

# Development of an electronic medical records project for Al-Razi hospital in Palestine

Journal of Public Health Research  
2023, Vol. 12(4), 1–9  
© The Author(s) 2023  
DOI: 10.1177/22799036231217795  
journals.sagepub.com/home/phj



Doaa Neirat<sup>1</sup>, Ahmad Batran<sup>2</sup> and Ahmad Ayed<sup>3</sup> 

## Abstract

**Background:** Electronic medical records (EMR) are considered an important aspect to improve medical services provided to patients. The purpose of this study was to assess the development of an Electronic Medical Records Project for Al-Razi hospital in Palestine.

**Design and Methods:** The study was mixed method, qualitative and quantitative. The use of a questionnaire for the staff in the Al-Razi hospital and seven administrators' participants were meat as focus group.

**Results:** Approximately 136 participants in the study. The study findings reported that employees perceived the use of EMRs to have several benefits. The most common benefits include promoting patient safety culture and drug error reduction. In addition, the study findings reported that employees perceived the use of EMRs to have several challenges. The most common challenges include lack of knowledge and skill, insufficient time to use EMR, and limited of computers.

**Conclusions:** Health informatics brings various benefits to the healthcare system. Some participants believed that the EMR system would improve patient care and it will improve patient satisfaction.

## Keywords

Electronic medical record, Al-Razi Hospital, implementation, benefits, challenges

Date received: 3 August 2023; accepted: 14 November 2023

## Introduction

The implementation of electronic medical records (EMRs) in medical practice has seen substantial growth in recent years. EMRs offer a valuable opportunity to enhance patient surveillance and assess the provision of services that may contribute to improvements in health policy and promotion.<sup>1</sup> This technology-based improvement is shown to increase the flow of information and make coordination between patient care teams more efficient.<sup>2</sup>

Implementation of the EMR is also seen as a promising information technology (IT) approach for enhancing the quality of health care.<sup>3</sup> This is due to the competence of the EMR system to address a vast volume of information and data within the health system and thereby meet the diverse needs of clinical, organizational, and health care administration.<sup>4</sup>

Primary clinical care and population health have common objectives to improve the health of individuals and families, but they rarely establish meaningful partnerships

to improve the well-being of both patients and populations.<sup>5,6</sup> Changing health goals includes adaptive systems. For most healthcare providers, EMR allows simple access to medical records, and while the importance of EMR in clinical environments is not to be underestimated, the technological requirements for health information are continually evolving.<sup>7</sup>

The sharing of data presents a new level of complexity. A recent international comparative study on the use of EMR for research showed that the procedures for governance of information, the level of adoption, and the time required to

<sup>1</sup>Faculty of Graduate Studies, Arab American University, Palestine

<sup>2</sup>Faculty of Allied Medical Sciences, Department of Nursing, Palestine Ahliya University, Bethlehem, Palestine

<sup>3</sup>Faculty of Nursing, Arab American University, Bethlehem, Palestine

### Corresponding author:

Ahmad Ayed, Faculty of Nursing, Arab American University, Nablus 00970, Palestine.

Email: ahmad.juma@aaup.edu



receive consent differed significantly across countries.<sup>8</sup> Established systems for data analysis frequently lack coordination and efficient interconnectivity within departmental and hospital systems, causing difficulties in the analysis and interpretation of patient outcomes, especially in relation to a specific population or community.<sup>9,10</sup>

The issue facing health practitioners is that as EMR systems expand, there is an increasing danger that the most vulnerable populations will be left behind in delivering effective healthcare and health strategies. Although government hospitals have been leading the way in implementing the EMR, little is known about the success and efficacy of similar information systems in private hospitals such as Al-Razi Hospital. Understanding the progress made and the processes by which EMR is applied to various settings in private hospitals offers practitioners the opportunity to learn useful lessons and implement effective systems to support and enhance individual and community wellbeing. Therefore, this study was to assess the development of an Electronic Medical Records Project for Al-Razi Hospital in Palestine.

## Healthcare services in Al-Razi hospital

In Al-Razi hospital, the health care system is heavily dependent on the paper recording method, and the information is transmitted by fax, email, or telephone. In some cases, the reports and the results of the analysis are conveyed by the patient. However, healthcare services rely on the accuracy and quality of the available data. Patients do not realize that this paper system can be plagued by complications, including duplication of medical services, medical errors, and unwanted or lengthy delays due to missing or incomplete information.

