 8, 23–25].

There was an inverse and significant correlation between the age of the EMS staff and the usability of the ePCR system. The results showed no significant correlation between the usability of the ePCR system and level of education, type of training, years of experience, as well as

Table 2: 5 points—Likert scale.

Likert scale	Interval	Difference	Description	Level
1	1.00–1.79	0.79	Strongly disagree	Low level
2	1.80–2.59	0.79	Disagree	
3	2.60–3.39	0.79	Neutral	Moderate level
4	3.40–4.19	0.79	Agree	High level
5	4.20–5.00	0.80	Strongly agree	

Table 3: Descriptive statistics for electronic patient care report system usability.

#	Statement		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std. Deviation	Rank
System usefulness										
1.	Overall, I am satisfied with how easy it is to use this system.	*N*	48	47	59	22	22	3.39	1.273	3
		%	24.2	23.7%	29.8%	11.1%	11.1%			
2.	It was simple to use this system.	*N*	49	63	41	29	16	3.51	1.237	4
		%	24.7%	31.8%	20.7%	14.6%	8.1%			
3.	I am able to complete my work quickly using this system.	*N*	40	43	58	28	29	3.19	1.314	3
		%	20.2%	21.7%	29.3%	14.1%	14.6%			
4.	I feel comfortable using this system.	*N*	51	41	61	18	27	3.36	1.324	3
		%	25.8%	20.7%	30.8%	9.1%	13.6%			
5.	It was easy to learn to use this system.	*N*	65	49	43	24	17	3.61	1.288	4
		%	32.8%	24.7%	21.7%	12.1%	8.6%			
6.	I believe I became productive quickly using this system.	*N*	46	49	48	29	26	3.30	1.329	3
		%	23.2%	24.7%	24.2%	14.6%	13.1%			
	Overall system usefulness subscale							**3.39**	**1.152**	**3**
Information quality										
7.	The system gives error messages that clearly tell me how to fix problems.	*N*	48	39	53	27	31	3.23	1.373	3
		%	24.2%	19.7%	26.8%	13.6%	15.7%			
8.	Whenever I make a mistake using the system, I recover easily and quickly.	*N*	38	32	66	32	30	3.08	1.303	3
		%	19.2%	16.2%	33.3%	16.2%	15.2%			
9.	The information (such as online help, on-screen messages, and other documentation) provided with this system is clear.	*N*	46	36	56	38	22	3.23	1.305	3
		%	23.2%	18.2%	28.3%	19.2%	11.1%			
10.	It is easy to find the information I needed.	*N*	45	50	50	33	20	3.34	1.275	3
		%	22.7%	25.3%	25.3%	16.7%	10.1%			
11.	The information is effective in helping me complete the tasks and scenarios.	*N*	42	56	60	20	20	3.40	1.217	4
		%	21.2%	28.3%	30.3%	10.1%	10.1%			
12.	The organization of information on the system screens is clear.	*N*	56	50	51	23	18	3.52	1.265	4
		%	28.3%	25.3%	25.8%	11.6%	9.1%			
	Overall information quality subscale							**3.30**	**1.052**	**3**
Interface quality										
13.	The interface of this system is pleasant.	*N*	59	60	52	17	10	3.71	1.132	4
		%	29.8%	30.3%	26.3%	8.6%	5.1%			
14.	I like using the interface of this system.	*N*	53	63	48	21	13	3.62	1.177	4
		%	26.8%	31.8%	24.2%	10.6%	6.6%			
15.	This system has all the functions and capabilities I expect it to have.	*N*	46	44	64	26	18	3.37	1.231	3
		%	23.2%	22.2%	32.3%	13.1%	9.1%			
	Overall interface quality subscale							**3.57**	**1.064**	**4**
16.	Overall, I am satisfied with this system.	*N*	41	55	63	15	24	3.37	1.239	3
		%	20.7%	27.8%	31.8%	7.6%	12.1%			
	Overall electronic patient care report system usability							**3.41**	**1.021**	**4**

"The bold values provided in this table are the overall mean and std. deviation for each system subscale."

computer/Internet usage. The results of this study are consistent with [39, 43, 44]previous studies except for the age variable. The age of the EMS staff in our study affected the staff usability of the ePCR system so that younger users were more satisfied than their older colleagues were. This might refer to the fact that the younger generation during and after the COVID-19 pandemic is experiencing a lot of cognitive, emotional, and social changes which make them more capable of thinking in a more sophisticated manner [3, 45].

Table 4: Descriptive statistics for the most and least liked about electronic patient care report system software.

Subscale	Most liked		Least liked	
	N	%	N	%
System usefulness	**87**	**43.9**	56	28.3
Information quality	66	33.3	**81**	**40.9**
Interface quality	45	22.7	61	30.8

"The bold values provided in this table are the higher number and percentage of the most and least liked about electronic patient care report system software selected by participants."