## Method

This exploratory research was carried out using mixed methods (quantitative and qualitative) in the period between June and October 2020. The study was conducted in Al-Razi Hospital in Jenin, Palestine. It includes 90 beds, and the occupancy rate is 55%.

## Study population

The sample of the study was all employees (206), and it included doctors of medicine, administration, IT services, nursing, and technicians at Al-Razi hospital. The inclusion standard was for full-time employees, and trainees or students were excluded.

## Instrument

The questionnaire was developed by the researcher after critically reviewing previous studies.<sup>11,12</sup> The first section

was demographic data such as gender, age, educational qualifications, years of experience, and field of work. The second section is composed of 29 items, distributed across four domains: general opinions about EMR issues, Efficiency domain, effectiveness domain, and Challenges domain. These domains included phrases that asked participants to rate their agreement using a 5-point Likert scale, which ranged from “strongly agree,” “agree,” “neutral,” “disagree,” and strongly disagree.

The questionnaire was sent to five experts in health informatics and IT to check the validity and wording of the phrases. The experts made their comments, and the researcher made a modification.

The reliability of the instrument was estimated in this study using the Cronbach alpha coefficient (Cronbach alpha). The study's alpha Cronbach was calculated for the total scale (29 items) at 0.90 and for each subscale at 0.80 and above.

The qualitative part was conducted with seven participants as a focus group, and they include the medical director, laboratory director, director of the department of Radiology, Matron of nursing, director of the Computer department, director of human resources, and director of medical records and public relations. The meeting took 1 h, and it was recorded. The meeting consisted of 10 questions, four of them job-related, and six of them related to the EMR system's advantages, disadvantages, and barriers.

## Data collection

After receiving approval from the Al-Razi Hospital administration to distribute the questionnaire, the researcher distributed the questionnaires to the employees. The questionnaires were completed within 5–10 min. The questionnaires were distributed during the COVID-19 pandemic, so the researcher was compliant with strict health protocols such as wearing a facemask and gloves and adhering to sterilization.

## Ethical consideration

The researcher obtained ethical approval from the Arab American University and permission from Al-Razi Hospital to conduct the study. The data that is essential for research purposes was collected, and informed consent has been obtained from the participants. To protect the confidentiality of sensitive information about individuals participating in the research, actual names were not used (anonymity), and participants were informed that they didn't need to answer any questions they didn't want answered and that they could withdraw at any time from the study.

## Data analysis

The quantitative part is the data analyzed by the statistical analysis program Statistical Package of Social Science

**Table 1.** Distribution of socio demographic variables among participants (N = 136).

Characteristics		M (SD)	n (%)
Age		35.8 (10.6)	
Gender	Male		72 (52.9)
	Female		64 (47.1)
Level of education	Secondary Certificate		3 (2.2)
	Diploma		38 (27.9)
	Bachelor		73 (53.7)
	Higher Diploma		2 (1.5)
Experience	Higher Education		20 (14.7)
	Less than a year		9 (6.6)
	1–5 years		61 (44.9)
Computer skills	more than 5 years		66 (48.5)
	Yes		7 (5.1%)
Profession	No		129 (94.9%)
	Nurse		60 (44.1%)
	physicians		20 (14.7)
	laboratory technicians		13 (9.6)
	pharmacists		3 (2.2)
	IT technicians		5 (3.7)
	administrators		21 (15.4)
Radiologist		14 (10.3)	

M: mean; SD: standard deviation.

(SPSS). Mean, standard deviation, frequency, and percentage were used. In the qualitative part, data were coded and analyzed according to theme.

## Results

One hundred thirty-six out of 206 questionnaires (66.0% response rate) were completed.

### Participants' characteristics

The analysis showed that the mean age of nurses was 35.8 (SD = 10.6) years. With regard to gender, more than half of the participants, 72 (52.9%), were male. Also, approximately 73 (53.7%) had a bachelor's degree, and about 66 (48.5%) had >5 years of experience. The majority of the participants didn't have computer science skills; 129 (94.9%) and 60 (44.12%) of them were nurses, as seen in Table 1.

### Opinions and attitudes toward the EMR

The analysis revealed that 82 (60.3%) reported agree and 39 (28.7%) strongly agree that use of an EMRS would improve patient care. According to Patient Satisfaction, the analysis illustrated that of 70 (51.5%) reported agree and 42 (30.9%) strongly agree that the introduction of

EMR will improve patient satisfaction. Approximately, 64 (47.1%) of the respondents reported agree and 39 (28.7%) strongly agree that Physicians' satisfaction is very important to the success or failure of the proposed EMR system. Also, 80 (58.8%) reported agree and 42 (30.9%) strongly agree that EMR will promote improved clinical processes.

The respondents' attitude to how an EMR system can reduce medical errors 74 (54.4%) reported agree and 45 (33.1%) strongly agree. Of 64 (47.1%) agree and 34 (25.0%) strongly agree considered that an EMR system in the long term would reduce the cost of patient record. The analysis of the respondents' answers showed that of the 74 (54.4%) agree and 47 (34.6%) strongly agreed that importance of training for the introduction of EMR. There were 72 (52.9%) respondents reported agree and 51 (37.5%) strongly agree that there should be a standard terminology for all records in the system, as seen Table 2.

### Main effects of EMR and its advantages

The analysis revealed that 28 (20.6%) reported agree and 89 (65.4%) strongly agree that EMR will contribute in promoting patient safety culture. Also, 66 (48.5%) reported agree and 40 (29.4%) strongly agree that the introduction of EMR will contribute in reducing malpractice in terms of diagnoses and treatment. Approximately, 70 (51.5%) reported agree and 46 (33.8%) strongly agree that EMR will improve accuracy compared with handwriting. Sixty-nine (50.7%) reported agree and 44 (32.4%) strongly agree that EMR will reduce Malpractice resulted from lack of line clarity in comparison with hand-writing. In addition, 79 (58.1%) reported agree and 42 (30.9%) strongly agree that EMR will help in determining patient's identity.

About reducing the occurrence of errors in drug ordering by showing drug interactions and contradictions, 82 (60.3%) reported agree and 35 (25.7%) strongly agree. Of 77 (56.6%) agree and 48 (35.3%) strongly agree considered that an EMR will improve data safety and medical information and protects data from being lost. Sixty seven (49.3%) agree and 47 (34.6%) strongly agreed that EMR will reduce time spent in diagnoses and documentation. There were 76 (55.9%) reported agree and 48 (35.3%) strongly agree that EMR will contribute to the process of filling out forms and meets the necessary information from patients easily. Seventy-one (52.2%) reported agree and 50 (36.8%) strongly agree that EMR will facilitate the process of communication and arrangements between different staff members. Also, 74 (54.4%) reported agree and 53 (39.0) strongly agree that EMR will facilitate the process of communication and arrangements between different departments. Eighty-three (61.0%) reported agree and 43 (31.6%) strongly agree that EMR will contribute in accessing medical registry very easily. Approximately, 81

**Table 2.** Respondents opinions and attitudes toward the EMR (N= 136).

#	Statement	Strongly disagree n (%)	Disagree n (%)	No opinion n (%)	Agree n (%)	Strongly agree n (%)
1	Do you agree that an EMR will improve patient care?	3 (2.2)	3 (2.2)	9 (6.6)	82 (60.3)	39 (28.7)
2	Do you think that an EMR will increase patient satisfaction?	2 (1.5)	4 (2.9)	18 (13.2)	70 (51.5)	42 (30.9)
3	Do you agree that an EMR will increase physician satisfaction?	3 (2.2)	11 (8.1)	19 (14.0)	64 (47.1)	39 (28.7)
4	Do you agree that an EMR will promote improved clinical processes?	1 (0.7)	1 (0.7)	12 (8.8)	80 (58.8)	42 (30.9)
5	Do you think that an EMR will reduce medical errors and improve patient safety?	3 (2.2)	8 (5.9)	6 (4.4)	74 (54.4)	45 (33.1)
6	Do you think in the long term that an EMR will reduce healthcare costs?	4 (2.9)	10 (7.4)	24 (17.6)	64 (47.1)	34 (25.0)
7	Do you agree that training program would be an advantage?	2 (1.5)	3 (2.2)	10 (7.4)	74 (54.4)	47 (34.6)
8	Do you think there should be a standard terminology for all records in the system?	2 (1.5)	4 (2.9)	7 (5.1)	72 (52.9)	51 (37.5)

(59.6%) reported agree and 41 (30.1%) strongly agree that EMR will prevents data and patients documents from loss, as seen Table 3.