Table 5: The correlation between demographic data with usability of the ePCR system.

Demographic data	Mean ± SD	r	P value
Age	2.54 ± .688	−0.150*	.035
Level of education	2.42 ± .684	0.067	.347
Years of experience	1.89 ± .805	−0.122	.087
Type of training	2.42 ± 1.057	0.137	.054
Computer/Internet usage	1.50 ± .752	−0.063	.382

*. Correlation is significant at the 0.05 level.

The results of this study show that the majority of the EMS staff were moderately satisfied with the system usefulness subscale considered to be easy and simple to use. The results of our study are consistent with [39, 44, 46] studies. Contrarily, the results of other studies found low levels of satisfaction with system usefulness [40–42]. Participants in our study reported the lowest scores for question number 3, 4, and 6 (able to complete my work quickly, comfortable, and became productive quickly using this system), respectively. Furthermore, the majority of the EMS staff (74.2%) had some training on their ePCR system, while (25.8%) had none. This might refer to the fact that the participants need standardized and more training on their ePCR system to improve efficiency and productivity [47, 48].

Information quality is an important factor in the prehospital setting as it is one of the factors that determine the level of prehospital care. The results of this study show that the majority of the EMS staff were moderately satisfied with the information quality subscale considered to be clear and effective in helping them complete the tasks. The results of our study are consistent with [39, 44, 49] studies. Furthermore, participants in our study reported the lowest scores for question numbers 7, 8, 9, and 10 (fix error, correcting a mistake, online help, and finding needed information), respectively. Similarly, our findings were consistent with the [39] study in which the majority of users were not satisfied with notifications received about obvious issues, functionalities such as online help, presentation of notifications, and unclear messages. It seems from the previous studies that the information quality subscale needs improvement and was rated in our study as the least liked {81 (40.9%)} ePCR usability software, as shown in Table 4. Such information can be used to enhance the performance of EMS and patient outcomes [8].

Finally, unpleasant interface design can cause challenges in users' interaction with the system [50]. In this study the overall mean score of the interface quality subscale was 3.57 (SD = 1.064), meaning that the majority of the EMS staff rate their interface quality subscale as "useable" at a high level, since a high level interval (3.40–5) as shown in Table 2. The results of our study are consistent with [51, 52] studies in which the majority of participants agreed that the interface design system in their study was pleasant. Participants in our study reported that the highest scores related to interface quality were question number 13 and 14 (pleasant and they like using the interface of this system), respectively. Participants reported the lowest scores for question number 15 (functions and capabilities). However, the participants in our study detected aspects of the system that reduce usability because they are not consistent with the EMS staff's needs and expectations. Additionally, they identified other system features that, if included, could have enhanced usability. For example, the participants required the need for clear error messages together with guidance on how to fix them, providing information correlated to common tasks, and improving functions and capabilities of the design to meet the EMS staff's expectations. Earlier research [50, 53] has shown that similar modifications can enhance users' interactions with systems.

5. Limitations

Despite the significance of the study, some obvious limitations should be considered when interpreting the findings. The study only included a limited sample of the EMS personnel who work in prehospital settings, so the results may not be indicative of how the EMS personnel in other prehospital settings perceive the usability of the ePCR system. Additionally, this study was restricted to a government prehospital setting run by SRCA, which limits the findings' external validity. Additional studies with a larger sample size that are drawn from different prehospital environments should be included in future studies. To get a thorough grasp of the quality and utility of the ePCR system in Saudi Arabia, more descriptive studies are still required.

6. Conclusion

The EMS staff rate their ePCR system as "useable" at a high level by focusing on three crucial system features (system usefulness, information quality, and interface quality). Through assessment of ePCR systems from the point of view of their intended users, one can enhance features that are crucial for system usage but may have been missed by the designers, which in turn enhances the system's performance. The findings of this research shed light on the features of the system that are admired by users and facilitate easy interaction. This study also identified the systems' design flaws and the parts that users felt needed to be changed. The findings may be useful for system designers to create products that satisfy users' needs and for system clients to consider the design from the viewpoint of users when they invest in or buy a system. This research will introduce key aspects of the future of EMS digital transformation success in prehospital settings.

Based on the results, we advise healthcare institutions' policy and decision-makers to pay close attention to performing standardized training for the EMS staff on their

ePCR system before going to the field to increase efficiency and productivity. Furthermore, the users in this study identified other system features that, if included, could have enhanced usability. For example, the participants required the need for clear error messages together with guidance on how to fix them, providing information correlated to common tasks, and improving the functions and capabilities of the design to meet the EMS staff's expectations.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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