### Users' perceptions toward the challenges of implementation EMR

The analysis revealed that 70 (51.5%) reported agree and 38 (27.9%) strongly agree that there are limited number of (PC) in departments compared to the workload. Also, 72 (52.9%) reported agree and 36 (26.5%) strongly agree that there are lack of Knowledge and skills in using EMR. Approximately, 57 (41.9%) reported agree and 28 (20.6%) strongly agree that there are lack of confidence and capabilities of EMR. Also, 66 (48.5%) reported agree and 30 (22.1%) strongly agree that there are lack of awareness and Knowledge of the importance and usefulness of EMR. In addition, 55 (40.4%) reported agree and 39 (28.7%) strongly agree that there are Lack of training for the staff to use EMR. Of 52 (38.2%) agree and 29 (21.3%) strongly agree considered that there are Lack of support and empowerment from Management. Furthermore, 48 (35.3%) reported agree and 38 (27.9%) strongly agreed that there are lack of financial resources to implementation EMR. According to insufficient time for using EMR due to workload and shortage of staff, 71 (52.2%) reported agree and 35 (25.7%) strongly agree, as seen Table 4.

### Qualitative part

#### Attitudes toward the implementation of an EMR

When conducting the meeting, the opinions of the heads and directors of the departments were taken about the number of computers in the departments, and the answer was that the numbers were sufficient. In addition to their experiences using the computer, the respondents agreed that most of them have computer skills.

#### Advantages of EMR System

Everyone agreed that the system will help in saving time, speed in performance, and easy communication between departments, accuracy, security, saving costs, as they mentioned that it is better than the manual system in keeping records and will develop patient care. Other advantages of EMR as mentioned are the provision of spaces that are used for keeping manual records .One respondent said *"Reduce space that is used to save paper files, as there are approximately 50,000 files."*

Administrator emphasized the importance of access to information and said,

*"I am with any update, so that there is no paper on the office that the electronic system facilitates access to any information I want."* Another one said *"Ease of extracting*

**Table 3.** The main effects of EMR and its advantages by respondents (N = 136).

#	Statement	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
1	It will contribute in promoting patient safety culture.	2 (1.5)	4 (2.9)	13 (9.6)	28 (20.6)	89 (65.4)
2	It will contribute in reducing malpractice in terms of diagnoses and treatment.	5 (3.7)	8 (5.9)	17 (12.5)	66 (48.5)	40 (29.4)
3	It will improve accuracy compared with handwriting.	5 (3.7)	3 (2.2)	12 (8.8)	70 (51.5)	46 (33.8)
4	It will reduce Malpractice resulted from lack of line clarity in comparison with hand-writing	6 (4.4)	2 (1.5)	15 (11.0)	69 (50.7)	44 (32.4)
5	It will help in determining patient's identity in terms of: Full Name and ID Card No, which helps in reducing errors in ordering lab tests, medications and therapeutic procedures accurately.	4 (2.9)	3 (2.2)	8 (5.9)	79 (58.1)	42 (30.9)
6	It will reduce the occurrence of errors in drug ordering by showing drug interactions and contradictions.	3 (2.2)	5 (3.7)	11 (8.1)	82 (60.3)	35 (25.7)
7	It will improve data safety and medical information and protects data from being lost.	1 (0.7)	1 (0.7)	9 (6.6)	77 (56.6)	48 (35.3)
8	It will reduce time spent in diagnoses and documentation	3 (2.2)	4 (2.9)	15 (11.0)	67 (49.3)	47 (34.6)
9	It will contribute to the process of filling out forms and meets the necessary information from patients easily.	2 (1.5)	2 (1.5)	8 (5.9)	76 (55.9)	48 (35.3)
10	It will facilitate the process of communication and arrangements between different staff members (Medical, Medical Support and Administrative etc. . . .)	1 (0.7)	1 (0.7)	13 (9.6)	71 (52.2)	50 (36.8)
11	It will facilitate the process of communication and arrangements between different departments (Medical, Paramedical and Administrative etc. . . .)	2 (1.5)	0 (0.0)	7 (5.1)	74 (54.4)	53 (39.0)
12	It will contribute in accessing medical registry very easily.	2 (1.5)	0 (0.0)	8 (5.9)	83 (61.0)	43 (31.6)
13	It will prevent data and patients documents from loss.	4 (2.9)	1 (0.7)	9 (6.6)	81 (59.6)	41 (30.1)

**Table 4.** Users' Perceptions toward the challenges of implementation EMR (N = 136).

#	Statement	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
1	Limited number of PCs in departments compared to the workload	1 (0.7)	8 (5.9)	19 (14.0)	70 (51.5)	38 (27.9)
2	Lack of Knowledge and skills in using EMRS	2 (1.5)	11 (8.1)	15 (11.0)	72 (52.9)	36 (26.5)
3	Lack of confidence and capabilities of EMRS	2 (1.5)	16 (11.8)	33 (24.3)	57 (41.9)	28 (20.6)
4	Lack of awareness and Knowledge of the importance and usefulness of EMRS	1 (0.7)	11 (8.1)	28 (20.6)	66 (48.5)	30 (22.1)
5	Lack of training for the staff to use EMRS	2 (1.5)	13 (9.6)	27 (19.9)	55 (40.4)	39 (28.7)
6	Lack of support and empowerment from Management in terms of reinforcement, monitoring, orientation, etc. . . in the implantation of EMRS.	4 (2.9)	13 (9.6)	38 (27.9)	52 (38.2)	29 (21.3)
7	Lack of financial resources to implementation EMRS	0 (0.0)	11 (8.1)	39 (28.7)	48 (35.3)	38 (27.9)
8	Insufficient time for using EMRS due to workload and shortage of staff.	2 (1.5)	8 (5.9)	20 (14.7)	71 (52.2)	35 (25.7)

the results of previous analyzes for comparison with the current result, as in the paper file it is difficult to refer to previous documents.”

The respondents confirmed the EMR system's ability to raise the level of confidentiality of patient data by specifying the powers and information that are allowed for each user. As one of respondent noted “You cannot enter to the patient's medical file except for the one who has authority, thus increasing the privacy of patient information and increasing patients' confidence in the health institution it was also commented on the importance of the EMR in saving time and effort.”

It was also commented on the importance of the EMR in saving time and effort, one said “in the electronic medical record The method of dealing between departments is easy, for example, if I want a hardcopy test result from the laboratory to the men's department, I will have to send a reporter to bring it, But if the system is electronic, the results of the medical examination will be recorded on the computer, it will save time, effort and manpower.”

Some also mentioned that the system will reduce medical errors resulting from the lack of clarity of handwriting, and they agreed that the solution to this problem is the EMR, as it will always be clear and readable to all. It also contains alerts to avoid medical errors, such as an allergy to a drug or interactions between prescribed medications.

“The electronic medical record implement for patient safety, for example, if the patient forgets that he has an allergy to a specific drug, the electronic record gives an alert, so this reduces medical errors”

One of the benefits that have been mentioned is the increase in work accuracy in the health institution, as one responded stated “The electronic system works to raise the level of accuracy in the work, as the human has more errors than the machine.”

In addition, the EMR system helps in obtaining information remotely and browsing it by more than one doctor at the same time.

### Barriers of implementation an EMR system

One respondent stated “Any system has disadvantages, but the EMR system has advantages more than disadvantages. Example of this disadvantages, we can lose information if the program is exposed to viruses, so we must make a backup copy to avoid this problem.” Another one said “Any system in beginning stage will have technical barriers such as internet problems and power failure, this is will effect on EMR.” Some of the respondents mentioned that the cost is also a problem, as they need equipment and training programs for employees to use the system. All respondents emphasized the importance of the training program on the system to ensure that it is used with the desired effectiveness. “There is a problem with experience in dealing with computerized systems, but it can be overcome by training programs, and these programs will increase costs.”

However, one said *“Elderly doctors may be against using the system.”*

### **The difficult issue of changing to EMR**

The employees will face some anxiety in general when change from a paper to an electronic system, but as mentioned previously, with training and practice, the person becomes more familiar with new system, then they will notice the benefits of quick and easy access to patients record, avoiding the spaces used for storing paper files, and reducing medical errors. Some of the respondent indicated the costs that the system needs at the beginning of its implementation, including the costs of appointing new skilled staff, networks cost, and equipment. One said *“We need new staff, for example, each department needs a medical secretary to enter patient information, in addition to the costs of the equipment and networks that we will need.”*

In addition to that, the culture of accepting change by staff and patients, as some patients can only trust on the paper copies to keep it, a respondent pointed out that *“People until now are not convinced about electronic system, they always go against technology, and they are only convinced by the hard copy.”*

At the end of meeting, some of the respondents concluded their remarks that there will be difficulties in the beginning of implementing the system. Acceptance of the system also varied from enthusiasm to anxiety. They were enthusiastic about the benefits that the system would provide, in addition to their concern about the difficulties previously mentioned during the transfer from the manual system to the electronic.

## **Discussion**

### **Quantitative part**

In general, the attitudes of Al-Razi hospital employees are in favor of adopting EMRs. Similar results were supported by the Alzobaidi et al. study conducted, which indicated that the attitudes of Saudi physicians at Al-Hada Military Hospital toward computerization of medical records were excellent.<sup>13</sup> Also, a study conducted on physicians in South Africa revealed similar results.<sup>14</sup> Moreover, similar results were reported in the Yehualashet et al. study, which reported that more than half (56.1%) of health professionals working in the Ayder Referral Hospital, Ethiopia, had a good attitude toward EMR.<sup>15</sup>

This would help to boost a sense of psychological ownership of new systems, resulting in greater support for technological change as well as harnessing their expertise and experience, thereby avoiding the development of an EMR that is neither feasible nor acceptable for use.<sup>16–18</sup>

On the other hand, this study was inconsistent with Al-Mujaini et al.'s study, which was conducted to evaluate the knowledge, attitude, and practice of physicians toward

the EMR system.<sup>19</sup> Majority of the respondents had a negative perception of EMR.

Moreover, an international survey involving 45 countries from different settings found a negative perception and low satisfaction with EHR in 67% of respondents, citing issues such as poor usability, limited functionality, and a lack of user training.<sup>20</sup>

The study findings reported that employees perceived the use of EMRs to have several benefits. The most common benefits include promoting a patient safety culture and reducing drug errors. These findings are consistent with other studies. Health informatics and health IT are continually evolving to make the existing EHR better by incorporating more functions such as clinical decision support system (CDSS) tools, CPOE systems, and health information exchange (HIE) to support physicians in reducing medical errors and increasing patient safety.<sup>21</sup>

In a study conducted by King et al. and colleagues, it was noted that the majority of physicians in the USA perceived the EHR to be useful in ambulatory care practice due to its benefits in enhancing overall patient care, enabling access to patient data remotely, and reducing medical errors.<sup>22</sup>

Also, a cross-sectional study conducted by Kutney-Lee and Kelly found that Nurses working in hospitals with basic EHRs consistently reported that poor patient safety and other quality outcomes occurred less frequently than reported by nurses working in hospitals without an EHR.<sup>23</sup>

On the other hand, this study was inconsistent with Barkley et al.'s results, which found that implementation of an EMR did not reduce overall medication error reporting rates. This difference may be due to the limited experience of a single institution and a single type of EMR.<sup>24</sup>

Despite the positive effects of EMR usage in medical practices, the adoption rate of such systems is still low and meets resistance from physicians. This systematic review reveals that physicians may face a range of barriers when they approach EMR implementation.<sup>25</sup>

The study findings reported that employees perceived the use of EMRs to have several challenges. The most common challenges include a lack of knowledge and skill, insufficient time to use EMR, and limited computers.

These findings are supported by other studies. A literature review indicated that the most important factor in implementing the EHR is resistance to change, while another literature review revealed that the primary barriers were user resistance, a lack of skills, and a lack of administrative and policy support.<sup>26,27</sup>

Another cross-sectional study conducted by Aloba et al. in Nigeria indicated that the most common challenges were, poor internet, information overload, power outages, and incomplete information in 65.7%, 62.9%, 37.1% respectively.<sup>28</sup>

On the other hand, the most frequently mentioned barriers were regarding cost, technical concerns, technical support, and resistance to change.<sup>29</sup>

## Qualitative part

Two main themes related to the administrators' perceptions of EHRs emerged. These included the perceived benefits of EHRs and the perceived barriers to their adoption and use.

### Perceived benefits of EMR

The respondents perceived that the use of EMRs had several benefits. These included using EMRs to make workflow more efficient, and the system will help in saving time, speeding up performance, and facilitating easy communication between departments. It will also improve accuracy and security, save costs, and improve patient care. These findings are consistent with other studies.

King et al. and colleagues noted that the majority of physicians in the USA perceived the EHR to be useful in ambulatory care practice due to its benefits in enhancing overall patient care, enabling access to patient data remotely, and reducing medical errors.<sup>22</sup> Further, Tharmalingam et al. reported that healthcare professionals in Canada perceived the interconnected EHRs to be valuable in improving the quality of care since they enable access to medical data at any point of care.<sup>30</sup> Thus, the positive perception of an EHR by healthcare professionals in Gulf Cooperation Council (GCC) countries identified in this review could be attributed to the perceived benefits of an EMR. Krousel-Wood et al. similarly found a positive association between EHR benefits and perceptions of the EMR.<sup>31</sup> These findings suggest that healthcare providers in the GCC countries have positive perceptions of EMRs due to their potential benefits; thus, they are more likely to adopt the system, which would increase its adoption and use in healthcare.

### Perceived barriers to EMR adoption

The respondents' perceptions of EMR barriers were associated with issues such as technical problems and costs in general. Some participants believed that the EMR system was complex and lacked computer knowledge and skill.

According to the EMR literature, early strategies to train health providers to use EMR are important and must be tailored to their knowledge, competence, and motivation during the transition from a paper-based system to EMR. Technical support from IT departments and EMR professional teams should be ongoing after EMR implementation.<sup>32</sup>

The respondents believed that the employees have low levels of computer knowledge, so system designers should develop a system that is easy to use for everyone in healthcare organizations.<sup>33</sup> According to the literature, the greater the perceived ease of use of EMRs by healthcare providers, the greater the user adoption of the system.<sup>34</sup>

## Study limitations

Work pressure in some departments did not allow the participants to complete the questionnaire, such as the emergency department. In addition to that, leave for employees was also one of the obstacles that faced the research, which led to a lack of full coverage for employees during the implementation of this study. Moreover, a self-reported questionnaire is a hindrance in itself. Finally, the questionnaires were distributed during the period of the Coronavirus pandemic, which limited the number of participants.

## Conclusion

The study confirmed that perceived benefits play a positive role in the users' adoption of the system. The employees believed that EMR could improve patient safety culture, reduce malpractice, and improve accuracy. Also, perceived difficulty can have a negative impact on user adoption of the EMR.

The administrators' perceived that EMR barriers were associated with issues such as technical problems and costs in general. Some participants believed that the EMR system was complex and lacked computer knowledge and skill. The study recommended establishing an integrated electronic health system at the level of Palestine to assist in the exchange of information between governmental and private health institutions by giving a unified health number to every citizen, provide distinctive integrated health services, and reduce the use of the paper system. In addition to facilitating the work of studies and statistics. Also, holding training courses for employees on the system and ensuring the continuation of these courses and upgrading them in line with the continuous development of technology. Furthermore, infrastructure support for the hospital departments is necessary to ensure continuity of periodic maintenance for devices and the network.

## Acknowledgments

The authors would like to express their thanks to the employees of Al-Raze hospital who participated in the study

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iD

Ahmad Ayed  <https://orcid.org/0000-0003-2164-8183>



## References

- Danciu I, Cowan JD, Basford M, et al. Secondary use of clinical data: the Vanderbilt approach. *J Biomed Inform* 2014; 52: 28–35.
- Evans WK, Ashbury FD, Hogue GL, et al. Implementing a regional oncology information system: approach and lessons learned. *Curr Oncol* 2014; 21(5): 224–233.
- Gastaldi L, Lettieri E, Corso M, et al. Performance improvement in hospitals: leveraging on knowledge asset dynamics through the introduction of an electronic medical record. *Meas Bus Excell* 2012; 16(4): 14–30.
- Reina R, Cristofaro C, Lacroce A, et al. Managing the knowledge interdependence with electronic medical record. *Meas Bus Excell* 2012; 16(4): 31–41.
- Chambers EC, Wong BC, Riley RW, et al. Combining clinical and population-level data to understand the health of neighborhoods. *Am J Public Health* 2015; 105(3): 510–512.
- MacGregor JC and Wathen CN. My health is not a job': a qualitative exploration of personal health management and imperatives of the 'new public health. *BMC Public Health* 2014; 14(1): 1–0.
- Doyle P. EMRs and capture solutions: the total cost of system ownership. *Health Manag Technol* 2017; 38(4): 17.
- van Velthoven MH, Mastellos N, Majeed A, et al. Feasibility of extracting data from electronic medical records for research: an international comparative study. *BMC Med Inform Decis Mak* 2016; 16(1): 90–0.
- Kimura M, Croll P, Li B, et al. Survey on medical records and EHR in Asia-Pacific region: languages, purposes, IDs and regulations. *Methods Inf Med* 2011; 50(4): 386–391.
- Peeters JM, Krijgsman JW, Brabers AE, et al. Use and uptake of eHealth in general practice: a cross-sectional survey and focus group study among health care users and general practitioners. *JMIR Med Inform* 2016; 4(2): e11.
- Batran A, Al-Humran SM, Malak MZ, et al. The relationship between nursing informatics competency and clinical decision-making among nurses in West Bank, Palestine. *Comput Inform Nurs* 2022; 40(8): 547–553.
- Baniode M and Hamdan M. Users' Perspectives on the Computerized Health Management Information System in the Ministry of Health Hospitals in the West Bank-Palestine. Mohammad Baniode; 2014 Oct 19.
- Alzobaidi H, Zolaly E, Sadeq B, et al. Attitudes toward implementing electronic medical record among Saudi physicians. *Int J Med Sci Public Health* 2016; 5(6): 1244.
- Lakbala P and Dindarloo K. Physicians' perception and attitude toward electronic medical record. *Springerplus* 2014; 3(1): 63–68.
- Yehualashet G, Asemahagn M and Tilahun B. The attitude towards and use of electronic medical record system by health professionals at a referral hospital in northern Ethiopia: cross-sectional study. *J Heal Inform Afr* 2015; 3(1): 19–29. DOI: 10.12856/JHIA-2015-v3-i1-124
- Paré G, Sicotte C and Jacques H. The effects of creating psychological ownership on physicians' acceptance of clinical information systems. *J Am Med Inform Assoc* 2006; 13(2): 197–205.
- O'Donnell A, Kaner E, Shaw C, et al. Primary care physicians' attitudes to the adoption of electronic medical records: a systematic review and evidence synthesis using the clinical adoption framework. *BMC Med Inform Decis Mak* 2018; 18(1): 1–6.
- Trudel MC, Marsan J, Paré G, et al. Ceiling effect in EMR system assimilation: a multiple case study in primary care family practices. *BMC Med Inform Decis Mak* 2017; 17: 46–54.
- Al-Mujaini A, Al-Farsi Y, Al-Maniri A, et al. Satisfaction and perceived quality of an electronic medical record system in a tertiary hospital in oman. *Oman Med J* 2011; 26(5): 324–328.
- Topaz M, Ronquillo C, Peltonen L, et al. Nurse informaticians report low satisfaction and multi-level concerns with electronic health records: results from an international survey. In: AMIA Annual Symposium Proceedings 2016, Vol. 2016. American Medical Informatics Association.
- Menachemi N and Collum TH. Benefits and drawbacks of electronic health record systems. *Risk Manag Healthc Policy* 2011; 4: 47–55. DOI: 10.2147/RMHP.S12985
- King J, Patel V, Jamoom EW, et al. Clinical benefits of electronic health record use: national findings. *Health Serv Res* 2014; 49(1 Pt 2): 392–404.
- Kutney-Lee A and Kelly D. The effect of hospital electronic health record adoption on nurse-assessed quality of care and patient safety. *J Nurs Adm* 2011; 41(11): 466–472.
- Barkley JE, Valdez AB, Coonrod DV, et al. The effect of electronic medical record adaptation on reported medication errors in peripartum care areas. *Int J Womens Health* 2017; 2(2): 1–4.
- Boonstra A and Broekhuis M. Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC Health Serv Res* 2010; 10(1): 1–7.
- Ajami S and Bagheri-Tadi T. Barriers for adopting electronic health records (EHRs) by physicians. *Acta Inform Med* 2013; 21(2): 129–134.
- Gesulga JM, Berjame A, Moquiala KS, et al. Barriers to electronic health record system implementation and information systems resources: a structured review. *Procedia Comput Sci* 2017; 124: 544–551.
- Alobo IG, Soyannwo T, Ukponwan G, et al. Implementing electronic health system in Nigeria: perspective assessment in a specialist hospital. *Afr Health Sci* 2020; 20(2): 948–954.
- Kruse CS, Kristof C, Jones B, et al. Barriers to electronic health record adoption: a systematic literature review. *J Med Syst* 2016; 40: 252–257.
- Tharmalingam S, Hagens S and Zelmer J. The value of connected health information: perceptions of electronic health record users in Canada. *BMC Med Inform Decis Mak* 2016; 16(1): 1–9.
- Krousel-Wood M, McCoy AB, Ahia C, et al. Implementing electronic health records (EHRs): health care provider perceptions before and after transition from a local basic EHR to a commercial comprehensive EHR. *J Am Med Inform Assoc* 2018; 25(6): 618–626.
- Xiao L, Cousins G, Courtney B, et al. Developing an electronic health record (EHR) for methadone treatment recording and decision support. *BMC Med Inform Decis Mak* 2011; 11(1): 5–0.
- Rogers WA and Fisk AD. Toward a psychological science of advanced technology design for older adults. *J Gerontol B Psychol Sci Soc Sci* 2010; 65B(6): 645–653.
- Tubaishat A. Perceived usefulness and perceived ease of use of electronic health records among nurses: application of technology acceptance model. *Inform Health Soc Care* 2018; 43(4): 379–389.